UNIVERSIDAD AUTÓNOMA DE MADRID

FACULTAD DE CIENCIAS ECONÓMICAS Y EMPRESARIALES

DEPARTAMENTO DE ESTRUCTURA ECONÓMICA Y ECONOMÍA DEL DESARROLLO

ECONOMIC DISPARITIES IN SOUTH AMERICA: NEW HISTORICAL EVIDENCE ON IMMISERIZING GROWTH

DOCTORAL DISSERTATION

D. DANIEL HERNÁN VEDIA JEREZ

Madrid, junio de 2012

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Madrid, junio de 2012

Esta Tesis es el resultado de mi investigación doctoral sobre el crecimiento económico en América del Sur y abarca el periodo que comprende los 50 últimos años en la evolución económica de la región. La Tesis está estructurada básicamente en 6 capítulos. El primero y el segundo se dedican a la Introducción y a la teoría económica del crecimiento empobrecedor, el tercero, cuarto y quinto se centran en el análisis los determinantes y las disparidades del crecimiento económico, así como las perturbaciones macroeconómicas que se originaron, y el sexto y último capítulo exponen las conclusiones y recomendaciones de política económica. La Tesis ha sido dirigida y coordinada por los profesores Coro Chasco y José María Mella.

AGRADECIMIENTOS

A la profesora Coro Chasco, que ha leído cuidadosamente numerosos borradores de mis capítulos, anotándolos con muchas y excelentes sugerencias. Su consejo y aliento durante todo el proceso es agradecido, sobre todo por sus valiosas contribuciones, el apoyo general, la paciencia y la ayuda, también cuando las cosas eran difíciles.

También gracias al profesor José María Mella por su continuo apoyo, entusiasmo, paciencia, y las grandes discusiones mantenidas sobre la Tesis han sido una valiosa fuente de información e ideas. Sin mis dos directores, este proyecto hubiera sido imposible.

Me gustaría destacar la generosidad recibida, tanto en tiempo como en calidad, de los Profesores José Vicéns Otero y Javier Alfonso Gil, así como de otros miembros de la Facultad, por su apoyo y estimable ayuda en la consecución de la Tesis.

Me gustaría ofrecer mi especial agradecimiento al profesor Joan Rosés por cambiar el curso de mi formación intelectual con su amistad y apoyo. No hubiera podido avanzar sin su guía detallada e intelectual durante las etapas iniciales de la Tesis doctoral.

Todo el proceso ha sido una experiencia totalmente transformadora para mí y estoy muy agradecido. Me gustaría dar las gracias al profesor Pablo Astorga (Oxford Economics) por sus comentarios y constructivas sugerencias sobre varios borradores de los capítulos. También al profesor Patricio Aroca (Universidad Católica del Norte), por sus valiosos comentarios en la revisión final.

Mucha gente me ha proporcionado ayuda y apoyo en la realización de esta Tesis. Digna de especial mención Luis Bértola (Universidad de la República, Uruguay), Pipa Norris (Universidad de Harvard y la Universidad de Sidney), Jeffrey Williamson (Universidad de Harvard), Gabriel Loza Tellería (Ex-Gobernador del Banco Central de Bolivia y Universidad Católica Boliviana), César Yunis (Banco Central del Paraguay), Stella Maris Zoppi (Ministerio de Economía y Finanzas Públicas de Argentina) y Eliana Carvidón (Banco Central del Uruguay).

Por último, doy las gracias a Zhang Kecheng (Universidad Renmin de China), por su excelente asistencia y sugerencias.

En un nivel más personal, muchos estarán en mi memoria, especialmente Coro Chasco y Pedro Chasco, con los que he compartido y he sido testigo de su trabajo, dedicación y ejemplo, que constituirán una referencia para mí de admiración y gratitud. Gracias a Pedro Chasco, que me enseñó detalladamente a trabajar con los datos y las fuentes estadísticas.

También quiero expresar mi agradecimiento especial para dos personas, porque si no lo hiciera, me traicionaría a mí mismo y mi convicción de que sin personas como éllos, yo no podría haber logrado este sueño. Tengo una deuda de afecto con éllos y son parte de este logro, Joan Rosés y José Luis Díez Pérez. En particular, agradezco al Profesor José Luis Díez, por su constante apoyo y por estar ahí todo el tiempo, sobre todo en los últimos meses que fueron difíciles para mí, creando una atmósfera de amistad y confianza en la que el trabajo duro, se hizo fácil.

Por último, agradezco toda la cooperación y la amistad de muchos otros colaboradores, que creyeron en mí, en especial a todo el equipo del Instituto Lawrence R. Klein, y el apoyo del Departamento de Estructura Económica y Economía del Desarrollo (Universidad Autónoma de Madrid).

DEDICACIÓN MUY ESPECIAL

Esto es para, Magda, Gualberto y Paco, que se sacrificaron para que yo pudiera obtener la mejor educación posible, gracias por su apoyo todos estos años y por su confianza en mis capacidades para terminar esta tarea con éxito. Le debo un agradecimiento especial a mi madre por su paciencia y cuidado. Sentí su presencia todos los días a pesar de que estaba a kilómetros de distancia. Agradezco a mis hermanos, Víctor, Horacio y Mattias, por nuestras alegres conversaciones y por compartir sus interesantes experiencias que han sido siempre un placer escuchar. Por último, dedico esta Tesis a todos los miembros de mi familia con mi más profundo respeto y agradecimiento.

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Introducción

Los mecanismos de desarrollo económico y crecimiento a largo plazo son una preocupación central para los economistas del desarrollo. Recientemente varios estudios sobre el comercio internacional han salido a la luz considerándolo como un sub-campo importante del crecimiento económico. No obstante, el debate sigue abierto, a pesar de algunas investigaciones anteriores que demostraron la existencia de una relación positiva entre la apertura en la política comercial y el crecimiento económico; aunque no hay una evidencia concluyente que apoye esta afirmación.

Al mismo tiempo, los países en desarrollo se han ido haciendo cada vez más vulnerables a las fuerzas que emanan fuera de sus fronteras. El resultado de haber respondido de manera tan diferente sirve como evidencia para demostrar que las decisiones de las políticas nacionales son un factor importante del crecimiento económico.

El crecimiento económico a largo plazo se ha convertido en un tema importante en los debates académicos y en una prioridad para el diseño de la política económica. De esta manera, el bienestar económico también ha sido un objetivo fundamental de la historiografía de América del Sur, donde el bajo crecimiento, el retraso económico, la desigualdad en los ingresos, sus particulares instituciones socioeconómicas y su geografía han sido considerados como impedimentos para el desarrollo social y económico de la región.

El desarrollo económico en América del Sur no ha sido muy elevado a lo largo de las décadas. La región es menos competitiva que sus principales socios comerciales; además, la desigualdad de ingresos se ha incrementado y conduce a conflictos sociales y económicos entre la población.

Desde la década de 1930 a finales de la década de 1970, la política económica de América del Sur se ha caracterizado por un modelo de sustitución de importaciones. La crisis de la deuda de los ochenta y las reformas del mercado de los noventa pusieron fin a la endémica inestabilidad macroeconómica a través de la diversificación de exportaciones y una mayor disciplina fiscal y monetaria. Sin embargo, el crecimiento económico sostenido en economías más abiertas todavía no se ha materializado. Varios estudios académicos sobre el desarrollo de América del Sur, coinciden en señalar a la herencia colonial al proceso de construcción de las naciones, en el siglo XIX, como las causas internas principales del subdesarrollo moderno.

La evidencia empírica reciente demuestra que el fracaso de la región en el logro del crecimiento económico se puede atribuir a una serie de distorsiones económicas derivadas de ciertas decisiones políticas desafortunadas. Durante el período de la posguerra, las estrategias de desarrollo de América Latina difirieron sustancialmente de las de otras regiones en desarrollo (por ejemplo, Asia Oriental); a partir de entonces, las economías de América del Sur experimentaron un proceso divergente. Los dos principales pilares de la industrialización por sustitución de importaciones (ISI) hicieron hincapié en la industrialización a través de la intervención gubernamental y de obstáculos al comercio.

La región siguió y profundizó esta política de industrialización en la década de 1950 y comienzos de 1960, y la mayoría de las economías continuaron con la sustitución de importaciones hasta finales de los ochenta. Ya entonces se preveía que una política restrictiva de largo plazo traería distorsiones macroeconómicas para la región; el desempeño económico fue visto como decepcionante, las oscilaciones económicas persistieron e incluso empeoraron (Elias, 1990; Díaz Alejandro, 1984, Cardoso y Fishlow, 1992). Es evidente que las distorsiones tenían raíces institucionales y permitieron su prolongada ineficiencia y su supervivencia a lo largo de los años.

En un contexto de recesión mundial, durante los noventa, América Latina llevó a cabo reformas de mercado que terminaron con la inestabilidad macroeconómica a través de la diversificación de exportaciones, la disciplina fiscal y monetaria y una política más orientada hacia el exterior. Sin embargo, durante las últimas dos décadas, las tasas de crecimiento no han convergido en comparación con otras regiones del mundo (Rodrik, 1997).

La literatura sobre comercio internacional y el crecimiento económico ha considerado y estudiado en detalle los efectos externos que perjudican al crecimiento: los choques exógenos y las políticas industriales erróneas que redujeron el crecimiento. Nuestra investigación se basa, en parte, en los trabajos de Bhagwati (1958, 1968 y 1969) y Johnson (1967), que señalaron que los shocks exógenos y las políticas incorrectas tienen efectos adversos sobre el crecimiento; y también, se basa en los estudios de crecimiento sobre la identificación de los obstáculos a la acumulación de capital (Kuznets (1963), Abramovitz (1986), Grossman et al. (1994), Hall and Jones (1999), etc.].

La abundancia de los recursos naturales juega un factor influyente en el crecimiento económico y los ingresos públicos. Estos ingresos económicos adicionales representan una fuente importante para las finanzas gubernamentales. De esa manera, la dependencia de las exportaciones de materias primas representa un riesgo importante por la volatilidad de los precios y, en gran medida, por las condiciones externas favorables, como la demanda de los principales países emergentes e industriales. Por lo tanto, los países en desarrollo se enfrentan al riesgo y la incertidumbre por la volatilidad de los precios, que afecta a los gastos del gobierno y otras importantes variables macroeconómicas (Mendoza, 1995). Ampliando el alcance de nuestro análisis, también se aborda la explotación de los recursos naturales en los países sudamericanos, que es un tema recurrente, tanto en los debates políticos y en el análisis empírico (Blattman et al, 2007; Frankel, 2010).

Recientemente, la literatura económica ha estudiado el rol de las instituciones económicas como una de las causas del atraso de los ingresos, Aunque los factores económicos convencionales no han sido ignorados, la literatura ha puesto en relieve las condiciones importantes para fortalecer el crecimiento económico: los derechos de propiedad, la estructura del sector financiero y la inversión en infraestructura pública y capital humano (North, 1981, 1993).

Por otro lado, las características institucionales son difíciles de cambiar, ya que las políticas gubernamentales y las propias instituciones se tienden a reproducir; por ejemplo, en aquellas sociedades en las que se produjo una gran desigualdad económica, las élites crearon aquellos marcos legales que les garantizaban una parte desproporcionada del poder político y de los ingresos (Acemoglu et al., 2001; 2003).

SUPUESTOS

Toda la teoría económica depende de supuestos que no funcionan perfectamente; sin embargo, la formulación de hipótesis es inevitable y éstas no deberían ser sensibles a cambios bruscos en los factores y en las decisiones de los agentes económicos.

La mayor parte de este trabajo está basada en un modelo de crecimiento a largo plazo basado, el modelo de Harrod-Domar,[1] pero excluimos el supuesto de que los factores productivos tienen las proporciones fijas a lo largo del tiempo; si bien,

[1] Ver por ejemplo, (Lucas (1988), Romer (1990), Grossman et al. (1994) entre otros.

consideramos que la estructura económica podría fluctuar principalmente en el medio y largo plazo por las políticas económicas. La tesis parte de un doble punto de vista teniendo en cuenta la teoría del comercio internacional y las teorías del crecimiento elaboradas por Jagdish Bhagwati y Johnson N. Harry. El primero estudia los efectos exógenos en el crecimiento económico; en particular, asociados con la volatilidad de los términos de intercambio. El segundo punto está relacionado con la presencia de barreras comerciales y distorsiones en el crecimiento, asumiendo que las políticas proteccionistas tienen un efecto negativo preponderante en el desarrollo económico.

Los capítulos siguientes cubren una amplia gama de temas económicos de crecimiento (instituciones económicas, globalización) que avanzan en un marco unificado motivado por una serie de preferencias comunes y preocupaciones para las economías de América del Sur. En consecuencia, este trabajo muestra un enfoque macroeconómico para señalar ciertos aspectos de la economía política de la región, considerando los factores exógenos, la conexión entre la apertura comercial y el crecimiento económico y el papel de la estabilidad macroeconómica en la acumulación de capital.

Otro factor importante es la política gubernamental que tiene un papel transcendental en estimular el desarrollo económico, más allá de permitir que los mercados funcionen correctamente a través de las finanzas públicas, el desarrollo de normas y la seguridad institucional; sin embargo, ésta podría afectar negativamente el crecimiento económico. Este enfoque contrasta con una perspectiva alternativa a través de la elección de las políticas proteccionistas y la búsqueda de rentas relacionadas con la industrialización por sustitución de importaciones (ISI) en América Latina.

PRINCIPALES OBJETIVOS

El principal objetivo de la tesis es el desarrollo de una extensión empírica sobre la teoría del crecimiento empobrecedor para América del Sur, en busca de los factores de crecimiento económico a largo plazo y el estudio de los impactos que sobre el crecimiento tienen las distorsiones macroeconómicas de políticas económicas. De esta manera, se propone alcanzar los siguientes objetivos que se desarrollarán en forma de documentos académicos.

1. Buscar los factores de crecimiento económico a largo plazo, proporcionando una evaluación del desarrollo económico de América del Sur durante los últimos 48 años. La parte empírica se concentrará en la determinación de las principales fuentes de crecimiento en una muestra representativa de países, estudiando dos factores importantes: (a) las influencias inmediatas y mensurables, que se reflejan en las cuentas de crecimiento y (b) las otras influencias macroeconómicas (es decir, las instituciones económicas y distorsiones macroeconómicas), que son más difíciles de medir.

2. Analizar de forma individual la evolución del crecimiento del ingreso per cápita y de los principales determinantes de crecimiento económico para las economías nacionales; además, presentamos mediante un análisis cuantitativo la formación de clústeres (agrupación de países) en la dinámica del crecimiento en América del Sur.

3. Considerar el costo de las políticas de sustitución de importaciones en el crecimiento económico de América del Sur. Por lo tanto, se construye un índice de distorsiones macroeconómicas (IMD) para medir la relación entre las perturbaciones macroeconómicas y el crecimiento económico. De hecho, creemos que las políticas anti-crecimiento (instituciones) ayudan a explicar el bajo rendimiento del crecimiento económico.

LA METODOLOGÍA

Este estudio se basa estrictamente en el análisis económico neoclásico, considerando los fenómenos sociales como una suma de individuos y de decisiones (consumidores, productores, inversores, políticos, etc.), que interactúan entre sí y actúan bajo las restricciones de las instituciones de su entorno socio-económico. Encontramos este marco analítico como una herramienta de gran alcance para la organización de nuestras ideas sobre asuntos económicos.

De esa manera, enfatizamos la importancia de una lectura cuidadosa de los resultados empíricos. En particular, nuestras interpretaciones están basadas en una comprensión sólida de los acontecimientos históricos y recientes de América del Sur. En ese sentido, esta investigación es sensible en cuanto al tipo de pruebas presentadas, ya que nos enfrentamos a las limitaciones de acceso y disponibilidad a la hora de los datos históricos. De esta manera, teniendo en cuenta nuestra base de

datos, creemos que el uso de modelos de datos de panel ofrece resultados más fiables en cuanto a la estimación de modelos de crecimiento.

- **Viabilidad y Fuentes**

Este estudio utiliza la literatura moderna del desarrollo económico, la economía internacional y la historia económica. Además, usa métodos cuantitativos y econométricos; para tal fin, los datos macroeconómicos proporcionan información útil sobre la que se basa este tipo de análisis. El empleo del análisis econométrico permite identificar ciertos aspectos de la economía institucional y política que afectan a la estructura y el crecimiento económico.

El estudio abarca el período 1960 a 2008 en gran parte del análisis y el espacio económico de la mayoría de los países de América del Sur[2]: Argentina, Bolivia, Brasil, Chile, Colombia, Ecuador, Paraguay, Perú, Uruguay y Venezuela. Este período abarca la etapa principal de la política de sustitución de importaciones. La amplia cobertura del periodo también considera las variaciones más importantes en las exportaciones de materias primas, precios de las materias primas y ciclos políticos en la región. Los resultados han sido corroborados con la literatura del crecimiento económico y comercio internacional, y contrastadas con información específica de otros estudios empíricos. Por lo tanto, el uso de estas diferentes fuentes nos permite la reconstrucción de los hechos históricos en el período analizado.

Las fuentes principales de este estudio son las series históricas individuales de cada país de América del Sur, además de libros y revistas de economía internacional, desarrollo económico y de historia económica. El proyecto es viable, puesto que ya hemos recogido y estudiado parte de las fuentes en anteriores investigaciones.

- **La base de datos de la historia económica**

Para el análisis del impacto de los factores institucionales, la acumulación de capital (físico y humano), la inversión extranjera, el crecimiento económico y otros indicadores de desempeño económico, es importante tener en cuenta una serie de tiempo prolongada. De hecho, al observar los cambios durante un largo período de

[2] Para estos países, hemos recogido un conjunto de datos que incorpora más de 400 observaciones anuales que cubren una amplia gama de sistemas políticos, instituciones, tipos de cambio y demás circunstancias históricas. Las fuentes de datos, que normalmente son específicas para cada país se detallan en el Anexo.

tiempo, los efectos a corto plazo y los ciclos económicos que afectan desproporcionadamente a las economías se reducirán. Por otro lado, es probable que los cambios en el marco institucional tengan efectos retardados debido a la tardía respuesta de las variables socioculturales y de los agentes. El período anual utilizado en la base de datos nos permite un estudio más profundo de la relación a largo plazo entre las instituciones e indicadores económicos.

El trabajo econométrico tiene dos características novedosas. En primer lugar, se beneficia de una nueva base de datos a largo plazo que hace posible la construcción de un modelo de datos de panel de amplia muestra, que incluye un gran número de factores del crecimiento durante el período 1960-2008. La elección del período es determinada en gran medida por la disponibilidad de datos y se hizo un gran esfuerzo para incluir aquellos países menos desarrollados de la región (Bolivia, Ecuador y Paraguay). Estamos seguros de que este periodo de tiempo es el adecuado para la captura de efectos a largo plazo. En segundo lugar, este estudio trata de comprender la relación entre las instituciones, la política económica y las perturbaciones macroeconómicas, para lo cual existe un vacío en la literatura empírica para estas economías en desarrollo.

- **Introduciendo las Instituciones**

Un factor importante que ha impedido un mejor desarrollo de las instituciones en la evidencia empírica es la dificultad de medir y la introducción de estas. De esta forma, muchos investigadores han enseñado que las instituciones son en realidad variables endógenas que reflejan diversas influencias históricas[3] y culturales a través del tiempo. Sin embargo, uno de los problemas en las series de tiempo, es la falta de información histórica y las variables socioculturales que cambian con el tiempo.

De esta manera, consideramos otras variables de interés (el crecimiento económico, el comercio y la calidad institucional) que muestran patrones de variabilidad. Utilizando la metodología mencionada anteriormente, la estimación de datos de panel proporciona algunas luces sobre la importancia de estos factores en el modelo econométrico; por ejemplo, encontramos que la política económica y los

[3] Estadísticamente, el uso de variables proxy proporcionan un método alternativo para tratar con el problema de endogeneidad en las estimaciones de corte transversal. De esta manera, Acemoglu et al, (2001) utilizan las tasas de mortalidad de las ex colonias (durante el periodo colonial) como un instrumento para la calidad institucional. Hall y Jones (1999) utilizan la fracción de la población que hablan inglés y otras lenguas europeas como instrumentos para las instituciones.

factores institucionales, así como la estabilidad macroeconómica y el grado de apertura explican las bajas tasas de crecimiento de las economías de América del Sur. Sin embargo, los flujos de capital y la acumulación de capital físico tienen un efecto preponderante en el crecimiento económico.

LA ESTRUCTURA DE LA TESIS

La primera parte estará dedicada a resumir la teoría del crecimiento empobrecedor, el rol de las instituciones en el crecimiento económico y la agrupación espacial (Capítulo 2). Un capítulo posterior analiza los principales factores de crecimiento económico en la región; sobre todo, para señalar la importancia de las instituciones, la acumulación de capital humano y otras variables fundamentales en el crecimiento económico. El diagnóstico gira en torno a los factores principales del crecimiento que se ven limitados por la falta de capital físico y humano, las diferencias en el marco institucional y la presencia de distorsiones macroeconómicas de la inversión que afectan el crecimiento económico.

El capítulo cuarto analiza por separado la evolución del crecimiento del ingreso per cápita de las economías nacionales en el largo plazo (1960-2008) para la mayoría de las economías de América del Sur. Además, se realiza un análisis cuantitativo para exponer la formación de clústeres (agrupación de países) en la dinámica del crecimiento de la región. Asimismo, se estudian dos sub-períodos (1960-1982 y 1983-2008), teniendo en cuenta diversas variables, diferenciando entre diferentes dinámicas de crecimiento en América del Sur antes de 1980 y después de las reformas estructurales de los noventa. El capítulo quinto estudia el efecto de políticas incorrectas sobre el crecimiento. Taylor (1998) y otros historiadores económicos consideran que la estrategia de industrialización por medio la sustitución de importaciones se determinó como una respuesta a la crisis económica de la posguerra, y que fue muy influenciada por la herencia institucional. Con el fin de estimar los costos económicos y los impactos de la ISI, se construye un índice de perturbaciones macroeconómicas (IMD), utilizando la metodología del índice de distancia de Pena (DP2) empleando un importante grupo de variables macroeconómicas. Por último, se estima el impacto del Índice de Distorsiones Macroeconómicas (IMD) en la acumulación de capital físico y el crecimiento económico.

Finalmente, el capítulo sexto concluye considerando los principales hallazgos de la Tesis. Considerando los patrones de la teoría del Crecimiento empobrecedor que pueden ser encontrados en América del Sur, incluyendo en detalle los resultados de los capítulos anteriores, los determinantes del crecimiento a largo plazo, la evidencia de factores macro nacionales que explican disparidades en el ingreso y, finalmente, los impactos y costos económicos de la política de industrialización (ISI) sobre el crecimiento económico. Posteriormente, se desarrolla una sección delimitada sobre las principales recomendaciones de política económica en la materia.

Chapter 1

Introduction

The mechanisms of economic development and long-run growth have always been a central concern to development economists. Recently several studies on international trade have come to the fore considering it as an important subfield of economic growth. Although right now, the openness debate remains very much alive, despite previous research asserting a positive link between openness in trade policy and economic growth, there is no conclusive evidence to support such a claim.

At the same time, countries have become increasingly vulnerable to forces emanating from outside their borders. The fact that they have responded so differently serves as an evidence to show that national policy choices are one important determinant of economic growth.

Ensuring long-run economic growth has become an important issue in academic debates and a priority for sound economic policy design. In that way, economic welfare in the long-run has also been an essential focus of the Latin American historiography, where slow growth, relative economic retardation, income inequality, and its institutional endowments and geographical features, have been seen as having important implications for institutional, social, and economic development in the region.

From the 1930s to the final of the 1970s, South American economic policy was characterized by an inward-looking model. The 1980s debt crisis and the market reforms of the 1990s put an end to endemic macroeconomic instability through export diversification and stronger fiscal and monetary discipline. However, the promise of a new period of sustained economic growth in more open economies has yet to materialize. The regional analysts were passionate with South American development failure. In particular, the colonial heritage and nineteenth-century nation building were always viewed as an underlying cause of modern underdevelopment.

Recent empirical evidence have come close to point out that the region's failure to achieve economic growth may be attributable to an array of economic distortions deriving from unfortunate policy choices. During the postwar period, the development strategies pursued by Latin America differed substantially from other developing regions (i.e. East Asia). Thereafter, Latin American economies were on a divergent path. The two main pillars of the import substitution industrialization (ISI) were emphasized upon industrialization through governmental intervention and barriers to trade.

The region followed the inward-looking policies in the 1950s and early 1960s, and most South American economies continued to pursue import substitution until the early 1980s. It was foreseen that a long-run restrictive policy will bring macroeconomic distortions for the region; the economic performance was seen as disappointing and economic twists persisted and even worsened (Elias, 1990; Diaz Alejandro, 1984; Cardoso and Fishlow, 1992). It is clear that distortions had institutional roots and allowed its marked inefficiency and their survival over the years.

Against a background of global recession, during the early 1990s, Latin America implemented market reforms that ended with macroeconomic instability through export diversification, fiscal and monetary discipline and a more outward-oriented policy. However, during the last two decades, GDP growth rates have not converged compared to other world regions, Rodrik (1997).

The literature on international trade and economic growth has considered and studied in detail the trade or external effects that hurt growth, exogenous shocks, and mistaken industrialization policies that reduced the country's real income. Our research is partly based on the seminal works of Bhagwati (1958, 1968, and 1969) and Johnson (1967) that pointed out that external shocks and misguided policies have adverse effects on income growth; and is based too, in the growth classic tradition of Kuznets and Abramovitz, identifying the obstacles to capital accumulation as the main growth culprit.

The abundance of natural resources plays an influential factor on economic growth and government revenues. These additional economic revenues represent an important source for public finances. The dependence on commodities exports presents important risks due to the volatility of prices; and the heavily reliance on favorable external conditions like the demand by major emerging and industrial countries. Therefore, developing countries face risk and uncertainty by the volatility of prices that affects government expenditure and other important macroeconomic variables (Mendoza, 1995). Widening the scope of our analysis, the concern of land wealth on South American countries is a recurring theme both in policy discussions and in empirical analysis (Blattman et al., 2007; and Frankel, 2010).

Recently, the economic literature studied the role of institutions as causes for output backwardness, although the conventional economic factors have not been ignored, the literature has highlighted significant conditions for strengthen economic

growth such as: property rights, the financial sector structure, investment in public infrastructure and human capital (North 1981, 1993). Institutional characteristics are difficult to change, because government policies and the institutions themselves tend to reproduce them (e.g. in those societies that began high inequality, elites established legal frameworks that warranted them disproportionate shares of political power and revenues) (Acemoglu et al., 2001; 2003).

ASSUMPTIONS

All theory depends on assumptions which don't work perfectly. Although formulating assumptions is inevitable, these must not be sensitive to abrupt changes of the economic factors and the decisions of economic agents.

The bulk of this dissertation is devoted to a long-run growth model based on the Harrod-Domar assumptions, excluding that productive factors have fixed proportions through time, since we consider that the economic structure could fluctuate mainly by economic policies.

The dissertation starts out from a double point-of-view considering the international trade and economic growth theories by Jagdish N. Baghwati and Harry Johnson. The first one studies the exogenous effects on economic growth specifically associated with the terms of trade volatility. The second point is linked with the presence of trade barriers and distortions on growth, assuming that protectionism policies have a preponderant negative effect on economic growth.

The following chapters cover a range of economic topics —growth, institutions, globalization. They advance under a unified framework for a number of common predilections and preoccupations of South America's economies. Consequently, this dissertation will show a macroeconomic focus to pinpoint certain aspects of the political economy of the region, considering exogenous factors, the connection between trade openness and economic growth, and the role of macroeconomic stability in capital accumulation.

Another important illustration comes from the government policy that has an important role in stimulating economic development, beyond enabling markets to function correctly through public finances, the development of rules and institutional security; however, it could negatively affect economic growth. This view is contrasted with an alternative perspective, the choice of protectionist policies and rent-seeking behavior related with the Import substitution industrialization (ISI) in Latin America.

MAIN OBJECTIVES

The main objective of the thesis is to develop an empirical extension about the inmiserizing growth theory for South America, looking for the long-run determinants of economic growth and studying the impacts of macroeconomic distortions of misguided economic policies. In that way, we propose to achieve the following objectives that will be developed in the form of academic documents:

1. To seek for the long-run determinants of economic growth, providing an assessment of South America's economic performance during the past 48 years. The empirical part will concentrate on determining the main sources of growth in a cross-section of countries, studying two main factors: (a) proximate and measurable influences, which are captured in the growth accounts and (b) potential influences (i.e. institutional economics and macroeconomic distortions), which are more difficult to measure.

2. To analyze individually the growth accounting of GDP per capita and main growth determinants for national economies; additionally we clarify quantitatively the formation of clusters (aggrupation of countries) in the dynamics of growth in South America.

3. To account for the cost of the Import-substitution industrialization (ISI) policies on South American economic growth. Therefore we build an Index of macroeconomic distortions (IMD) to measure the relationship between economic disturbances and GDP per capita growth. Indeed we believe that anti-growth institutions help to explain the disappointing growth performance.

METHODOLOGY SORTS

This study is strictly grounded in the neoclassical economic analysis considering the social phenomena like an aggregation of individuals and decisions (consumers, producers, investors, politicians, and so on), interacting with each other and acting under the constraints that their socioeconomic environment ordains. We find this analytical framework as a powerful tool for organizing our thoughts on economic affairs.

We remark the importance of a careful reading of the empirical results. In particular, our interpretations are based on a solid understanding of historical and recent events of South America. In that sense, this research is sensitive in terms of the kind of the evidence given, since we face the constraints of access and accessibility when it comes to historical data. Considering our database, we believe

that the use of panel data models yield results reliable as soon as economic growth models.

- **Viability and sources**

This study uses the modern literature of economic development, international economics, and economic history. Besides, it will make use of quantitative and econometric methods, for that purpose, macroeconomic data provides useful information on which this kind of analysis is based. The focus of this analysis identifies certain aspects of the institutional and political economy that affect the economic structure and economic growth.

The study covers the period from 1960 to 2008 in great part of the analysis and the economic space of most countries on South America[4]: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. This period covers the main stage of the inward-looking development. The wide coverage of the period also considers the most striking variations on raw material exports, commodity prices, and political cycles in the region. The results are corroborated with the economic growth literature and international trade, and contrasted with specific information from other empirical studies; therefore, these different sources allow us to reconstruct the historical facts for the analyzed period.

The primary sources of this study are the individual historical series of each South American economy, as well as books and journals of international trade, development economics and economic history. The project is feasible, since we have already collected and studied part of the sources in earlier investigations.

- **The economic history database**

Analyzing the impact of institutional factors, capital accumulation (human and physical), foreign investment, economic growth and other indicators of economic development, it is important to consider a lengthy time period. As a fact, by looking at changes over a long time period, the short-term effects -business cycles or shocks- that disproportionately affect economies will be minimized. On the other hand, changes in the institutional framework are likely to have lagged effects due to

[4] For these countries, we have collected a dataset that incorporates over 400 annual observations covering a wide range of political systems, institutions, exchange rates and historical circumstances. The data sources, which are typically country specific are detailed in the Appendix.

the late response of sociocultural variables and agents. The yearly-period utilized in the database allows a deeper examination of the long-run between institutions and economic indicators.

Our econometric work has two novel features. First, it benefits from a new long-term data base, which makes it possible to construct a rich panel data set including a large number of growth determinants over the period 1960–2008. The choice of the period is largely dictated by data availability and a huge effort was made to include a large sample of the less developed countries of the Region (Bolivia, Ecuador and Paraguay). We are sure that this time span is adequate for capturing long-term effects. Second, this study tries to encompass the relationship between institutions, economic policy and macroeconomic disturbances, for which there is a gap in the empirical literature for these developing economies.

- **Introducing Institutions**

One important factor that has hindered a better development of the institutional approach in the empirical evidence is the difficulty of measuring and introducing institutions; in that way, many researchers have expressed that institutions are actually endogenous reflecting various historical or cultural influences[5] over time. However, one of the problems in long time series is the lack of historical information on sociocultural variables which do change over time.

In that way, we consider other variables of interest -growth, trade, and institutions quality- that exhibit patterns of variability. Using the methodology mentioned above, the data panel estimation provide some lights on the importance of these factors on the econometric model, we find that economic policy and institutional factors, such as macroeconomic stability and the degree of openness, explain the slow growth rates of South American economies. However, capital flows and physical capital accumulation have a preponderant effect on growth.

[5] Statistically, the use of proxy variables provides one alternative method of dealing with the endogeneity problem in cross-section estimations. In that way, Acemoglu, Johnson and Robinson (2001) use the mortality rates of colonial settlers (during the colonial period) as an instrument for institutional quality. Hall and Jones (1999) use the fraction of the population speaking English and Western European languages, as instruments for institutions.

A ROAD MAP OF THE THESIS

The first part will be dedicated to sum up the immiserizing growth theory, the role of institutions and agglomeration (clusters) in Chapter 2. A following chapter analyzes the main sources for economic growth within the region, mainly, to draw the important role of institutions, human capital accumulation and other fundamental variables on economic growth. Our diagnostic revolves around the main growth determinants which are constrained by the lack of physical and human capital, differences in the institutional framework and the presence of macroeconomic distortions in investment that affect its role on growth.

The fourth chapter analyzes individually the growth accounting of GDP per capita for national economies over a long-time period (1960-2008) for most South American economies. We also quantitatively clarify the formation of clusters (aggrupation of countries) in the dynamics of growth in South America. Further, we study two sub-periods (1960-1982 and 1983-2008) considering several variables, distinguishing different dynamics of growth in South America before the 1980s and after the structural reforms of the 1990s.

The fifth chapter studies the effect of misguided policies on growth. Taylor (1998) and other economic historians consider that the inward-looking strategy was determined as a response for economic shocks from the post-war period, which was greatly influenced by the institutional heritage. In order to account for the economic costs and impacts of the ISI policy, we construct an index of macroeconomic disturbances (IMD) using the methodology of Pena's distance index employing a group of key macroeconomic variables, finally, we estimate the index of macroeconomic distortions (IMD) on physical capital accumulation and economic growth.

Finally, the sixth chapter concludes considering the main results of the dissertation. Considering which patterns of immiserizing growth can be found in the South American economies, including in detail the results from previous chapters, the long-run growth determinants of economic growth, evidence that nation-state macro factors explains the observed GDP disparities and finally, the economic impacts and costs of the industrialization policy (ISI). Subsequently, it develops a delimited section on the major economic and political recommendations on the subject.

Chapter 2

On Immiserizing growth, Institutions and Geographical economics

On Immiserizing growth, Institutions and Geographical economics

1. Immiserizing Growth

1.1. Introduction

The constant development of new economic theory has produced three major approaches that have emerged as explanatory factors underlying cross-country differences in income and economic growth rates. The first, the neoclassical theory of economic growth, based on Solow (1956) and Romer (1986, 1990) focusing on the inputs of physical and human capital into the production process, and on technological advances as the determinants of economic performance. The second, the geographic-locational theory (Sachs, 2001; Gallup et al., 1998; Diamond, 1997) argues that a temperate climate and ease of access to markets are critically important for the achievement of high income levels and economic growth; for example, tropical climatic conditions erode the energy of workers and increase the risk of inability. Finally, the institutional approach stresses the importance of creating an institutional environment that is generally supportive of markets (e.g. protection of property rights, enforcement of contracts, and voluntary exchange at market-determined prices). The idea that a solid institutional framework is necessary for investment and economic growth, is well-established by Diamond, J. (1997), Knack and Keefer (1995), Dollar and Kraay (2003).

This allows for a one-off increase in the stock of human capital to have an indefinite impact on growth. A different approach (Lucas, 1988) views the accumulation of human capital as the key determinant of growth. In this view, countries can only grow in the long-run as long as human and physical capital keeps accumulating over time. The pursuit of long-run growth determinants represents the major contribution of the endogenous growth approach.

After this brief summary of the main economic determinants and growth approaches, we review the recent literature that has emerged to deal with the literature of immiserizing–growth paradox[6] and economic institutions, discussing the problems that this literature has faced and sketching a framework that we believe

[6] See Bhagwati and Johnson (1968), Martin (1977), Miyagiwa (1993), Srinivasan (1983, 1996).

useful to further explore the links between the growth theory and the institutional dimension.

In one of the most influential papers in the theory of trade policy, Bhagwati (1958a; 1958b) demonstrates the possibility of immiserizing growth in an economy: an open economy experiencing an expansion in its productive capacity (caused by economic growth or technological progress) can become worse off due to terms of trade deterioration sufficiently to offset the beneficial effects of economic growth.

This path-breaking example set up the stage for the development of the generalized theory among distortions and welfare, which constitutes the analytical framework of the modern trade policy theory. In the same way, Johnson (1967) produced another example of immiserizing growth, where a small open economy facing an imposition of tariffs could be injured as a result of economic expansion. Bhagwati and Johnson (1968) related the three fundamental components of commercial-policy theory: welfare, distortions and growth. The contribution of Bhagwati established that in the presence of economic distortions, economic growth might cause deterioration in social welfare.

The theory of immiserizing-growth paradox belongs to the class of cases where a welfare-reducing distortion is the cause of the immiseration in the domestic economy. The essential point is the following: “the gains which would accrue from growth, if the correct policies were followed, are outweighed by the incremental loss of real economic output, which the distortion imposes in the post-growth situation in relation with the pre-growth situation" (Bhagwati, 1958a: 481).

The first case is traditionally analyzed in terms of the (initial) gain from growth -at constant terms of trade- being outweighed by the (subsequent) deterioration of terms of trade. Additionally, a complementary way of looking this case is to argue that under free-trade, foreign distortions play an important role in the general form of immiserizing growth (Bhagwati and Johnson, 1969), particularly in small countries, where changes in the rest-of-the-world supply lead to terms of trade adjustments damaging output.

Johnson (1967) developed another example of the immiseration theory, where government authorities impose a permanent tariff on imports. In absence of monopoly power, the tariff is distortionary and, compared with a free-trade policy, causes a loss of welfare. Since economic growth arises under a tariff-policy, it raises the possibility that the loss of welfare caused by the tariff may be accentuated in the

post-growth period; this negative effect may outweigh the previous gains, resulting in immiserazing growth as a consequence of a reallocation effect in consumption and production of the imported good.

Subsequently, in this chapter we will present two examples of immiserizing growth, to underline and illustrate the general proposition that immiserizing growth can arise under the above mentioned distortions. In the first example, an exogenous distortion, due to a technical progress and/or factor accumulation, leads to a sufficiently acute deterioration in the terms of trade, which takes the shape of a distortionary price differential (Bhagwati 1958a). In the second example, the government policy uses tariffs on import goods and services, which results in trade distortions on economic growth (Johnson, 1967).

Additionally, we consider the results of other literature on immiserizing growth theory that show the association among foreign capital inflows and tariff barriers and its effect on welfare (Hamada, 1974; Brecher and Diaz-Alejandro, 1977). The possibility of immiseration in the presence of foreign investment has been previously examined by Yabuuchi (1982) and Brecher and Findlay (1983). Further, Bhagwati and Srinivasan (1980) had described the revenue seeking activities, which involves revenues from the adoption of a protectionist tariff, resulting in a contraction of the economy.

In conclusion, it should be noted that the possibility of immiserizing growth analyzed here, is associated with the presence of protectionist policies and adverse foreign conditions, in which deterioration of terms-of-trade affects economic growth.

In spite of the importance of the immiserizing growth theory, there is no sufficient empirical literature that evaluates extensively the possibility of such phenomenon. Partly, in this dissertation we devoted to investigate the empirical reality of immiserisation using historical economic data of South American economies.

1.2. Modeling immiserizing growth

Typical theoretical studies of immiserizing growth utilizes the traditional two-country two-commodity model where full-employment is achieved and economic growth is a result of increments in the productive capacity, measured by an expansion in the production possibility frontier. Viewed from the neoclassical point

of view, this treatment of economic growth is consistent with two possible interpretations. The first is a contrast of two different steady-states of a growing economy, where the final equilibrium corresponds to a higher steady-state point (caused by the acceleration in the rate of technological progress). [7] In the second, the steady-state level is associated with other transitional effects; for instance, a decline in the rate of population growth generates a higher steady-state, as well as increments in the capital labor ratio and changes in the growth rate.

Analyzing the immiserizing growth theory within the neoclassical growth framework, we find some missing particular specifications: the strength of institutions and the dynamic growth effects of trade liberalization and policy. Then the analysis has to consider a dynamic -and even historically- framework to obtain better and consistent results, since it is important estimating the effects of distortions during the transitional path of different episodes of economic growth, and not only considering the short-run.

1.2.1 Two theoretical approaches: prices volatility and foreign distortions

The immiserizing growth theory was a particular contribution of Bhagwati (1958a), who studied different circumstances related to terms of trade deterioration that outweighs the benefits of output growth, arguing that in a world of trade distortions, a previous episode of growth could latter induce a net loss of output[8]. The first example (terms of trade deterioration) evaluates the gains of economic growth (assuming constant terms of trade), which is outweighed by the downward adjustment of terms of trade. For example, if terms of trade decrease under an international economic slowdown, also the exported good suffers of lower prices in a context where its productivity may be inferior.

- Prices volatility

Bhagwati (1958a) follows the discussion of terms of trade deterioration indicating that it has a negative impact on economic growth. He concludes that in order to improve the trade balance, the economy has to increase their volume exports

[7] As we study the case for developing countries, we do not treat the innovation and technology process explicitly. However, we imply that the use of new technology will be relied on the grade of openness.

[8] Due to space constraint we restrict to show the most important fundaments of the immiserizing growth theory.

to compensate the falling price process. For developing countries, the unchanged structure of output supply intensifies the dependency on commodity exports: there is no real development but only immiseration. This situation is especially pertinent for countries with agrarian sectors or high dependence on natural resources exploitation (e.g. most South American economies are extremely susceptible on oil, gas, and mining exports, which rely upon prices). Therefore, under certain circumstances, economic expansion may harm the growing country itself. Although economic growth increases output, it might lead to deterioration in terms of trade sufficiently to offset the beneficial effect of growth and reducing the real income. Additionally, terms of trade deterioration could decrease the gains arising from an advance in technology.[9]

Figure 2.1 simplifies the theoretical analysis using the standard 2-2-2 model, where the economic growth is confined to a single country so that the other one will be the rest-of-the-world (which is not experiencing growth in output), with two goods *x* (the exportable) and *y* (the importable), and two episodes 0 and 1. This assumption enables to assume the offer curve of the rest-of-the-world as given.

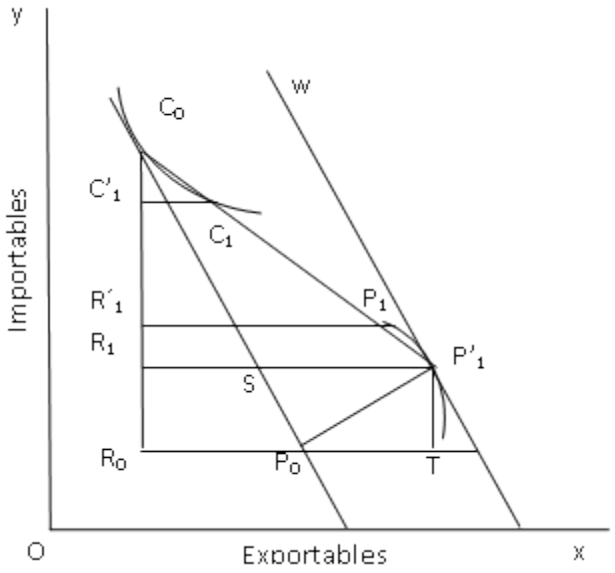

Figure 2.1. Immiserizing growth

Bhagwati (1958a) shows the possibility of the immiserizing growth when international trade has a negative effect on welfare by means of exogenous shocks. This is what is shown in Figure 1, where a first episode of economic growth provokes

[9] Krueger and Sonnenschein (1967) sumarized the welfare implications of changes in the terms of trade.

a significant increase in production (*Po to P1*); however, assuming that terms of trade adjust in the second episode, there is also a reduction of consumption (*C0 to C1*) of the imported good (y). The final effect of the expansion of imports and subsequent adjustment of terms of trade (being R'1 the fitted curve after the price change) reduces the demand of importable goods from C_0R_0 to $C'_1R'_1$. However, from the beginning $R0$ and $R1$ represent respectively the initial and subsequent points of the quantities consumed and produced of the good (y). This reduction of imports can be analyzed into the sum of two main effects: an increase in the domestic production of imports due to economic expansion and price changes, and a decrease in consumption of importables.

In that way, we introduce the following equations to explain the effects shown in Figure 1. It is necessary to emphasize that, here, the main purpose is to show the effects in production without considering price adjustment. Then, the change in the production of importables is measured as:

$$R_0R_1 = C_0R_1.\frac{\delta Y}{\delta K}.(p_1 - p_0) \qquad (1)$$

In this point, the term R_0R_1 represents the change in the quantity produced of good *y*, which is equal to: C_0R_1, the volume of imports consumed, *K* is defined to be the country's productive capacity, which is measured in terms of exportable goods produced at constant terms of trade; *Y* is the domestic output of importables, and ($p_1 - p_0$) the difference in prices, measured as the number of units of exportables required to buy a unit of importable. The phenomenons are studied assuming constant terms of trade.

The previous expression shows the change in the production of importables due to the economic expansion; diagrammatically growth is reproduced as an increase in the production-possibility curve (see Figure 1). The expression is normally positive, indicating that the output of importables increases, consequent on economic expansion, at constant terms of trade (a zero-gain prices). It should be noted here, that the equation considers the volume of imports (defined as consumption) and the productive capacity of good (y) measured as the number of units produced of exportable goods.

It is assumed that any changes are infinitesimal in the consumption of imports to control for the price differences; that is, even though prices change, it is previously

deduced that any price change does not affect the demand for the good *y*. This postulation helps to derive the effect on the production of good *y*. It follows that the initial volume of imports (M) is equal to the final one: $M = C_o R_1 = C_o R_0$; so that:

$$R_0 R_1 = M.\frac{\delta Y}{\delta K}.dp \qquad (2)$$

being *dp* the price differential.

Eq. (2) shows that any change in the production of importables due to economic expansion is normally positive, indicating that the output of importables increases, as a consequence of economic expansion, at constant terms of trade. However, an increment of prices (p_0 to p_1) reduces the consumption of importables (C_1), but increases the production of importables (P_0 *to* P_1).

In that way, Eq. (3) represents the sum of the effects of the price change of imports, where the last two components of the equation represent the changes in the production and consumption of the importable good as a result of increments in price. On the other hand, Eq. (4) measures the change of the rest-of-the-world supply of good *y (SM)* as a result of variations in prices. Whether the country will actually be made worse off or not depends on what would happen to the quantity of imports supplied.

$$\left(M.\frac{\delta Y}{\delta K} + \frac{\delta Y}{\delta p} - \frac{\delta C}{\delta p} \right).dp \qquad (3)$$

$$\frac{\delta SM}{\delta p}.dp \qquad (4)$$

Multiplying Eq. (3) and (4) by $-\frac{p}{M}.dp$, we get the condition for immiserizing growth.[10] Eq. (5) is defined as the excess supply of imports [the sum of Eq. (3) and (4)], if it is positive, the import prices will not adjust; in the other case, the price will rise further to preserve equilibrium. In that case, the domestic economy will actually be made worse off by growth.

$$\left(\frac{C}{M}.\varepsilon + \frac{Y}{M}.\sigma + y_k \right) < 1 - \eta_x \qquad (5)$$

[10] See Bhagwati (1958a: 204) for a detailed illustration of the final results.

Where: $\varepsilon = -\frac{p}{C}.\frac{\delta Y}{\delta p}$; $\sigma = \frac{p}{Y}.\frac{\delta Y}{\delta p}$; $r_m = -\frac{p}{M}.\frac{\delta M}{\delta p}$; $y_k = p.\frac{\delta Y}{\delta K}$; $\eta_x = \frac{p}{X^0}.\frac{\delta X^0}{\delta p}$

Analyzing the signs of both elasticities we have that σ (the elasticity of the supply of domestic imports) is necessarily positive, and ε (the demand-elasticity for importables) which, being the demand elasticity with respect to a change in the price of importables, is necessarily positive.[11] Additionally, X^o is the quantity of domestic exports and η_x is the rest-of-the-world's demand elasticity for imports (into the rest-of-the-world economy), and r_m is the elasticity of the of the rest-of-the-world's supply of (its) exports (to the domestic economy) in response to a shift in the terms of trade. And y_k is the change of domestic production of importables at constant terms of trade, which has a negative sign on the equation

Under the implications of the conditions derived above, the possibilities for immiserazing growth increase if:

(i) The ratio of domestic production of importables to the demand of imports (Y/M) is small, since it follows that the ratio of import consumption to total imports (C/M) will be relatively high.

(ii) The demand-elasticity for importables (ε) with respect to a change in prices is small (i.e. changes in price have a relatively small effect on the quantity of imports); this would depend on the substitution effect against importables, being insignificant when the demand of importables is high.

(iii) The elasticity of the domestic supply (σ) is small (ineslatic), when production shifts along the production-possibility curve in response to a change in the price of importables, limiting the short-run prospects of expansion.

In fact, the possibility of immiserizing growth arises when either or both of the following conditions are fulfilled: the supply of the rest-of-the-world is inelastic and/or growth actually reduces the domestic production of importables at constant relative prices. However, we consider this last condition may be related to the reallocation effect of economic growth.[12]

[11] This argument rests on the assumption of convex indifference curves and concave transformation curves, being concavity defined with reference to the origin and not in the strict mathematical sense of the formula.

[12] Thus the Rybczynski proposition states that under a two-commodity, two-factor model where, say, labor and land being the factors, one good is labor-intensive and the other land-intensive, if labor

- Foreign disturbances

On the other hand, Bhagwati and Johnson (1969) describe another possibility of immiserizing growth where international trade (i.e. the supply of importables) has a negative effect on welfare. The following observations may then be made about: the possibility of immiseration is as a cause of the reduction of the rest-of-the-world supply in a free-trade situation, followed by an adjustment in prices, which deteriorates terms of trade and harms domestic output.

At this point, the model considers two periods (the pre-growth and post-growth situations), two goods and two countries, where immiseration may be caused by the shift in the foreign supply curve. In such eventuality, the slowdown occurs as an exogenous shock of international trade, since we are under free-trade, there won't be a policy adjustment after the pre-growth situation.

In Figure 2.2, the pre-growth situation is depicted by the production possibility curve A_1B_1, the free-trade production and consumption levels by P_1 and C_1, respectively; the given foreign price is given by the line F_1, and the welfare level by U_1. If growth were to take place at a constant foreign supply (i.e. at constant prices), then, the post-growth production possibility curve will increase to A_2B_2. Then the supply curve shifts from F_1 to F_2 (a price increment), the production and consumption in the following equilibrium will shift to P_2 and C_2, respectively, and the welfare level will reduce to U_1.[13] The gains from trade have reduced, to wipe out the primary gain from growth.

(land) increases in supply. Then the output of the land-intensive (labor-intensive) industry must actually contract if the relative commodity prices are maintained constant.

[13] This example would be relevant if the rest-of-the world was a Ricardian economy and its production possibility curve shifted outwards with bias in favor of the importable commodity. We would assume that our country was operating on the straight line segment of the supply curve of the rest-of the-world. In other words, the supply curve could decrease if the increment in the relative price is greater than at the baseline situation; i.e., the terms of trade decrease in the post-growth situation.

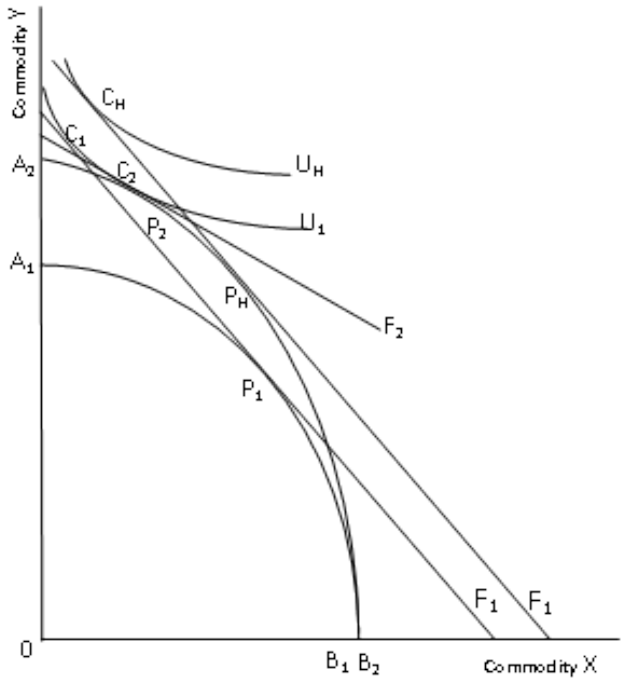

Figure 2.2. Immiseration in the pre and post-growth period

Additionally, if the foreign supply had deteriorated any further, the post-growth equilibrium would have been worst off and immiserizing growth would occur. The resulting immiseration accrues really from the fact of an exogenous reduction in the international trade.

In this possibility of immiseration, assuming that the pre-growth situation was characterized by a restrictive policy, the reduction in the gains from trade would merely have to be larger than in the previous case, where the initial situation was under free trade and a higher level of welfare.

By contrast, the earlier examples of immiserizing growth possibilities arose precisely from the failure to pursue optimal policies, and hence this could eliminate the immiserizing-growth paradox.

1.3 *Policy distortions and immiseration*

Continuing the discussion of the point above among trade revenues and policy distortion, recently, developing economists have increasingly turned to a theoretical analysis of the phenomena, with topics such as: lobbying for protection, competing for a share of industrial or import licenses to obtain monopolistic barriers to domestic entry and utilizing resources to evade price regulations, etc.

On the other hand, the adoption of more efficient technology and the accumulation of factors of production are generally assumed to increase economic output, but when a country is following a protective policy, then efficiency in the protected industry will actually reduce the country's GDP.

This possibility of immiserizing growth is relevant to the fact that countries, which are industrializing by means of protectionist and import-substitution policies are frequently dissatisfied with the final results, creating economic distortions.

Over this phenomenon Johnson (1967) describes another possibility of immiserizing growth where international trade policies have a negative effect on welfare. The following observations may then be made about this class of immiserizing growth: the possibility of immiseration obtained assumes that the pre-growth situation is characterized by the implementation of a permanent tariff in an open economy.

In this case, the tariff is necessarily distortionary and, compared with the free-trade policy causes a loss of welfare. However, since growth occurs under the tariff (growth occurs in protected import-substituting industries), there arises the possibility that the damage caused by the tariff may be accentuated after growth; nevertheless this incremental loss may outweigh the gain resulting in immiseration.

A formal demonstration is presented in terms of the standard Heckscher-Ohlin model. For this purpose, Figure 2.3 describes the production and consumption equilibrium with the initial level of technology, factor supply and an imposition tariff, where *TT'* is the transformation curve, *II* is the international price ratio and both *MM* and *M'M'* are defined as the domestic price ratio,[14] which differs from the foreign price, and is determined by the rate of protection on good *y*. Finally, *P* and *C* are the production and consumption equilibrium points.

[14] *M'M'* is the domestic price curve that intersects to II with a slope equal to the new curve P', which defines the new utility level.

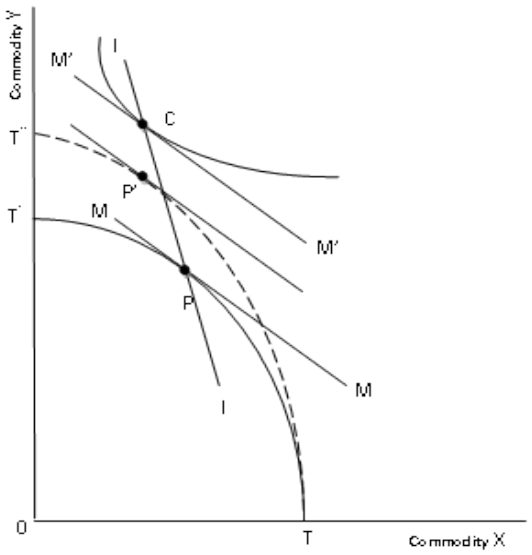

Figure 2.3. Immiseration in the presence of tariffs

Assuming that technical progress occurs in the good *y*, the transformation curve will shift outward to *TT''*, the new equilibrium production at point *P'* lies to the north-west of *P*. The new utility level of the country is given by the indifference curve that intersects with *II* curve through *P'* with a slope equal to that of *M'M'*. The result depends on the tariff rate applied, the extent of the technical improvement, and the elasticities of substitution between the factors in the two production functions. In this case, the country is made worse off by technical progress in the protected industry.

If instead of a technical progress, there was an increase in the stock of the factor production, the transformation curve would shift outward throughout its length But (by the Rybczynski Theorem)[15] the new equilibrium point of production *P'* would -in this case- also have to be to the north-west of *P*, again entailing the possibility of loss or gain of real income. The possibility of loss depends on the quantity of the increment: if the increment is higher, there will be an income loss.

For example, the import-substitute industry case shows a loss from increased waste through the excess cost of additional protection, which absorbs the increment of the potential output. Similarly, an increment in the factor supply increases

[15] The point of departure for examining the effects of an increase in factor endowments is Rybczynski`s theorem, where the increase in the quantity of a factor will cause an increase in the output of the commodity which is intensive and a decrease in the output of the other commodity at unchanged factor prices. It follows that the output of the commodity has increased as a consequence of the addition in the quantity of the production factor, whilst the output of the other commodity has decreased. See Gandolfo (1998: 97).

potential output, but there is a reallocation effect towards the industry using that factor intensively. Regarding the protected industry, there is a second effect, a waste of resources through excess production costs, which may absorb the increase in the potential output per head.

- Revenue seeking activities

A deeper theoretical analysis relies whereby claimants compete for premium-fetching import licenses (premium seeking).[16] Further, Bhagwati and Srinivasan (1980) had described the *revenue seeking* activities, where economic agents try to get a slice of the tariff revenue resulting from the adoption of a protectionist tariff.

The theoretical analysis of *tariff seeking,* where lobbies seek protectionist trade tariffs, has been pioneered by Brock and Magee (1978) and Bhagwati (1980), Feenstra and Bhagwati (1982), and latterly enhanced by Bhagwati (1982) under Directly Unproductive Profit-seeking (hereafter DUP) activities.[17] The essential feature of the DUP phenomena was previously referred above as a mean of acceding to benefits through directly unproductive activities. These pecuniary returns do not produce any good -or service- that generates specific economic activities, nor redistribute efficiently the productive factors, damaging –in consequence- future prospects of economic growth. Thus, resources spent in protectionism activities are a waste of economic recourses, which in other way could be rearranged to most benefiting activities.

Insofar as such activities use real resources, they result in a contraction of the economy. Thus, tariff-seeking lobbying, tariff evasion and premium seeking for given import licenses are all privately profitable activities. However, their direct output is zero in terms of the flow of goods and services entering a conventional utility function: for example, the tariff seeking yields pecuniary income by changing the

[16] The premium seeking theory was begun by Krueger (1974). The analysis of revenue seeking is as follows: legally was directed to unproductive competition for securing a share in the transfer of tariff revenue that resulted as the imposition of a high tariff, thanks to protectionist lobbying. Thus the tariff is an exogenously and unchanging distortion that triggers off the revenue seeking. On the other hand, Bhagwati and Srinivasan (1980) demonstrated that the revenue seeking may lead to a Metzler production paradox: "The protectionist tariff plus revenue seeking may lead to a lower output of the importable than under free trade" If so, further the protectionist lobby may well seek greater protection, influencing the original tariff distortion itself, making the eventual tariff level as an endogenous problem.

[17] We should clarify that the DUP activities are considered as a deficiency of governmental policies, for example, they involve changing policies or evading them. However, they can in principle be government free or exclusively private. For a detailed example of DUP activities (see Bhagwati, 1982: 992).

tariff and hence factor rewards. The evasion of tariffs brings revenues by exploiting the differential price between legal (tariff-bearing) and illegal (tariff-evading) imports; and, the premium seeking permits returns from the payments on import licenses.

In that way, we refer and discuss this theory under import restrictions and the rent-seeking taxonomy that both are mentioned in Johnson (1967) as consequences for further immiserization growth. That is, the analysis is concerned with a welfare comparison introducing import licenses associated with lobbying activities to earn the payment on these licenses, while the tariffs were explicitly assumed not to attract any rent-seeking activity. For example, price-distortion triggers DUP activities, or distortion that triggers DUP activities.[18]

With an eye on welfare analysis, we focused the attention on the fact that some DUP activities will involve a distorted situation, before and after the undertaking of such activity. Therefore, we distinguished only one case as follows from Bhagwati (1982: 993).[19]

We proceed then to show that for DUP activities falling into the third category are immiserizing and paradoxically feasible. Only two classic examples are present in the economic literature: monopoly seeking and tariff seeking, which are legal DUP activities to get tariff protection from the government. In such cases, the total social loss imposed by the DUP activity can be decomposed as the sum of two effects:

$$\left\{\begin{array}{c}\text{The welfare effect of the withdrawal of resources into the directly unproductive activity, assuming that no distortion has resulted}\end{array}\right\} + \left\{\begin{array}{c}\text{The welfare effect of the imposition of the distortion, assuming that the resources have already been diverted to the directly unproductive activity}\end{array}\right\}$$

[18] For example, Krueger (1974: 301-302) did mention minimum wage legislation, regulation of tax fares, and capital gains tax treatment as possible rent-seeking activities. However, the arguments concerning these are ambiguous. To say the least, as example: "the capital gains tax treatment results from overbuilding of real state and uneconomic oil exploration". But this seems to be simply stating the traditional resource-misallocation effects of a tax. At the same time, another paragraph reiterates the view of her concept of rent-seeking activities intended to be as a created restriction: "All market economies have some rent-generating restrictions on economic activity". Krueger's generic examples of intervention for rent-seeking activities are a subset of the far more general class of DUP activities (Bhagwati and Srinivasan, 1980).

[19] The four critical classes of DUP activities are distinguished as follows: 1) the initial and final situations are both distorted. 2) The initial situation is distorted, but the final situation (thanks to the DUP activity) is distortion free. 3) The initial situation is distortion free, but the final situation is distorted. 4) The initial situation is distortion free again, and so is the final situation (despite the DUP activity).

In that way, Figure 2.4 illustrates the tariff-seeking case. The protectionist lobby, starting from free trade at P^*manages to spend resources to get a tariff enacted. Considering the diversion of resources from the lobbying activity, at free-trade prices production would shift from P^* to $\hat{P}l^*$ on the shrunk-in production possibility curve *A'B'* which represents a loss of *RS* measured in terms of good 1.

Additionally, the tariff resulting from the successful lobbying shifts the production point further to $\hat{P}l$. This is the final equilibrium under tariff seeking at world prices (vertical lines). This is equivalent to a further loss of *QR* in terms of good l. Thus the overall loss *(QS)* is decomposed into two elements, each of which is unambiguously negative. The first, the shift from P^* to Pt^* along *AB*, represents the social cost of the tariff, as if hypothetically lobbying resources are not yet expended and the rate was the result of a decision without pressure. The second, the shift from Pt^* to $\hat{P}l$ from *AB* to *A'B'* represents the diversion of resources of lobbying assuming that the tariff distortion is in place.

In this case, the first element of the decomposition will always yield a social loss (*WS)*, as illustrated in Figure 1, which reflects that the initial and final situations are both distorted.[20] The second element may well yield a gain (*WQ*), while the overall impact of the final distorted situation must be necessarily negative (*QS*). It would be incorrect to assert that the social cost of any distortion must be necessarily less than that of the same distortion imposed by DUP activities; that is, the shift from Pt^* to $\hat{P}l$ need not always be a social cost and is, in fact, shown to be a social gain worth (*WQ*).

In conclusion, it should be noted that the possibility of immiserizing growth demonstrated here is associated with the presence of protectionist policies, under conditions in which any terms-of-trade effects of growth are excluded by assumption. One of the principle criterions of the immiserizing growth theory presented is the downfall in welfare due to decreasing imports. Adding both Bhagwati and Johnson (1961; 1968) conclusions, immiseration may be cause by decreasing terms of trade, or by policy distortions on international trade.

[20] Only defined in quantity terms, this increment in production refers to the second-best possibility, and a welfare improvement through DUP activity. It indicates that further losses in output will be prevented under free trade, which leads into a paradoxical outcome. The protectionist tariff plus the revenue seeking activity may lead to a higher output than free trade, because it leads to lower imports and, at least, a minimal increment in the production of the exportable good.

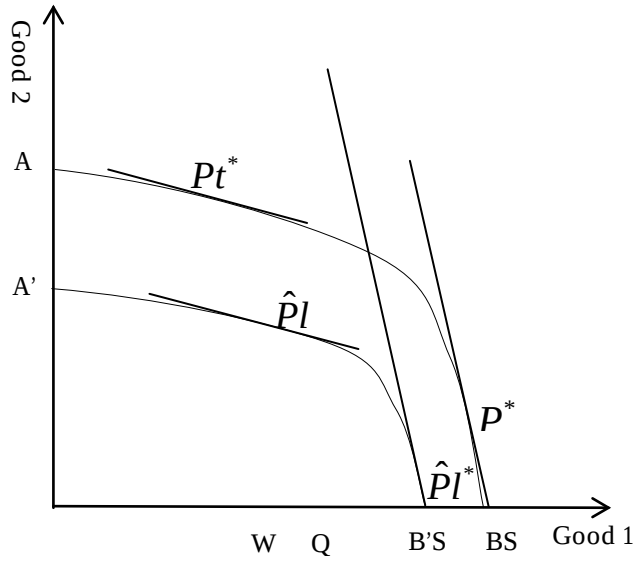

Figure 2.4. Revenue seeking activities and tariffs

From the revised theory above, it is clear that the removal of a distorting policy to eliminate the welfare-reducing effects will reduce the possibility of immiserizing growth altogether.

1.4 *Capital accumulation and immiserizing growth*

In 1967, Harry G. Johnson published an influential paper on the possibility of immiserizing growth. His paradoxical result that capital accumulation may lower national welfare for a small country depends on the following three assumptions: (i) the entire stock of capital is owned by national residents and not by foreign residents, (ii) the government restricts imports by means of a tariff rather than quantitative restrictions -import quotas- and, (iii) the capital is mobile between sectors.

Johnson (1967) has shown that a small open economy where the only distortion was a tariff on imports may experience a loss in welfare as a result of increased efficiency or capital accumulation.[21] In the same way, Bertrand and Flatters (1971) have considered the case phenomenon and derived an approximate

[21] Bhagwati (1968) has shown this to be a particular case of a large class of situations where growth can be immiserizing: those where the post-growth situation is not free of distortions (e.g. tariff rates, as in the present problem).

criterion involving factor shares on production and elasticities of substitution; this last part also was contrasted by Miyagiwa (1993).

Bhagwati (1973) has demonstrated the possibility of immiserizing growth caused by tariff that induces capital inflow, assuming that the host country is a small economy that continues importing the capital-intensive good, while remaining incompletely specialized. The deterioration in welfare may be decomposed into the following three effects: (i) the general loss due to tariff-created distortions in consumption and production, (ii) the loss or gain that would result from accumulation of national owned capital in the presence of a tariff[22] and, (iii) the economic cost when foreign profits are repatriated.

On the other hand, Brecher and Alejandro (1977) show the importance between the linkage of foreign capitals and tariffs following the standard assumptions of Johnson. They conclude that the sudden capital outflow reduce host-country welfare.

Relaxing the first assumption of Johnson (1967), we found the following result: if an increase in the stock of capital is owned by foreign investors then national welfare always declines in the presence of a tariff. Thus, immiserization is inevitable when the country's capital stock increases due to foreign capital inflows. In contrast to the previous analysis, Srinivasan (1983) has established a slightly more optimistic proposition in the capital model: relaxing the first and the last assumptions, the author shows that foreign investment actually improves host country welfare if capital is specific to the exportable sector.

Otherwise it yields an ambiguous welfare effect; for example, with an expansion of capital to the import-competing sector and if the tariff rate exceeds[23] the ratio of the share of capital over labor in that sector.

On the other hand, Hamada (1974) shows that in developing countries, with government using subsidies to protect the infant industry, the inflow of capital is not large enough to extinguish imports or to achieve a complete specialization. As noted above, under a sudden capital outflows, initially, the economic output proceeds to

[22] See Johnson (1967) and Bertrand and Flatters (1971).

[23] A higher price of Good 1 will increase the income of the foreign country, but its returns will rise in both countries, especially in the foreign one. If a factor price rises relative to the other, the factor (capital) used to produce the Good 1 will then flow to countries in which production is relatively less abundant (Jones 1984). Following this demonstration, an increase in the tariff rate would produce a capital outflow from the country, and capital will flow to other country with a lower price and less share of capital.

decrease, but it has no additional consequences for national welfare, as long as product specialization remains incomplete.

Originally, the model of immiserizing-growth considers that the prices of output factors do not change and the return of capital may change if the factor prices increases. Resuming, it is interesting to mention that there is no a clear answer for the negative impact of capital inflows and welfare changes depends on the diversity of the export sector and the level of capital accumulation. However, any possible welfare loss is clearly associated with a slowdown in output and investment reallocation to other activities.

1.5 *Immizerization in the presence of endogenous forces*

So far, it has been described the welfare effect of an exogenous change in the stock of capital in the presence of import restrictions and policy distortions. Briefly in this point, we consider the possibility of immiserizing growth when foreign capital is endogenous. The possibility of immiseration in the presence of foreign investment has been previously examined by Yabuuchi (1982) using the Heckscher-Ohlin model, and Brecher and Findlay (1983) with the Ricardo-Viner model.

The focus of this study has been set on the welfare effect of a change in tariff rates which affects inflows of foreign capital, turning out that tariffs and import licenses are similar. For example, Brecher and Findlay (1983) shows that an increment in tariffs produces a negative effect on national welfare. The same results are obtained replacing tariffs with import quotas; that is, reducing the volume of imports allowed with import licenses also affects national welfare. Miyagiwa (1993) analyses the policy when only a quota on imports are imposed in the first period.

Therefore, here we sum up the welfare effect of exogenous economic growth in the presence of endogenous foreign capital inflows. We consider the GDP function as $g(\Phi, p, k)$, with $g_{\Phi}(\Phi, p, k) > 0$, where Φ represents a parameter of economic growth (technical progress, accumulation of a non-capital factor, etc.), k is the stock of capital and p is the domestic relative price of the importable good.

The host country is a small economy that faces a given return to capital (r^*) in the world market, representing u the level of welfare of the population. Assuming that the foreign capital flows into the economy until the return of capital in the domestic and international markets are equal, we have:

$$g_k(\phi, p, K_d + K^*) = r^* \quad (7)$$

$$e(p,u) = g(\phi, p, k) + (p - p^*)\bar{m} - K^* gk \quad (6)$$

where $\bar{m}$ is the quota on imports, and K and K^* denote the stock of domestic and foreign capital. In Eq. (7) we have the income-expenditure equation and a binding quota.

$$\bar{m} = ep(p,u) - gp(\phi, p, k) \quad (8)$$

$$u_\phi = g_\phi / e_u \quad (9)$$

Eq. (9) shows that a positive change in any parameter of Φ will raise GDP and also the welfare of the host country, regardless the sector to which foreign capital is attracted. Thus, for example, an increase in the supply of labor or any type of technical progress that affects GDP favorably raises host country national welfare.

To determine the effect of the import quota in the system equation, Eq. (8) and (9) show the following points: the imposition of the quota will increase the domestic relative price of the importable good (p), and total imports defined as (m) will adjust to eliminate the excess demand for the importable.

Concluding, Miyagiwa (1993) demonstrates that in the case of tariff protection, further adjustments of foreign capital remain crucial in determining the welfare effect of economic growth.

1.6 *Aspects of immiserizing growth empirics*

The different paths of development have been a long center of concern to scholars and have recently attracted more attention from economic historians and economists, more generally.[24] Although the conventional economic factors have certainly not been ignored, the explanations offered for the contrasting records in growth have focused on fundamental growth variables such as: capital accumulation (physical and human), trade, investment and institutions, highlighting the variation across countries.

[24] Engerman and Sokoloff, 1997; Coatsworth 1993, 1998; Acemoglu, Johnson and Robinson, 2001; Engerman, Haber and Sokoloff, 2000.

There is a well-known phenomenon in international trade theory where increasing welfare and positive economic growth do not coincide. This is the case of immiserizing growth-paradox. The prototypical example of immiserizing growth is where an economy worsens their terms of trade so much that there is a welfare loss due to the deterioration.

Although the idea of immiseration has proved to be a remarkably development theory among trade and welfare (Bhagwati et al. 1998), most economist at this time do not regard the concept of immiserizing growth as a real-world issue (Krugman and Obstfeld, 2000: 102). Despite the theoretical importance of this phenomenon, there is no abundant empirical literature which evaluates the possibility of such effect.

Recently there has been some new empirical evidence on the immiserizing-growth theory. Most of them have been applied on developing countries or regions of the world (Africa, Latin America, Western and Southeast Asia), covering different macroeconomic themes or phenomenons enshrined in international economics, especially globalization.

Mainly, these new evidence studies the terms of trade deterioration effects (Bhagwati, 1958a) on economic growth (welfare), covering a data set for almost three decades (except Sawada, 2003, who examines prices from post-war period). Additionally, Vakulabharanam, V. (2004) goes far behind and analyses the impact of falling prices on the agriculture sector, demonstrating that if the output of these crops have annually risen more than 4%, the abrupt slowdown in prices led to significant losses in income and consumption in South Indian regions.

Moreover, Bilge (2010) studies the long-run deterioration for terms of trade on developing countries during the 1980s, finding that growth differences among them may be a result of declining export prices and partly of productivity and technological asymmetries; he suggests that countries that diversified exports had better chances of eliminating income differentials and thus, attaining higher rates of growth. On their side, Davis (2009) and Todorova (2010) examine the relationship between extractive activities and the economic growth, concluding that developing countries are likely to benefit from the exploitation of natural wealth; although this economic growth could be immiserizing for products with an inelastic demand that normally leads to a sizable worsening of terms of trade (e.g. food products, oil and gas).

Finally, Tokarickl (2009) followed Johnson's (1967) paper, concluding that adding more goods in the analysis, reduces the likelihood of immizerization; however examining tariff structure, he ends that the higher the dispersion among tariffs, the greater the possibility of immizerization.

Table 2.1. Empirical examples on immiserizing-growth

Authors	Main deductions
Kaplinsky, R., and Morris, M. (2002).	It focuses on South African local firms' difficulty to compete effectively in global product markets by increased competition, falling unit prices and an overvaluated exchange rate.
Sawada, Y. (2003).	A straightforward test using a framework on welfare evaluation with macroeconomic growth data. The author identifies 34 episodes of immiserizing growth in the post-war world economy, mostly in Africa and Latin America
Vakulabharanam, V. (2004)	It examines the impact of globalization on agriculture growth, in a South Indian region between 1985 and 2000. As the prices of market-oriented crops have declined during the phase of globalization, the planted area and the output of these crops have been rising rapidly (more than 4% annually); in that way, terms of trade slowdown led to significant losses in income and consumption.
Tokarickl, S. (2009).	This paper follows Johnson (1967), but adds more goods in the analysis reducing the likelihood of immiserizing growth. It also examines how a country's tariff structure affects the likelihood to suffer immizerization. In general, the greater the degree of tariff dispersion, the higher the possibility of immizerization.
Davis, G. A. (2009).	It examines the relationship between extractive activities and the economic growth, via a simple comparison in extractive and non-extractive economies. The paper shows that poor countries in growing extractive economies, are as likely or more to benefit from the exploitation of natural wealth than poor economies without such resources.
Todorova, T. (2010).	Economic growth would be immiserizing only for products for which world demand is inelastic and leads to a sizable worsening of terms of trade. The phenomenon considers a few commodities, food products and natural resources (oil). It studies econometrically the demand function for the Brazilian coffee.
Bilge, A. (2010).	Tests the long-run tendency for the terms of trade of primary commodities to deteriorate. The results suggest that the growth rates of developing countries during the 1980s declined as a result of the downward trend in terms of trade and partly by the productivity and technological asymmetries between the developed and developing economies. In general the countries that diversified towards manufactured exports had better chances of eliminating the elasticity differentials, and thus attaining higher rates of growth. Additionally, it analyses two comparative case studies on Turkey and Malaysia; the results show that industrial and trade policies, if carefully designed, can counter potential costs of external market dynamics.

In general, immiserizing growth involves some form of misguided policies, underlying the phenomenon that the country experiences economic growth subject to foreign distortions. Hence, if the incremental losses from distortions outweigh the primary gains from economic growth, then immiserizing growth will follow. In that

way, the existence of immiserizing growth indicates the existence of a sufficiently large distortion in the economy.

In spite of the importance of the immiserizing growth, there is no sufficient empirical literature that evaluates extensively the possibility of such phenomenon. Partially, in this dissertation we devoted to investigate the empirical reality of immizerization in a consistent framework using historical economic data for most South American economies.

In order to develop an empirical literature, two chapters of the dissertation focus on the issues of the immiserizing growth theory; the first one studies the effects of terms of trade volatility and other exogenous variables on growth, initially searching for the long-run growth determinants. The second employs an index of macroeconomic disturbances to measure the distortions caused by the import substitution industrialization, evaluating the welfare changes.

The historical perspective we consider in this study is remarkable to stress the evolution of growth, in this way; we follow a dynamic perspective for economic growth.

In that way, one of the novelties of this study is the inclusion of political institutions on the immiserizing growth model. South American has a history of distortionary macroeconomic policies, high inflation rates, large budget deficits and misaligned exchange rates. The region is characterized by high volatility and low growth rates than in any other developing world region. Does this reflect the causal effect of macroeconomic policies on economic output? We suspect that the answer may be that countries pursuing poor macroeconomic policies also have weak institutions. This suggests that distortions are more likely as well to be symptoms of underlying institutional problems.

2. Other Topics in the Growth Literature

2.1 *Institutions and economic performance in South America*

In the past few decades, the study and research of institutions on development plays a key role determining economic growth. This path of institutional development has affected growth in many ways, and it is been represented in every problem that may attain low growth rates such as extreme inequality, the constant struggle to maintain

elites' power and the limited access of some part of human population to economic opportunities.

Despite the advances in democracy throughout the world, these socioeconomic problems have an enormous cost on the society and the economic potential, especially for developing countries.

In that way, it is not the intention of this document to cover the vast literature of institutions on development; instead, we will briefly sum up the most importance literature related to South American economies.

A growing literature has documented the importance of good institutions for economic growth in the very long-run (Acemoglu et al., 2001; Hall and Jones, 1999; Engerman and Sokoloff, 1997; and many others). This literature has identified the effects of institutions by tracing back their origins to more fundamental determinants such as: (i) the incentives of colonial powers to invest in institution building (e.g. settler mortality); (ii) the colonial origin itself; and (iii) natural resource endowments. A parallel literature has documented the importance of trade on economic growth (Frankel and Romer, 1999).

The main argument is that in institutionally weak societies, elites will find various ways of expropriating different segments of the society, even considering various macroeconomic policies to take advantage of the resulting rents of poor macroeconomic outcomes and the exploitation of natural resources.[25] These findings suggest that it is the inability of weak societies to deal with their own economic and political shocks that are of first-order importance.

Moreover, this inability to deal with exogenous shocks appears to be somewhat linked to state failures (civil wars, revolutions and power struggle). Considering these problems, it is a rational conjecture that many economic crises and macroeconomic volatility happen amidst political problems. In this way, a few studies link volatility to long-run institutional causes. An exception is Rodrik (2002),

[25] There are a variety of reasons why weak constraints on executives and other institutional problems might lead to volatility. For example, Acemoglu and Robinson (2001) show how weak institutions might encourage coups and revolutions, leading to political and economic instability; alternatively, institutional failures may also make economic adjustment difficulties. Rodrik (1999) suggests that countries with poor institutions are unable to deal with major economic shocks, suggesting that this inability to deal with global economic changes underlies the disappointing growth performance of many developing countries during the 1980s and 1990s (Easterly, 2001). Similarly, Johnson et al. (2001) shows that among emerging economies open to capital flows, those with weaker political and financial institutions experienced more severe crises during the late 1990s, suggesting an important interaction between global shocks and institutions (see also Eichengreen and Bordo, 2002).

who shows that democracies are less volatile than nondemocratic regimes. In addition, Acemoglu and Zilibotti (1997) and Acemoglu, et al. (2003) also show that richer countries are less volatile due to the strong relationship existent between initial GDP per capita and volatility. Further development on theory had been written documenting the effects of this type of anti-growth institutions on economic development (Acemoglu et al., 2001; 2002a, Knack and Keefer, 1995, and Hall and Jones, 1999).

In institutionally weak societies there are few constraints on rulers, following a change in the balance of power: groups that gain politically may then attempt to use their new power to redistribute assets and income, creating economic turbulence. The lack of effective constraints on politicians and elites implies that there are greater gains from coming to power, and equally greater losses from not controlling the political power. Therefore, in institutionally weak societies, there will be greater power struggle between various groups to achieve power and hence, greater political and economic turbulence.

The negative effects of weak institutions on economic growth affect various areas. For example, the economic cooperation may have to rely on some 'trust' between authorities and cooperative institutions, supported by strategies which finally will lead to sustained cooperation that influence positively on foreign investment. As a result, the contractual arrangements will be more imperfect, making economic relationships more susceptible to shocks and capital outflows. In most of the cases, entrepreneurs may choose sectors from which they can withdraw their capital more quickly, thus contributing to potential economic instability. And authorities may be forced to pursue unsustainable policies in order to satisfy elites to remain in power. Then, volatility results when these policies are abandoned.

When recession hits the inner economy, it is easy to blame macroeconomic policies for the economic downturn. Instead, many subjacent problems are reflected by anti-growth institutions. For example, Bates (1981) describes the political economy in Africa, emphasizing how overvalued exchange rates were a way of transferring resources from the large agricultural sector to urban interests, reflecting the power of these interests to influence the decisions of politicians. Ghana is a case of high inequality redistribution, political instability and power struggle by interest groups to pursue distortionary policies in order to remain in power. Another world region studied for failed institutions has been South America; with special emphasis

since the great depression and the post-world war II, leading to a phase of import substitution drove by a strong industrial groups that induces state subsidies and intervention. As we see above, theory sees badly industrial policies and state intervention since they lead to unsustainable subsidization, fiscal insolvency, bankruptcy and inflation.

A case study based on Mazzuca (2001) shows Argentina in the colonial period, which had a low population density due to its lack of minerals. The country avoided many of the worse colonial institutions, such as the *encomienda* and the *mita*.[26] After its independence, Argentina suffered from severe political instability as rival regional warlords vied for the control of Buenos Aires and the rest of the country. During the twentieth century, the political power highly depended on provinces, which led to no constraints to regional leaders. If well the Argentine regime did not face external threats to its sovereignty, it was never forced to modernize its institutions. The expansion of the agriculture sector and capital inflows gave the central government enough fiscal resources to avoid the costs of disciplining the provinces, resulting into a high inefficient form of redistribution away from the productive sectors of the economy.

Recent empirical findings and theory[27] stressed that endowments influence the formation of long-lasting institutions such as the implementation of private property, rights of protection, rule of law, the extent of corruption and the ability with which the ruling government interacts with the private sector, in some way, extending protection to small elites that shape economic development. As noted above, land wealth helps explaining the level of development. For example, countries that produce oil have higher levels of economic development beyond the ability of the natural resource to explain the institutional development.

There are important sociopolitical factors that affect institutions in the long-run. In that way, empirical studies show that in countries with high ethnical diversity, the group that comes to power tends to implement policies that expropriate as many resources as possible from the ethnic losers, restricting the rights of other groups and prohibiting the growth of industries or sectors that may threat the ruling

[26] The working methods adopted in indigenous South America were the *encomienda* and the *mita*. The *encomienda* was a core comprised of native people, given to a high member of the elite until the end of his lifetime, and often to one of his family, with the commitment to provide food, clothing, shelter, and education. The benefit in return was their work or the payment of a tribute. On the other hand, the *mita* was a forced labor and they received a salary (Yeager, 1995).

[27] See Acemoglu, et al., 2001; 2002a; Engerman and Sokoloff, 1997, and Engerman et al., 2000.

group (Alesina et al., 1999; Easterly and Levine, 1997). Thus, ethnolinguistic diversity may directly hinder economic development and indirectly shape the underlying institutions and policies that influence economic development in the long-run.

Acemoglu et al. (2001) notes that colonial settlers did not aim to settle, instead sought to extract as much from richer colonies. In these *extractive states*, settlers did not create institutions to support private property rights; rather, they established institutions that empowered the elite to extract the natural resources, using slavery as a way to capture labor force for extractive states.

2.2 *Models of the New Economic Geography*

Growth has been viewed by some as a process determined by the accumulation of physical and human capital (neo-classical theory); others see it also as a process linked to a place's characteristics, such as innovation, knowledge and human capital (endogenous growth). Neo-classical theories rely entirely on capital accumulation (Solow, 1956); although technology is considered to be important, it is considered to be exogenous (Barro, 1997) and therefore excluded from the models. However, technology has been brought into these models through the inclusion of R&D theories (Romer, 1990; Grossman and Helpman, 1994; Barro and Sala-i-Martin, 1995). The growth literature tells us that economic growth can be explained by the stock of physical capital, human capital and innovation. Thus, the growth model can be expressed as a function of capital accumulation, assuming perfect competition and decreasing returns to capital, leading to equilibrium. The technological progress is recognized as an important growth determinant, but it is regarded as exogenous, mainly due to the difficulties in modeling increasing returns. In that way, a number of potential advantages of spatial clustering have long been identified in the research literature, notably related to costs for infrastructure, the build-up of a skilled labor force, transaction efficiency and knowledge spillovers.

The new economic geography (NEG) theory and the process of agglomeration are precisely concerned with scale effects, where small initial differences can cause large effects over time through a self-feeding mechanism. The main idea behind, is to explain why economic agents tend to agglomerate together. The formalization of the theory was through mechanisms of accumulation, Krugman (1991) provided the theoretical foundations by showing how regions that are similar in underlying

structure can endogenously differentiate into center and periphery. The literature has considerably evolved considering various set of new variables and theme. For example, as transportation costs fall, the region with the larger manufacturing share attracts more capital due to forward and backward linkages increasing its real output. On the other hand, wage differential induces firms to relocate back to peripheral regions (Krugman and Venables 1995, Puga and Venables 1997[28]). Another topic deals with labor mobility for skilled labor hand within the goods and services sectors, which induces to higher agglomeration (Englmann and Walz 1995). Duranton and Puga (2004) mentions three main mechanisms that produce agglomeration economies, i) indivisible facilities such as local public goods that serve economic agents, such as laboratories, universities and other infrastructure; ii) the gains from a wider variety of input suppliers that can be sustained by larger industries; and iii) the generation and accumulation of knowledge,[29] referring to the learning of technologies and the acquisition of skills.

In that way, the agglomeration has positive effects on economic activity, decreasing transport costs, increment in supply chains, access facility to resources, a higher degree of specialization in goods and services, greater cooperation between cluster members, better confidence and facilitates communication and better access to skilled employees. The relationship between regional output and growth disparities has enjoyed a revival of interest. A major reason for this is the rediscovery of the region as a meaningful observational unit for spatial economic analysis (Barro and Sala-i-Martin, 1991) with an emphasis on increasing returns to scale and the resulting agglomeration of economic activity, Kaldor (1970).

The NEG stresses that regional growth tends to be spatially clustered through cumulative causation processes that favor the advantaged regions. Economic growth, in these models, is not expected to lead to a reduction of inequalities but rather an increase. Similar predictions about a positive relationship between regional inequality and growth fall out on endogenous growth theories (Nijkamp and Poot, 1998). Given the diversity of theoretical expectations regarding income inequality

[28] Industrialization will occur in a few countries when forward and backward linkages are strong enough; agglomeration occurs in one country, raising the level of wages in the industrial sector with decreasing transport costs. Industries relocate to another country creating agglomeration (Puga and Venables 1997).

[29] The analyses of how different countries exhibit distinct innovation systems (Lundvall, 1992) have been adopted by geographers who have tried to show that individual countries has innovation systems which are partly related to the existence of agglomerations of related firms and industries.

and growth disparities, the literature has tended to focus on the analysis of the evolution of per capita GDP distribution, therefore, suggesting the study of an alternative method to treat growth disparities. The general idea of this approach has been on the per capita GDP distribution and from the changes in the countries' relative positions within this distribution over the long-run.

However, new evidence on the theme, Cerina et al., 2011 develop an extension of the canonical model with an additional sector producing non-tradable goods,[30] which benefits from localized knowledge spillovers coming from R&D performing at the industrial sector. This departure introduces an anti-growth effect of agglomeration for both the deindustrializing and the industrializing regions and leads to: i) when agglomeration takes place, growth is lower at the periphery; ii) agglomeration may have a negative effect on the growth rate of real income.

The reason why agglomeration might be bad for Southern real growth is a bit more straightforward. Economic growth is boosted by agglomeration in the North for two different reasons: i) innovation cost is reduced; this leads to a faster decrease of the price of goods produced in the North; ii) as long as intersectoral spillovers are not perfectly localized in the South; agglomeration in the North means deindustrialization in the South; it means, manufacturing firms have no incentive to invest in knowledge capital in the South (Bruhlart et al., 2009)

The intersectoral knowledge spillovers introduce a pro-growth effect of dispersion: when agglomeration takes place, the productivity loss in the deindustrialized region (South) has a negative effect on economic growth. This effect may offset the positive effect of agglomeration given by the reduced innovation cost. When this is the case, agglomeration is bad for growth.

3. Main deductions

The ensuing empirical analysis in this Dissertation has, in our interpretation, taken two principal forms. First, we make an effort in order to examine directly the underlying economic mechanism, using the spatial dimension primarily as a source of apposite data (see, Ciccone and Hall 1996), Rauch 1993), using panel data and

[30] The empirical evidence on structural change shows the importance of the service sector in the real economy, and how it has increased its share in the global economy over the past 30 years. It is widely accepted that the importance of non-tradable services in the utility function is larger in more advanced stages of development.

cross-section models related by space and geography. Second, we also attempt to characterize the entire distribution of any economic phenomena relative to a set of assumptions; for example, a distribution of production across space, evolving in particular ways over time, or certain patterns of industrial concentration.

Here, the interest does not rest in the characteristics of a representative country, but instead in the joint behavior of all the different countries distributed across space. The current research belongs to this form of analysis; we find it useful to think of this as a macro empirical analysis. We study the agglomeration phenomena, regional output and growth disparities on South America over the period 1960-2008. We seek to expand the focus of the empirical literature on growth including the role of clustering through some new exploratory techniques for GDP per capita dynamics with the goal of generating fresh stylized facts on regional growth and clustering.

We also consider the use of institutions and macroeconomic distortions to identify policies that may affect growth in the long-run. Our study is beyond the original base of the immiserizing growth theory, studying institutional economics, which is an important area in the long-run growth theory and other growth determinants.

However, it is well-argumented that the terms of trade improves growth exogenously, and nowadays, it has been an important subject of economic policy for developing countries, especially trying how to deal with the negative effects of its distortions. On the other hand, the welfare loss caused by protectionist policies induces capital outflows, fiscal imbalances and low growth rates. These economic issues are relevant for economic policy and policymakers.

The agglomeration phenomena shows many positive effects on economic activity, decreasing transport costs, increments in supply chains, access facility to resources, a higher degree of specialization in goods and services, higher cooperation between cluster members, better confidence and facilitates communication and access to skilled employees. However, there is risk that the peripheral economies may be excluded from the benefits; in that way, outcome disparities may rise, leading to economic divergence.

Another important task studying the agglomeration economics is to capture the historical origin and its evolution, trying to find the deep historical roots shared by clusters member. The aim is just to establish as a fact that some of our knowledge

on the clustering phenomenon comes from studying history, and that it is possible through such accounts to gain insight into the processes which make for the development of clusters.

The entire work of this dissertation centers on economic growth and some of its various models. In that way, the growth literatures developed above have been enshrined using the neo-classical exogenous growth model, including aspects of human capital and institutions. Accordingly, we aim to provide new answers and insights with respect to the roles of macroeconomic uncertainty and institutions on economic growth of developing countries. Throughout this work, different methodological approaches are used, and much attention is given to the immiserizing growth literature and how it affects economic growth on South American economies, considering the negative effects of terms of trade distortions, as well as protectionism government policies (costs of trade restrictions). Additionally, we study the dynamics of GDP per capita disparities and clustering through the differences on accumulation of production factors, human capital, sectorial development and other macro-variables such as, macroeconomic distortions and economic institutions.

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Chapter 3

Long-run determinants of economic growth in South America

Long-run determinants of economic growth in South America

Summary

We exploit a new annual historical data set for ten South American countries from 1960 to 2008 for insight into long-run economic growth within a two-equation framework. A system of two panel data models is estimated by generalized least squares, which is a method used to control for unobserved country-specific effects, accounting for within-panel serial autocorrelation, as well as heteroskedasticity and cross-sectional correlation between panels. Growth is found to be driven by capital formation, foreign investment and human capital, as well as by sectoral exports (manufacturing and other services). Trade openness is positively correlated with foreign investment, indicating that relatively closed countries stand to benefit most from opening up their economies. The evidence shows that macroeconomic disturbances still have a significant detrimental effect on long-run growth in developing countries. Finally, in view of the scope of our analysis, we divide the sample in two sub-periods 1960–1982 and 1983–2008. The results highlight our previous findings and reveal a convergence process within the region. Our approach here is decidedly empirical, taking advantage of a broad new historical data set especially for the developing countries in the region.

Keywords: Economic growth, Latin America, Investment, Dynamic panel data analysis.

JEL Classification: F41, O54, N26

1. Introduction

This research sheds new light on important aspects in development economics. The chapter combines the immiserizing growth theoretical framework (Bhagwati, 1958a) with empirical evidence on the patterns of long-run economic growth (growth determinants) and terms-of-trade volatility. Beginning with a review of the growth literature, we highlight the terms-of-trade deterioration (revised in the previous chapter) and the different statistical estimation techniques. The rest of the chapter presents an empirical analysis, including terms-of-trade volatility in an endogenous growth model and investigates the growth implications of doing so.

The relationship between terms-of-trade and output growth is an issue that has drawn a lot of attention, especially in empirical studies; commodity price volatility is an incentive for the reallocation of resources from agriculture to industry or from the export-oriented sector to domestic production that could lead to a major redistribution of income between sectors in the economy.

Ensuring long-run economic growth in developing countries has become an important topic in academic debates and a priority for sound economic policy design. This was particularly true of South America in the mid-1990s because of public policy changes and structural reforms. These are some of the reasons for the recent glut of academic papers on the fundamental sources of economic growth in the region and in other developing countries.

Economic growth in South America has not been very spectacular over time. The region is less competitive than its main trading partners. In addition, inequality within countries is on the rise again, leading to social and economic conflicts between the governors and the governed. Problems of low economic growth coupled with marked inequality have been particularly acute in less developed countries. However, some have managed to overcome them and engage in a process of economic growth increasing output and population welfare.

The main reason for confining our study to South America is its history, its institutional endowments and its geographical features, which somehow affect long-run growth. The region tended to be dominated by periods of economic and political instability, followed by decades of import substitution policy. The 1980s debt crisis and the market reforms of the 1990s put an end to endemic macroeconomic instability through export diversification and stronger fiscal and monetary discipline.

However, the promise of a new period of sustained economic growth in more open and competitive economies has yet to materialize.

The last two decades have witnessed the proliferation of multi country studies, focusing on the connection between trade openness and economic growth and, on the other, exploring the role of macroeconomic stability in capital accumulation. These inter-related themes have been a recurrent concern for academics and policymakers alike in all developing countries. They are especially relevant at present when policy debates center on whether to join the new wave of globalization. However, the problem faced by empirical growth economists is that growth theories are not explicit enough about which variables truly affect growth.

The openness debate remains very much alive, particularly after the seminal paper of Rodríguez and Rodrik (2001). Despite previous research asserting a positive link between openness in trade policy and economic growth, there is no conclusive evidence to support such a claim. However, there are warnings about the sensitivity of the empirical results due to the fact that they may change with the variable specification and with the choice of time-aggregation. Widening the scope of our analysis, the concern that land wealth may somehow be immiserizing for South American countries is a recurring theme both in policy discussions and in empirical analysis (Blattman et al., 2007; and Frankel, 2010).

Most of the empirical work[31] on Latin America uses data covering a relatively short time span (usually 30 years or so) after 1960 and with only a five-year period for panel data studies. The main conclusions of such studies do not necessarily hold for any specific subset of countries within the sample and suggest that the best results could be obtained by a complete regional overview only.

This chapter provides an assessment of South America's economic performance during the past 48 years in a comparative and historical perspective. The empirical part of the document concentrates on determining the main sources of growth in a cross-section of countries. Economic growth in the region is explained by two factors: (a) proximate and measurable influences, which are captured in the growth accounts and (b) potential influences (i.e. institutional influences and macroeconomic distortions), which are more difficult to measure.

[31] See, for example, Elias (1990), De Gregorio (1992), De Gregorio et al. (1999), Cardoso et al. (1992), Hausmann et al. (2005), Loayza et al. (1995) and Astorga (2010).

The primary purpose of this chapter is to provide a quantitative assessment of the long–run determinants for South American economic growth. Our sample covers the ten biggest South-American countries:[32] Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. In 2000 they had a combined population of 410 million, which is equivalent to 80% of the region's total population and almost 90% of its GDP.

We emphasize the role of physical and human capital, trade openness, institutional quality and macroeconomic volatility. Our econometric work has two novel features. First, it benefits from a new long-term data base, which makes it possible to construct a rich panel data set including a large number of growth determinants over the period 1960–2008. The choice of the period is largely dictated by data availability and a huge effort was made to include a large sample of the region's less developed countries (Bolivia, Ecuador and Paraguay). In this way, we are also sure that this time span is adequate for capturing long-term effects. Second, this study tries to encompass the relationship between institutions, economic policy and macroeconomic disturbances, for which there is a gap in the empirical literature for these economies.

The empirical contribution of this chapter lies in providing new empirical evidence on how economic growth depends on a variety of structural characteristics. We estimate a system of two panel data models by generalized least squares (GLS) that is more efficient. This method is an alternative to the fixed-effects and random-effects estimators to control not only for serial autocorrelation within panels, but also heteroskedasticity and cross-sectional correlation between panels. It also handles unobserved cross-section specific effects if necessary. The first panel data model estimates the effects of a group of fundamental variables and other exogenous factors on GDP per capita growth. In addition, the chapter runs another equation in order to re-examine the nature of investment-growth providing better empirical insight by considering explanatory variables that affect capital funds across South American economies. It exploits the full information of the data while, at the same time, correcting many of the shortcomings mentioned above. On the other hand, taking into account the empirical issues of the historical literature, we decided to test for

[32] For these countries, we have collected a dataset that incorporates over 450 annual observations covering a wide range of political systems, institutions, exchange rates and historical circumstances. The data sources, which are typically country specific, are detailed in the Appendix.

temporal instability of the growth determinants and, additionally to show the coefficients of the convergence process and its evolution. This is achieved by dividing the sample into two sub-periods (1960–1982 and 1983–2008).

Using the methodology mentioned above, we find that economic policy and institutional factors, such as macroeconomic stability and the degree of openness, explain the slow growth rates of South American economies. However, capital flows and physical capital accumulation have a preponderant effect on growth.

The remainder of this chapter is structured in the following way. Section 2 reviews the economic literature and empirical evidence on the theme. Section 3 develops the empirical framework, discussing the general points of the methods. The results of the econometric model are presented in section 4. Section 5 draws out the most relevant discussions and concludes.

2. Determinants of economic growth in South America

This subsection shows how much of the variations in growth performance within South America can be attributed to fundamental factors, which explain the growth variations and the effects of external shocks on economic growth. Furthermore, we are interested in determining how much of the variations are due to differences in domestic institutions and economic policies.

Latin America experienced steady economic growth in the three decades after the Second World War. With total GDP growing at around 5%, the region seemed to be entering a period of democratic growth, with greater social participation in politics and signs of industrial growth. However, in most countries the democracies gave way to authoritarian repression, military coups, and consolidation of protectionism. These events of the mid-1970s were contributory causes to the crisis of the 1980s, this profound crisis revealed some of the structural weaknesses of Latin American economic development. During the 1990s most countries in the region felt compelled to undertake structural reforms to establish more stable economies and were made in the hope of becoming a more integral part of the international scene.

However, reforms were often implemented before an appropriate institutional framework could be put in place. For example, institutions for revenue collection and expenditure management were not strengthened as part of a fiscal reform program, while privatization was embarked upon without a regulatory framework for adequate

competition. While weak institutional structures contributed to lax fiscal discipline, fiscal reform has also been hampered by the volatile nature of government revenues in many countries. The reform process has also been impeded by its own momentary success, meaning that the pressure to continue enhancing the institutional framework has tended to dissipate. As a result the process slowed, or even halted, leaving the economy vulnerable to future shocks (i.e. capital flow reversals). Thus, it led to a procyclical fiscal policy in a number of countries; e.g. spending grew when capital inflows were strong and growth boosted tax receipts, whereas cuts were made when it could not be financed. To complete the scenario, these factors must be added to macroeconomic instability, through both the direct effect of the dependence on commodity exports and the debt accumulated during the previous years.

The literature on the determinants of endogenous growth shows that the main causes include human capital (Lucas, 1988), public infrastructure (Barro, 1990), and technological diffusion (Barro and Sala-i-Martín, 1997). The institutional background is also seen as crucial for explaining differences within countries (Olson, 1996; Easterly, 2001). In addition, Fischer (1993) stressed the importance of macroeconomic stability for development. In our view, the empirical evidence available is still insufficient to provide conclusions respect to South American countries.

In practice, the formal aspect of trade theory attempts to address problems that are regarded as of major significance for the less developed countries. These have ranged from the "infant industry" problem of Hamilton (1957) to the terms of trade deterioration problem. One of the results to emerge from the 1950s was the demonstration by Bhagwati (1958a) that growth in an open economy could be "immiserizing"; i.e. national welfare could actually decline as a result of expansion, causing a strong enough deterioration in the terms of trade to counter the favorable effect on welfare.[33]

Historical academic research over the past 50 years has examined the relationship between openness/globalization and poverty reduction. After observing the last inevitable process of globalization, the majority of the empirical evidence on international trade is inconclusive.[34] Elsewhere, trade is presented as a channel and

[33] An entirely different type of "immiserizing" growth was analyzed by Johnson (1967).

[34] See, for example, Roubini and Sala-i-Martin (1992), Rivera-Batiz and Romer (1991), Frankel and Romer (1999), Hall and Jones (1999), Dollar and Kraay (2003, 2004).

GDP improvement is seen as the result of both increased consumption of goods, equipment and capital goods by the industrial sector, and the dissemination of ideas (Romer, 1994). However, one of the risks of greater openness in less developed economies is the potential increment in external shocks; i.e. the distortions of the terms of trade and exchange rate enable foreign capital flows to leave the country leading to a deterioration in output growth rates.

Several empirical studies about the effect of international trade on growth reported a positive and significant relation between trade and per capita GDP. Frankel and Romer (1999) found that an increment of 1% in the ratio of trade on GDP increased income by between 0.5 and 2%. The importance of markets (accessibility) and commercial policies has recently been argued by leading-edge literature on poverty and development (see, e.g. Sachs, 2003; Easterly and Levine, 2003), highlighting additional important factors for international trade and development (i.e. regional and geographic characteristics, commercial partners and policies to access to foreign markets).

Despite the positive empirical results of the literature, a seminal document by Rodriguez and Rodrik (2001) questioned the different indicators used to measure international trade. Their results point out that in some cases the indicators are closely correlated with institutional variables and macroeconomic stability.[35] Considering Frankel and Romer's (1999), Rodriguez and Rodrik's results using geographical dummies, found that the explanatory variable for openness is not significant. Similar results can be found in Hall and Jones (1999), after including institutional variables.

De Gregorio (1992), analyzing Latin American countries over the period 1950–1985, found that various openness indicators are not significantly related to per capita GDP growth and that low investment and high inflation inhibited economic growth, whereas macroeconomic stability and human capital played a crucial role. The results suggest that instruments such as learning-by-doing fostered by protectionist policies may have played a positive role in economic growth. In support

[35] Rodriguez and Rodrik (2001) claim that the indicators of openness frequently used in the literature are poor measures of trade policy, since they are closely correlated with macroeconomic policies (see e.g. the Sachs-Warner correlation between openness and growth that can be explained by: the state monopoly on exports and the black market exchange rate premium). We consider that the positive effect of trade openness on growth is through various channels (e.g. imports of capital and intermediate goods, and technological spill-over).

of these results, Astorga (2010) suggests that the positive correlation between openness and growth is only a recent phenomenon, occurring after the 1980s for Latin America.

2.1 *Institutional quality and endowments*

The consideration of additional factors that provide incentives to societies to maintain high-quality institutions is, therefore, a key recent issue in development literature. Accordingly, our research attempts to introduce evidence of institutional quality and its aggregate effects on growth. Institutional quality has two principal effects: it induces higher overall investment and a faster pace of economic growth; and it restricts the activities of groups involved in the unlawful appropriation of resources thereby ensuring a more equal distribution of the benefits of growth.

The institutional set up and its relation to economic growth is extremely important. As stated before, this chapter claims to make a contribution to the literature on this topic. Recent economic literature suggests that policy and institutional factors (i.e. trade, rule of law and political freedom, as well as human resources) play an important role in economic performance.[36]

Therefore, it is futile to recommend good macroeconomic and microeconomic policies if the institutional structure is not appropriate to support them (Acemoglu et al., 2001; North, 1993). The theory says that weak institutions lead to inequality, intermittent dictatorship, and lack of constraints to prevent elites from plundering the country.

Development economists are sure that without reasonable guarantees for property rights there can be no asset accumulation or investment in new technologies, and hence no growth. Hausmann and Velasco (2005) found that the existence of weak institutions is a particularly binding constraint for growth in Latin America. For instance, expropriation risk should result in high investment costs and ex-post returns. But in general, the results are low marginal returns on assets such as

[36] "Institutions provide the incentive structure of a society, and they comprise the formal rules, laws and regulations, informal constraints and their enforcement characteristics" (North, 1993). Accordingly, governments must provide the right environment for private sector development, economic growth and employment. Developing laws to preserve order and stability, providing protection and advancement of human rights, delivering education and health services, etc.

human capital and infrastructure, which are complemented by the accumulation of physical capital and most recently by population growth.

The roots of this situation can be found in the distribution of the initial endowments during the colonial period. Labor relations, inherited from the system of land ownership, and education were completely neglected by small elites that ruled the countries and wielded economic power. With the existence of land inequality, the workers were tied to the land (Cardoso and Helwege, 1992). This caused uneven initial conditions and proved to be a major obstacle to a more equal distribution of income. The labor system (the *Encomienda*) established a landed aristocracy that dominated political life for centuries before sharing its power as the economic structure changed (shift to agriculture). The concentration of power created a highly bifurcated class structure compared to other population groups. Problems of unequal income distribution and widespread rural poverty continued in the region well into the twentieth century.

As stated in Acemoglu (2005), it is quite obvious that initial conditions determine the joint evolution of institutional quality and the accumulation of human and physical capital. This is why more attention should be given to historical factors, which shape the progress and the prospects of developing economies. In contrast, Ross (2001) backs the evidence that institutions are endogenous, e.g. "the result of economic growth rather than the cause". Many institutions such as the structure of financial markets, mechanisms of income redistribution and social safety nets, tax systems, and intellectual property rules tend to evolve endogenously, in response to the level of income.

As regards the relationship between institutions and capital markets, the empirical evidence shows that the association between foreign direct investment[37] (FDI) and the institutional framework is stronger in developed countries, where political stability, property rights, and judicial credibility play a key role in attracting capital inflows (Brunetti et al., 1998). Abramovitz (1986) indicates that there are prerequisites for countries looking to attract FDI: a minimal degree of social capacity

[37] The relationship between growth and capital inflows is in part non-causal, because it largely depends upon similar aspects of the policy and non-policy economic environment. The causality that does exist clearly runs in more than one direction, as international investors tend to search for regions in which rapid growth can be expected. Accordingly, the neoclassical growth theory argues that an increase in investment raises the steady-state level of output per worker, while the endogenous growth focuses on economies of scale and spillover effects to justify the way that investment promotes growth.

is required (i.e. adequate level of human capital, economic and political stability, liberalization of markets, and adequate infrastructure). Other determinants are economic policies (taxes, macroeconomic stability, trade, the degree of economic freedom) and the set of regulations affecting FDI. In the specific case of Latin America, the public debt overhang acts as a deterrent and exchange rate volatility is detrimental to FDI (Benassy-Quere et al., 2007). Regarding the poverty reduction effect of FDI, the results depend on country and time-specific features. The overall impression is that the East Asian countries were more successful than their Latin American counterparts during the postwar years (Apergis et al., 2007).

We would like to briefly introduce some additional costs of the earlier policies, which trigger enforcement costs, such as those reflected in the resources regularly expended in litigation and related activities. This is the case of rent and the stemming of revenue-seeking activities that arises from trade restrictions as individuals and interest groups try to protect their actual rights.[38] However, many countries face more severe and costly enforcement problems, which show up in a variety of domestic conflicts (e.g. strikes and lockouts, military coups, or class rivalries), as well as in fear of insecurity that the state is simply unable to curtail.

2.2 *Macroeconomic volatility and capital inflows*

Macroeconomics and institutional stability seem to have a crucial effect on growth. This is why Rodrik (1999) recommends proper management of internal problems in order to prevent the negative impacts of external volatility. That is to say, institutions must provide a stable framework and unity against potential conflicts arising from pressures over redistribution of resources or poverty. Considering that strong and transparent government institutions can also mitigate in part the negative impact of external volatility on growth (Easterly and Kraay, 2000). Volatile economies often have weak fiscal institutions that cannot guarantee a rapid and appropriate response to shocks, after capital outflows. They are unable to sustain a fixed exchange-rate system if the government reacts late to any possible threat, leading to further depreciations of the exchange rate equilibrium, lagged fiscal liabilities issues and an increase in public debt. Poelhekke and Van der Ploeg (2007) in a study of commodities as export shares, indicates that commodity prices affect real exchange

[38] More generally, “directly unproductive profit-seeking (DUP) activities” (see e.g. Bhagwati, 1982).

rate volatility. Uncertainty about the real exchange rate exacerbates the negative effects of domestic credit market constraints, which will ultimately curb economic growth.

However, empirical results mention that the influence of external shocks (e.g. terms of trade volatility) goes beyond the effects on GDP or consumption, being capable of explaining the behavior of other macroeconomic variables. Bourguignon (2004) notes that the impact of terms of trade on the current account balance is also important. This relates to the limited access of many less developed countries to international capital.[39] Razin et al. (2003) point out that less developed economies are more likely to suffer from the effects of volatility since there is greater investment in infrastructure and physical capital than in other places (as in many cases, current infrastructure is unfit for the efficient performance of new industries).

Hausmann and Velasco (2005) argue that the dependence of Latin American public finances on the exploitation of natural resources means government finances remain fragile due to variation in prices. Consequently, the informal sector may be large and the government borrows to make up a hefty and growing deficit. In these cases, the present rate of investment is lower than is required. This is why the investment in infrastructure is insufficient for social returns. Gavin and Hausmann (1998) find that Latin American government revenues and expenditures respond significantly to variations in commodity prices, especially for Argentina, Ecuador, and Venezuela.

As for macroeconomic volatility, variations in the real exchange rate reduce the relative prices of tradable manufactured products. For instance in Bolivia, the real exchange rate appreciated by 17% in 1973, and then doubled between 1979 and 1983. As a result, non-mining activity was relatively uncompetitive and its share of exports slumped to 5.2% of total exports in 1985, (Auty 1995). During the 1980s, Peru experienced a resource boom through dramatic increases in the price of copper. The resulting appreciation of the real exchange rate increased the relative export prices of non-tradable goods and subsequently damaged Peru's manufacturing and agricultural sectors (Sarraf & Jiwanji, 2001). Venezuela's economic policy did not react swiftly enough to the first negative shock of the 1980s that generated current

[39] The downturn of these economies intensifies the recessionary effect of volatility due to the disruption or even interruption of capital flows from international markets. The main periods of volatility in Latin America were linked to external crises, high levels of external debt and subsequent periods of inflation (see e.g. Michael Pettis, 2001).

account and fiscal deficits, which were accompanied by massive attacks on the currency. In 1983, in the wake of one massive attack, the traditional fixed exchange rate system was abandoned, and a multiple exchange regime was adopted, the economy contracted by some 13% (Hausmann, 1997).

3. Specification of the empirical model

In this section, we explore the main factors influencing economic growth in South American countries. The analysis is based on a general framework of panel data regressions, emphasizing the regional experience. This approach allows us to understand the factors associated with economic growth plus the main differences between South American economies. We focus on South American countries because they still have a medium level of social capacity in terms of human capital and financial intermediaries, as well as a certain level of institutional stability.

3.1 *Modeling long-run determinants*

Our regression applies to a panel set of cross-country data for 1960–2008. Since our sample is small (10 countries), it was advisable to exploit the time dimension of the data in order to obtain more robust estimates by working with more degrees of freedom (Caselli et al., 1996). This is what panel data models do (Islam, 1995): they consider the information on within-country variability explicitly and allow for differences in the dependent variable in the form of unobservable individual effects. Actually, we estimate a system of two panel data models by generalized least squares (GLS), which considers explicitly the within-country variability information and allows for differences in the production function in the form of heteroskedasticity and cross-country variations.

Equation I: The fundamental determinants of growth

The first equation estimates the effects of a group of fundamental variables and other exogenous factors on GDP per capita growth. It measures the log of real GDP per-capita growth (*gr*) as a function of certain fundamental variables. According to traditional economic growth theory, we estimate Eq. (1) with a set of variables that,

as stated previously, are assumed to have a greater effect on South American economies:

$$\ln(gr)_{it} = \beta_0 + \beta_1 \ln(g0)_{it} + \sum_{f=1}^{F} \gamma_f \ln\left(x_f\right)_{it} + \sum_{e=1}^{E} \gamma_e \ln\left(x_e\right)_{it} + u_{it} \qquad (1)$$

where $g0$ is the initial GDP per capita; x_f is one of the F fundamental variables (foreign direct investment, gross fixed capital formation, external debt, real openness and human capital); x_e is one of the E expansion variables (natural endowments, manufacturing exports, macroeconomic shocks and institutional quality).

Equation II: The impact of exogenous shocks on economic growth

The second equation measures the effects of a set of macroeconomic disturbance variables on foreign direct investment (*fdi*). This approach of adding exogenous shocks to main growth determinants has recently received wide empirical support (Barro, 1991; Astorga, 2010; and Tamirisa et al., 2008, among others) and it has been applied to other formal economic growth exercises. Following the arguments presented in the previous section, FDI is regressed on itself (lagged by one period) and some fundamental variables (x_f) like GDP per capita and real openness, as a policy indicator. It also depends on a set of expansion variables, such as certain exogenous shock variables (terms of trade and real exchange rate deviations). Thus, the equation to be estimated is:

$$\ln(fdi)_{it} = \gamma_0 + \gamma_1 \ln(fdi)_{it-1} + \sum_{r=1}^{F} \gamma_j \ln\left(x_f\right)_{it} + \sum_{e=1}^{E} \gamma_k \ln\left(x_d\right)_{it} + v_{it} \qquad (2)$$

3.2 *Specification features*

All the variables in Eqs. (1) and (2) have been transformed into logarithms, with the exception of *Institutions Quality* (see Appendix Data). Moreover, we used first-differenced and log lagged variables as in De Gregorio (1992), Loayza et al. (2005) and Astorga (2010) so as to avoid potential endogeneity in some of the regressors.

For the construction of the indicator of terms of trade volatility we apply the Kalman filter method,[40] which has recently received intensive attention (Clark, 1987; Álvarez et al., 2000; Cunningham et al., 2007). In that way, we considered the stochastic volatility as an attractive alternative for measuring volatility processes since it is theoretically consistent with continuous-time modeling specifications. The model captures the time-varying variances, and it is formulated in the state space form. For linear systems with Gaussian innovations, the Kalman filter offers an optimal way to include unobservable variables and it estimates them in any further empirical application (Hamilton, 1994).

We follow the subsequent estimation strategy. First, we begin by testing specifications that include only some fundamental factors; e.g. standard regressors (physical and natural capital, demographic changes, labor, etc.) plus human capital. Then we move to augmented specifications where we can assess the role of a number of additional factors commonly found in the empirical literature, such as macroeconomic stability, structural transformations, macroeconomic shocks, economic policy and institutions. These are nested specifications, which include only those determinants that were significant in each regression.

3.3 *GLS estimation method*

When the basic assumptions about the error variance-covariance matrix do not apply, GLS methods lead to more efficient estimators than fixed-effect or random-effect estimators. GLS is capable of accounting for various patterns of correlation between the residuals. In the literature, it has also proved to be an appropriate estimation method when the number of cross-sectional units (N) is relatively small and the number of time periods (T) is relatively large, as is the case in this chapter. In this kind of model, the time dimension prevails and serial autocorrelation appears to arise as in pure time-series data. In addition, it is also well-known that heteroskedasticity tends to be present in cross-sectional data allowing for a different residual variance for each cross-section. This is particularly true in cross-country

[40] To estimate the volatility of terms of trade, we model the new variable as a function of terms of trade in logs. In that way, the underlying volatility process can be defined as hidden, with a form of an auto-regressive process with trend, allowing the trend component to be either an irregular random walk with drift or a smoother series moving irregularly over time. We used the Kalman Filter as a method for inferring the predictable components and trends in the evolution process.

comparisons where a large variation of the scale of all variables in the model can be expected. Finally, it would also seem reasonable to allow correlation of the disturbances across cross-sectional units, restricting residuals in different periods to being uncorrelated.[41]

In Eq. 1, we analyze economic growth determinants in a panel of 49 years (1960–2008) across 10 Latin American countries. First, we tested the accuracy of a fixed- versus a random-effects model with the Hausman test (Hausman, 1978). The test is very significant (28.16), demonstrating the need to control for country-specific unobservable effects in this model. In addition, the Wald test on groupwise heteroskedasticity (79.34) rejects the null hypothesis of constant variances across countries (Greene, 2008); i.e. we must estimate the regression allowing for cross-country heteroskedasticity. Moreover, the Breusch-Pagan independence test (172.54) clearly rejects the null hypothesis of zero correlation between the errors of the ten countries (Breusch and Pagan, 1980); i.e. we must allow for contemporaneous correlation of the disturbances across countries. Finally, within-country serial autocorrelation is also tested and found in Eq. 1, the correlation AR(1) parameter being significantly different for each panel.[42]

In Eq. 2, we also apply GLS to estimate foreign direct investment as a function of certain fundamental variables and macroeconomic disturbances. In general terms, the test results are similar to those for the previous equation. First, the Haussman test (33.51) rejects the null hypothesis that the country-level effects are adequately modeled by a random-effects model. With respect to the variance-covariance structure of the error terms, only groupwise heteroskedasticity is found by the Wald test (37.66). Nevertheless, the Breusch-Pagan test (41.54) accepts the null hypothesis, pointing out the absence of cross-correlations across countries in the error term. Finally, no serial autocorrelation is found in the errors.

Therefore, we must select an estimation method capable of producing efficient estimates in a fixed-effects panel data model when the error covariance matrix must relax the assumptions about intra-country serial autocorrelation, heteroskedasticity, and/or cross-country correlation. This is the case of the GLS specification, which in practice is reached in iterative form until the coefficients and weights converge. For

[41] Complete information on GLS can be found in Greene (2008) and Maddala and Lahiri (2006).

[42] The restriction of a common autocorrelation parameter could be reasonable when the individual correlations are nearly equal and the time series are short (which is not the case here).

this reason, the complete procedure is called “Feasible Generalized Least Squares” (FGLS).

3.4 *Analysis of structural change*

One key advantage of having a long-term data set covering almost 50 years is that we can compare the results for the global period with those in two or more sub-periods, assessing the sensitivity of the coefficients. Particularly, our interest relies on the analysis of the potential impact (on the regression coefficients) caused by the debt crisis during the early 1980s, as well as the beginning of the pro-market reforms that took place during the 1980s and 1990s. To what extent could the final estimations for Eqs. 1 and 2 be biased due to structural change?

A well-known test on the stability of the regression coefficients over different time sub-periods is the Chow (1960) breakpoint test.[43] The application of this test to the full model of Eqs. (1) and (2) -extensions 3 and 4, respectively- demonstrates the existence of structural change in the early 1980s. This test is highly significant in 1982 for Eq. 1 and in 1985 for Eq. 2.

In order to test for significant changes in the parameters of the equations we opt to apply a switching regressions solution; i.e. we partition the complete data set into two subsamples: 1960–1982 and 1982–2008 (for Eq. 1) and 1960–1985 and 1985–2008 (for Eq. 2). The results are shown in Table 3.2. There are significant changes in the coefficients quantity. However, the most outstanding finding is that variables that are significant in the global regressions become insignificant in the sub-periods, and vice versa (mainly in Eq. 2). All these results will be commented on in the next section.

[43] This is a test on the null hypothesis that the coefficients are the same in all the sub-periods of the sample. It is distributed as an F variate with $K,N-MK$ degrees of freedom, K being the number of coefficients, N the complete sample period, and M the number of sub-periods. An important assumption made in using the Chow test is that the disturbance variance is the same in all regressions. Our GLS estimations for Eqs. 1 and 2 conveniently control for the initial presence of heteroskedasticity in the errors, which validates the application of the Chow test in this exercise.

4 Results of the Panel Data model

The FGLS estimation results reported in Table 3.1, for both equations and the entire period (1960–2008) are interesting and consistent with the growth literature and other empirical evidence. All these variables have the correct sign and are statistically significant. The estimation of Eqs. (1) and (2) coefficients in the *Core specifications* (Table 3.1, column 0) embed not only the direct impact of fundamental variables (investment and physical capital accumulation) on economic growth and foreign direct investment, but also other institutional variables.

In Eq. 1 (GDP per capita growth), the variable of initial GDP per capita is very significant with a negative sign, reflecting conditional convergence across these countries in the given period. The convergence process can be characterized by two concepts: on the one hand, the convergence rate (or speed), which can be defined as $b = -\ln(1+\beta)/t$, for β the coefficient of GDP per capita and t the growth rate time period; on the other hand, the half-life or the time necessary for the economies to fill half of the variation that separates them from their steady state: $\tau = -\ln(2)/\ln(1+\beta)$. In the *Core estimation*, the associated speed of convergence is 2.2%, which is similar to the 2% usually found in the convergence literature, with a half-life of almost 24 years; e.g. at this speed, South American countries will achieve convergence in 50 years. This speed significantly accelerates for the last extension of the Eq. 1 model, in column (4), to 3% shortening the half-life measure by some years. These results are similar to other empirical references on the subject; for example, our β coefficient of 3% is similar to the results of Serra et al. (2006) who examined six large middle-income Latin American countries during the period 1970–2000, and found a β coefficient of 2.8% once sectoral variables (agriculture and manufacturing) were controlled for. The longest period revised is 100 years, by Astorga et al. (2005), but only for the six most developed Latin American countries. It found a slower rate of absolute and conditional convergence of around 1.4%.

Resuming, Table 3.1 (column 1) describes the estimate β coefficient of 3.2% when sectoral exports are included. On the other side, the inclusion of macroeconomic shocks (real exchange rate deviations and the U.S. interest rate) further decreases the estimates to 2.8%. Once we control for institutional variables in the regression the speed of convergence is higher 3.0% (Table 3.1, column 4).

The coefficients for the explanatory variables of foreign investment (Eq. 2) demonstrate that international trade policies (real openness) boost capital funds. Similarly the coefficient representing the *accelerator principle* (one-period lagged GDP per head growth) has a positive and significant relation with foreign direct investment. The two institutional variables, life expectancy and secondary enrollment are statistically significant. Life expectancy reflects convergence in terms of health, is also likely to reveal other important contributing factors to long-term growth, such as the accumulation of human capital and structural and institutional changes. The positive sign of *secondary enrollment* indicates a direct positive association between growth and human capital accumulation, especially in developing countries, which are actually converging to human capital international standards (Barro and Sala-i-Martín, 1997).

Finally, the external debt coefficient still has a negative impact on South American economies, being highly significant as we discussed in the literature review. The empirical results indicate that it is difficult to say whether external debt has a negative effect on economic growth, though many studies conclude the first. The debt hypothesis basically indicates that the accumulated debt acts as a tax on future output, discouraging private sector investment plans, and it usually demands efforts on the government side. So if governments want to pay their debt obligations, they need to levy a tax on the private economy or reduce any future project, leading to negative effects on future production and income. Geiger (1990) reaches the same conclusion for nine Latin American countries, i.e. that there is a statistically significant negative relationship between debt and economic growth. On the other hand, Warner (1992) indicates that the reasons behind the decline of investment in some of the heavily indebted countries are declining export prices, high world interest rates, and sluggish growth in developed countries.

4.1 *Empirical extensions*

Table 3.1 (columns 1 to 5) presents the econometric outcome of a set of exogenous variables on the dependent variables. These results are *extensions* of the *core equation*. This part of the empirical results includes other important socioeconomic variables related to development economics. They are included to capture the effects of other factors associated with GDP per capita growth and foreign investment. For

example, the presence of good institutions fosters strong political institutions that can associate growth with welfare, and are able to attract foreign investment to the internal market. Conversely, the negative effects of debt overhang can create major dislocations on the balance sheet, bringing the regional economy closer to a risky external position.

- Sectoral exports

The export sector's low diversification of South America is one of the key obstacles to sustainable economic growth. For example, fuel and mineral exports represent approximately 37% of the total exports of our sample and agricultural and manufacture exports about 25%. That is why we introduce sectoral exports (manufacture, services and food exports) to check whether sectoral production has significant effects on economic growth (see Table 3.1, column 1). The results are interesting especially for exports of manufactured goods and services, which are highly significant, with a direct and positive impact on economic growth. This may be due to the impact of the Industrialization Substitution Imports policy which attracted high levels of foreign investment before the 1980s (first sub-period) (see e.g. also Table 3.2). The food exports variable appears to be one of the most significant factors attracting investment, due to higher foreign prices and better production techniques.

- Macroeconomic shocks

The results of macroeconomic volatility and real exchange rate deviations have a negative effect on both economic growth and investment, being highly significant in all the equations. The U.S. rate has the expected and significant negative sign. Its negative association with economic growth is related to capital outflows due to increments of foreign interest rates (Table 3.1, column 2). It also has other important effects on economic growth; e.g. if foreign interest rates increase, debtor countries will have to pay more for their external debt, forcing them to reduce future projects and hampering the potential output.

Facing these results, it appears interesting to analyze the *real exchange rate deviations* that has a major negative impact on investment and increases its statistical significance with the interaction of terms of trade. This result may reveal the impact of the exploitation of natural resources on developing economies reflected in higher income exports and increasing import capability, which is used as a source

of public expenditure. However, the presence of the Dutch Disease[44] could temporally affect export prices, leading to further overvaluation of the real exchange rate and negative effects on growth.

- Terms of trade

We found that the presence of terms of trade in the models influences positively GDP per capita (Eq. 1). Regarding Eq. 2 (see Table 3.1, column 3), it changes *life expectancy* by *secondary enrollment* as a significant factor of GDP per capita growth. Also, it enhances the significance of the exchange rate deviation.

In fact, the *terms-of-trade* exhibits a negative impact on foreign direct investment (Table 3.1, column 3). A plausible explanation for our result may lie in the region's production structure. Since South America depends in part on commodity exports, it seems plausible that high raw material prices may boost the negative effect of macroeconomic disturbances on the investment variable. Additionally, it is reasonable that foreign investment is attracted to sectors with lower volatility.

Finally, we suggest that the export promotion strategy led to a somehow 'biased' economic growth in countries specialized in exporting commodities; this may also increase the region's output gap and disparities. A theoretical description of this can be found for the sectorial structure of exports. According to the above theory, Bhagwati et al. (1978) find that terms of trade might worsen the country's capital inflows, resuming that the effect on foreign investments depends on the country's trading mode, that is, import substitution or export promotion.

Reading the outcome from Eq. 1 (Table 3.1 column 3), the *terms-of-trade* is positively significant enhancing economic growth, which is probably due to commodity exports and in increments in the government revenues. Conversely, there is a reduction in the level of significance of the export of manufacturing comparing the results of the above equation for growth (column 2).

[44] In analytical terms, the Dutch Disease in the region should be understood as a case of "earlier" de-industrialization as a result of changes in economic policy, which brought countries back to their initial position. In this case, the description is associated with countries following an industrialization agenda aimed at generating a trade surplus in manufacturing, which finally generates a trade surplus in primary commodities or services (see Palma 2003, 2005).

- Institutions

Finally in column (4), the inclusion of the *Institutions Quality* appears with the correct sign, though it is only significantly different from zero at the 10% level. Thus, the presence of a favorable institutional framework is important for economic growth in less developed countries, although institutions are prompt to be affected by rent-seeking behavior especially in those countries with natural resources wealth. This seems to be one of the poverty traps permanently affecting governance and good institutions.

4.2 *Growth over different sub-periods*

An empirical explanation of the division into two sub-periods is the appearance of the debt crisis during the 1980s and the adjustment process followed after 1987, which cost real GDP per capita growth and welfare deteriorations in most countries of the region. The fiscal deficits incurred by these countries in the 1970s produced high levels of foreign borrowing in order to ride out the effects of the oil price rises in 1973 and 1979. Moreover, unfavorable terms of trade (except for major oil exports) and interest rate shocks resulted in an unleashing of the crisis that brought regional growth to a halt for almost a decade. According to the conventional view, the fundamental causes were worldwide inflation, which almost tripled global interest rates while the debt-service jumped to unmanageable levels (e.g. Mexico defaulted on payment in 1982, later other countries followed default problems and were forced to reschedule their outstanding debts).

- Fundamental variables

Table 3.2 shows the results of the division between sub-periods for each equation. Columns 3 and 4 show a negative and significant result of external debt coefficients on economic growth for both sub-periods confirming the findings of other studies. The result for the first period reflects the initial impacts of the accumulation of fiscal imbalances and debt overhang on the regional economy. This effect exacerbated the debt problems of the 1980s that were greatly compounded by higher levels of external debt and a sudden cut of the flow of loans to South America, which increased the risk of recession and debt payments.

Table 3.1

Determinants of per capita GDP growth and Investment.

Panel setting: Yearly frequency

Estimation method: Feasible Generalized Least Squares (GLS). FIXED EFFECTS

	Core		**Extensions of the model**						
			Sectoral exports		Macroeconomic shocks		Terms of trade		Institutions
	(0)		(1)		(2)		(3)		(4)
VARIABLES	growth	investm.	growth	investm.	growth	investm.	growth	investm.	growth
GDP per head (-1)	-0.0289***		-0.0317***		-0.0272***		-0.0295***		-0.0300***
	[0.006]		[0.006]		[0.006]		[0.006]		[0.006]
GDP p. head growth (-1)		1.6607**		1.5337**		1.4992**		1.7241***	
		[0.672]		[0.656]		[0.655]		[0.633]	
Investment (-1)	0.0051***	0.6938***	0.0045***	0.6586***	0.0043***	0.6543***	0.0049***	0.6067***	0.0055***
	[0.002]	[0.036]	[0.002]	[0.038]	[0.002]	[0.037]	[0.002]	[0.038]	[0.002]
Gross fixed capital form.	0.0405***		0.0443***		0.0425***		0.0391***		0.0336***
	[0.006]		[0.007]		[0.007]		[0.007]		[0.006]
External debt	-0.0200***		-0.0213***		-0.0190***		-0.0217***		-0.0239***
	[0.004]		[0.005]		[0.004]		[0.005]		[0.005]
Real openness (-1)		0.4874***		0.6137***		0.6394***		0.7418***	
		[0.136]		[0.142]		[0.142]		[0.139]	
Sec. enrollment (-1)	0.0018**		0.0015*					0.2112***	
	[0.001]		[0.001]					[0.063]	
Sec. enrollment (diff)					0.0335*				
					[0.020]				
Life expectancy (-1)		1.5014***		1.3489***		1.2492***			
		[0.458]		[0.455]		[0.457]			
Manufacture Exp (-1)			0.0039*		0.0048**		0.0037*		
			[0.002]		[0.002]		[0.002]		
Services Exp (-2)			0.0100*		0.0100**		0.0140**		0.0106**
			[0.006]		[0.005]		[0.005]		[0.005]
Food Exp (-1)				0.1881***		0.1915***		0.1412**	
				[0.062]		[0.061]		[0.066]	
REER deviations (-1)						-2.1e-05*		-3.3e-05**	
						[1.2e-05]		[8.7e-06]	
US rate (-1)					-0.0035***		-0.0038***		-0.0039***
					[0.001]		[0.001]		[0.001]
Terms of trade (-1)							0.0152***	-0.4789***	0.0164***
							[0.004]	[0.104]	[0.004]
Institutions Quality									0.0001*
									[6,0e-05]
Haussman test	28.16***	33.51***							
Wald heterosked.. test:	79.346***	37.662***							
B-Pagan independ. test:	172.548***	41.544							
Chow test	2.76*** (year: 1982)	2.79*** (year: 1985)							
Convergence rate:	2.2%		3.2%		2.8%		3.0%		3.0%
Half-life (years):	23.6		21.5		25.1		23.2		22.8
Observations	480	400	470	400	470	400	470	415	470
Pseudo-R2:	0.2217	0.6931	0.2405	0.6931	0.3018	0.6979	0.3154	0.7076	0.3172

Standard deviations in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In addition, Table 3.2 shows the importance of *secondary enrollment*, reflecting the significant progress in human capital accumulation in South American economies specifically in the first sub-period, where it is significant at 1% and has a positive effect on GDP per capita growth; for the second sub-period, the secondary-enrollment variable (in differences) is significant and exerts a positive effect on growth, reflecting a possible convergence within the region in terms of human capital.

As stated before, trade openness appears to be beneficial to economic growth on average, whereas its effects vary considerably across countries and depend on a variety of conditions related to the structure of an economy and its institutions.[45] Our results for the foreign investment equation (Table 3.2, columns 6 and 7) show that *real openness* has an indirect impact on growth via investment, which is significant during the second period, confirming the positive effects of the reforms in the 1990s and trade agreements in the region. On the contrary, this variable is not significant during the first sub-period, probably as a consequence of the implementation of trade barriers that were part of the strategy of import substitution (1950–1980).[46] It is well known that protectionist trade policies tend to discourage rather than promote the desired diversification of exports. Edwards (1993) argues that the beneficial impact of openness on Latin American economic growth is greater when society has a more efficient, accountable and honest government, since the presence of solid institutions attracts foreign investment flows.

Therefore, a strong sociopolitical setting is capable of promoting economic growth with population welfare, which is able to make the economy more competitive in the global markets. The continuous institutional change process of South American economies has a substantial impact on economic growth, which is more noticeable after the debt crises and under democratic regimes (see Table 3.2 – Growth equation).

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[45] Edwards (1993) reviews the literature studying the conditions needed for successful trade reform. He argues that a minimum level of development is required before the benefits of export promotion can be realized, and that depend on a 'minimum critical threshold' related to the trade structure itself, rather than to per capita income.

[46] The strict version of the openness hypothesis requires the marginal effect of trade openness to be non-positive when the capital account is relatively closed to trade. Rajan and Zingales (2003) suggest that for Latin America, the episodes of financial repression to protect industrial incumbents prevented financial development. Similarly, the marginal effects of financial openness are expected to be negative or zero when an economy is not open to trade.

The results also show that the rate of convergence in the first sub-period (1960 –1982) is higher and stronger (3.6%) than for 1982–2008 (2.6%). We suggest that manufacturing exports, services exports and other conditioning variables had substantial effects on growth in the first sub-period, possibly increasing the rate of convergence in the 1960s and 1970s; however, the results for the same set of variables are not so significant during the second sub-period (e.g. terms of trade are no longer significant, decreasing the beta convergence in South America).

We firmly believe that the rising internal constraints (structural and cyclical) and macroeconomic imbalances exacerbated the inherited economic problems, and made it even more difficult to manage economic policies. Finally, by the 2000s, South American economies achieved moderate growth, but it appears that GDP per capita growth is still not high enough for small countries to revert to the lower growth path.

- Empirical extension variables

With respect to sectoral exports, we surprisingly find that manufacturing and services exports are only significant in the first period (1960–1982), as shown in Table 3.2, columns 2 and 5. It could be said that ISI policies had achieved a degree of manufacturing production that normally corresponds to a situation in which countries seek to generate a trade surplus in manufacturing. In addition, in the investment equation (Table 3.2, column 5), the manufacturing export coefficient is highly significant. We believe that this result is due to favorable conditions for investment in the manufacturing sector, which were part of the industrialization strategy. Finally, we can better distinguish that food exports attracted foreign investment in the first period only, possibly as a result of favorable foreign prices.

It is instructive to associate the previous results (sectoral exports) with this process of de-industrialization in South America that was based on the remarkable slowdown in productivity growth in the mid-1970s. This process could have been caused by “mistaken” and “wrong” structural policy decisions (particularly in the 1980s) that over-intensified the processes of de-industrialization and damaged the long-term growth prospects for the region (See Palma, 2003; 2005).

Table 3.2
Determinants of per capita GDP growth and Investment. Full models.
Panel setting: Yearly frequency
Estimation method: Feasable Generalized Least Squares (GLS). FIXED EFFECTS

	Growth (Eq. 1)			Investment (Eq. 2)		
	Period	Period	Period	Period	Period	Period
VARIABLES	1960-2008	1960-1982	1982-2008	1960-2008	1960-1985	1985-2008
GDP per head (-1)	-0.0300***	-0.0354***	-0.0255***			
	[0.006]	[0.004]	[0.008]			
GDP p. head growth (-1)				1.7241***		
				[0.633]		
Investment (-1)	0.0055***	0.0066***	0.0037**	0.6067***	0.4937***	0.5470***
	[0.002]	[0.002]	[0.002]	[0.038]	[0.056]	[0.056]
Gross fixed capital formation	0.0336***	0.0228***	0.0586***			
	[0.006]	[0.005]	[0.009]			
External debt	-0.0239***	-0.3400***	-0.0185***			
	[0.005]	[0.004]	[0.006]			
Real openness (-1)				0.7418***		1.0622***
				[0.139]		[0.209]
Sec. enrollment (-1)		0.0033***		0.2112***		
		[0.001]		[0.063]		
Sec. enrollment (diff)			0.0911***			
			[0.024]			
Life expectancy (-1)						
Manufacture Exp (-1)		0.0048**			0.2120***	
		[0.002]			[0.048]	
Services Exp (-2)	0.0106**	0.0309***				
	[0.005]	[0.007]				
Food Exp (-1)				0.1412**	0.7342***	
				[0.066]	[0.121]	
REER deviations (-2)				-3.3e-05**		
				[8.7e-06]		
US rate (-1)	-0.0039***	-0.0053***	-0.0042***			
	[0.001]	[0.001]	[0.001]			
Volatility		-0.0029***			-0.0502*	
		[0.001]			[0.029]	
Terms of trade (-1)	0.0164***	0.0222***		-0.4789***		-0.3784*
	[0.004]	[0.003]		[0.104]		[0.219]
Institutions Quality	0.0001*	0.0001*	0.0002*			
	[6,0e-05]	[5.3e-05]	[1.1e-04]			
Convergence rate:	3.0%	3.6%	2.6%			
Half-life (years):	22.8	19.21	26.9			
Observations	470	210	270	415	216	222
Pseudo-R2	0.3172	0.4866	0.3547	0.7076	0.6604	0.6218

Standard deviations in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the final part of Table 3.2 (macroeconomic volatility), our results show that the U.S. interest rate is negatively related to growth throughout the period, indicating that increments in foreign interest rates may produce capital outflows from less

developed countries. On the other hand, the real exchange rate deviations show no distinguishable effect between the two sub-periods.

Since it is common knowledge that the mayor macroeconomic distortions in South America occurred in the first sub-period (e.g. sudden oil price changes during the 1970s, and economic distortions of the protectionist policy), the volatility of terms of trade appears to be significant and to have a direct negative effect on growth and investment, but only in the first sub-period (columns 2 and 5). It is reasonable to suppose that the impact was greater in this period due to higher prices for natural resources.

Moreover, according to the Bhagwati et al. (1978) paradox, we confirm the previous results of Table 1. We find that the terms of trade have a negative effect on the GDP per capita growth rate and foreign investment (see Table 3.2, columns 4 and 6). We still assume that despite this -e.g. the fact that the terms of trade have a negative effect on foreign investment-, the natural resources wealth (oil, agriculture, etc.) has an important role in attracting capital funds; on the other hand, foreign investment behavior depends largely on macroeconomic performance and its stability, as well as on a favorable and sound institutional framework.

Furthermore, although the region has undergone substantial institutional changes during its history, particularly in the last half century, qualitative advances have been made in institutional terms. In that way, our results show that they had positive effects on economic growth in both sub-periods (though with less statistical confidence than other variables (see Table 3.2, column 1)).

5 Concluding remarks

Any conclusion drawn from an empirical exercise like this is admittedly tentative and suggestive. However, since our sample consists of most of South American economies we believe that our results deserve serious attention. In view of the apparent and inevitable process of globalization, the majority of the historical evidence suggests some valuable lessons for South American growth. First, physical capital accumulation (both public and private) is a necessary condition for boosting long-term growth and it is stimulated, in conjunction with investment, by a more open economy. Second, significant advances in life expectancy and access to basic education foster human capital accumulation, and hence GDP per capita growth.

Third, there is a need to secure macroeconomic stability to set the basis for high and sustained economic growth, which includes fiscal and monetary discipline, a predictable real exchange rate, and a diversified export sector to minimize exposure to terms of trade volatility. Finally, the presence of good political institutions is an important factor for sustainable growth, by stimulating productivity as well as capital accumulation.

This chapter makes a new empirical contribution to South America's economic growth, considering a longer-term perspective (almost 50 years), it also includes the small regional economies, for which there is not much historical and empirical evidence on the determinants of economic growth. In addition, we applied a new methodology for terms of trade volatility that brought the expected results according to other empirical works.

Despite data restrictions, our results are robust and gain more efficiency by the use of long time series, confirming the findings of previous studies of the subject. We could even try out different variables in order to achieve better results consistent with the FGLS.

Despite the methodology applied, we encountered some difficulties in finding a proxy variable for institutions. *Institutions Quality* exhibits frequent changes due to the instability of political regimes in the region during the 1970s and 1980s. Nevertheless, we can consider it as a good reference variable, since our results are free from perception effects problems.

As discussed in the introduction, other previous empirical evidence about the impact of trade on economic growth has failed to reveal undisputed beneficial effects on GDP per capita growth. We report that the benefits of trade are more visible from the mid-1980s onward, during the broad macroeconomic reforms and adjustment process.

The impact of foreign investment is country-specific, but it tends to promote economic growth when developing countries adopt an open trade regime, improve access to education and thereby human capital conditions, maintaining macroeconomic stability. Therefore, the link between foreign investment and growth has an important implication for developing strategies, which leads to capital accumulation and might be able to enhance economic growth through spillover efficiency and technology transfers.

Surprisingly the results show evidence that the region faced positive changes regarding its export sector; however we found that the Dutch Disease (process of de-industrialization) spread to part of the region, brought on by a drastic switch in the economic policy regime. Basically as the result of a radical program of trade and financial liberalization within the context of economic reforms that did not focus deeply on institutional changes, which later affected the results of reforms.

The results show a positive effect of food and agriculture exports that attracted foreign investment; though this could be temporary, as we think it was a result of higher commodity prices.

The presence of macroeconomic disturbances is robust in all equations and has a negative effect on both investment and economic growth. In that way, we present evidence that the region is still vulnerable to fiscal imbalances, external debt, and lack of monetary discipline (exchange rate deviations). In this context, changes in the U.S. interest rate directly affect GDP per capita growth. The presence of external debt in the region still affects the potential output, the real exchange rate disturbances are negatively associated with investment decisions, and finally, terms of trade volatility once more reflects the region's exposure to external shocks.

There are signs of the existence of conditional convergence within the region, more plainly up until the mid-1980s. In the same way, the new results for the last sub-period confirm the process of regional convergence, but with lower intensity and at a slower rate. In particular, public debt overhang and fiscal liabilities have a significant negative impact on growth; conversely, the macroeconomic imbalances of the 2000's crisis acted as a deterrent for new foreign investment. Additionally, unfavorable terms of trade and interest rate shocks resulted in low economic growth rates that affected the lower income economies.

Summing up, we have found partial evidence regarding the immiserizing-growth phenomenon, since this chapter only focused on the first example of immiseration (Bhagwati, 1958a); in that way, the results show strong evidence of terms of trade volatility in the South American economies. Additionally, the econometric results on investment reaffirm the negative effects of terms of trade (Bhagwati et al., 1978). Although the volatility of prices was significant merely in the first sub-period, affecting GDP per capita growth, nowadays, the high level of terms of trade in the region may affect long-run investment due to its high concentration on natural resources exploitation. Identifying such common factors (within a large

and diverse region) improves our understanding of why South America grew faster in the first sub-period than in the second, and what the socio-economic factors behind this phenomenon were. Revealing economic growth behavior in South America is the first and probably the easiest step in understanding development processes in developing countries among the similarities and weaknesses that lie behind emergent economies.

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Chapter 4

Growth disparities in South America, evidence from 1960–2008

Growth disparities in South America, evidence from 1960–2008

Summary

We study the regional GDP per capita disparities and it's dynamic in South American economies. We use a new historical data base that offers a detailed look at the evolution of national economies, shedding empirical light on economic disparities. For this purpose, a system of multiple equations was estimated by Seemingly Unrelated Regression (SUR) to analyze a growth accounting model. Additionally, this chapter argues the existence of clusters in the dynamics of growth, testing for parameter instability problems on national economies from a historical perspective. The dynamics of growth in South America are contrasted comparing two sub-periods (1960-1982, 1983-2008). Since South America changed its development pattern driven by industrial progress and trade openness, an analysis of productivity and growth determinants becomes a central concern for policymakers.

Keywords: Income disparities, development dynamics, Latin America.

JEL Classification. O18, F43, N16.

1. Introduction

Economic growth differentials have recently been tackled from very diverse perspectives, and have been widely discussed in great detail in the economic literature for both developed and developing countries – see Mankiw et al. (1992) among others -. These studies are diverse in the methodology, the geographical and the temporal scope. The experience from homogeneous groups of countries has been documented, for instance, for the OECD countries (Strazicich et al., 2004), the European Union (Armstrong, 1995; Fingleton, 1997), Asia (Hsiao and Hsiao, 2004), Latin America (Dobson and Ramlogan, 2002), and also in Africa (Collier and Gunning, 1999).

Given the pervasiveness of income disparities, a variety of methods has been used. Recent papers have analyzed disparities in different countries, using several variables and applying growth equations such as growth accounting (DiGiacinto and Nuzzo, 2006) or spatial data analysis (Le Gallo and Ertur, 2003; Garrett, Wagner and Wheelock, 2007).

Notwithstanding, the problem of growth disparities is a matter of concern to the developing world and unfortunately, empirical evidence focusing on South American countries is scarce. On a more academic level, recent contributions have focused in sub-country regional analysis, for example Cardenas and Pontón (1995) for Colombian regions, Azzoni (2001) for Brazil, and Madariaga et al. (2004) for Argentina).

However, other studies considered the trading blocs of the region - MERCOSUR and the Andean Community (CAN) - including national economies that partially deal with the phenomena between income disparities and economic growth in South America. Most of these recent studies focused on MERCOSUR analyzing economic convergence, regional integration, industrial development, etc. (Blyde, 2005; Yeats, 1997; Freund, 2010; Moncarz and Vaillant, 2010; etc.). Most studies for the CAN, which are dated in the 1980s and 1990s, analyze developing-country integration, trade flows, foreign investment, etc. (Khashayar and Clark, 1990; Hojman, 1981, Vargas-Hidalgo, 1979; Ferris, 1979; etc.).

South America has achieved low growth rates during the past half-century. The region is characterized as one of the most volatile, facing low competitiveness (with its main trading partners), political mismatches and income inequality, which

is still one of the main problems. However, it benefits from increasing commodity prices that boost economic growth and public revenues. In that way, it is important to stress the different particular characteristics (i.e. natural wealth, political regimes, geography, and so on) among the South American economies. The principal issue of growth disparities is that almost half of the region is relatively poor in terms of GDP per capita compared to the big and trade-connected neighboring economies.[47]

Recently, the change of the pattern of development toward growth driven by industrial progress and trade openness was stressed by the economic reforms of the 1990s, which reinforced the necessity to analyze the role of productivity and growth determinants for policymakers. These are some of the reasons why academic works on growth have flooded the economic literature, trying to find some of the basis sources for economic growth in South America. However, the problem faced by empirical growth economists is that growth theories are not explicit enough about what variables have truly an impact on growth.

The purpose of this chapter is to analyze individually the growth accounting of GDP per capita and growth determinants from a historical perspective for most of South American economies covering a long-run episode. We present results by countries in order to distinguish the basis sources of economic growth for national economies due to the existence of biases in the results. Additionally, we clarify quantitatively the formation of clusters (aggrupation of countries) in the dynamics of growth in South America, contrasting countries that grow faster than others, due to geospatial similarities, common development polices and institutional framework, etc.

The chapter shed empirical light on the evolution of GDP per capita in South America. It complements the discussion of economic growth literature on developing economies through the search for the key long-run drivers of growth, and -where possible- the identification of exogenous determinants, which are amenable to policy intervention. That is, it is important to know what ultimately determines growth and therefore where policymakers should concentrate their efforts to improve economic development.

[47] While income disparities in South America have been the subject of continuing policy concern, factors driving economic growth have also been the focus of a considerable research effort. Nevertheless it is fair to say that much of this interest has been primarily motivated by questions about disparities, and by an interest in the determinants of long-term growth (Barro, 1991; De Gregorio, 1992; Astorga, 2010; etc.)

By contrast, this paper differs from other studies, since we present results for each national economy and consider a long-time period of study (1960-2008) for most South American economies.[48] The choice of the period was dictated by data availability, a huge effort was made to include a large sample for the less developed countries (i.e. Bolivia, Ecuador and Paraguay). The use of large time series allows us to do a most careful analysis of the evolution of growth disparities.

The document provides evidence on economic growth literature based on a historical data set, considering the effect of a set of fundamental and exogenous variables.

In particular, the growth model estimates and compares the results of a general baseline model (i.e. including the same parameters for all countries), looks for the existence of bias in the estimates as a result of not considering parameter instability. The significance of different parameters on each country would be enough evidence that growth factors do not impact in the same way. Therefore, we proceed to group countries according to the influence of the fundamental or the exogenous variables that are statistically significant and consistent with economic literature (i.e. countries that were positive affected by trade openness and others affected by inflationary shocks, etc.).

Further, we study two sub-periods (1960-1982 and 1983-2008) considering several variables. In previous studies, it has been detected different dynamics of growth in South America before the 1980s and after the structural reforms of the 1990s (De Gregorio, 1992; Astorga, 2010, etc.). The results deserve attention since these are quite consistent taking into consideration the empirical issues of the economic historical literature of South America and other references on the subject.

The empirical strategy considers a model of economic growth that accounts for such differential patterns. In doing so, we base this chapter on an uneven development model capable of accounting for the special features of less developed economies. We opted for a Seemingly Unrelated Regression (SUR) model to account for economic growth disparities, which allows for a flexible modeling strategy exploiting cross-regional and temporal autocorrelation, and controls for between-

[48] For these countries, we have collected data on the main GDP expenditure aggregates (real output, investment, trade openness, capital and human accumulation) from 1960 to 2008. Taken together, the dataset incorporates over 400 annual observations covering a wide range of political systems, exchange rate, trade arrangements and historical circumstances. The data source, which are typically country specific, are detailed in the Appendix.

group differences to increase the efficiency of the estimations. This model allows for an individual estimation and the inclusion of different variables, distinguishing the growth determinants of national economies.

Most analysts of the modern South American economy hold to evidence that the region has always been volatile, with low income growth rates, high levels of inequality, and low levels of capital accumulation and innovation (R&D). This chapter revisits and argues that this conclusion is not deeply supported by the new evidence we have. We show exhaustively the existence of country clusters in the dynamics of growth (winners and losers between countries) from a historical perspective, where growth factors have impacted in different ways on national economies. The results are contrasted comparing two sub-periods (1960-1982, 1983-2008).

This chapter show evidences that nation-state macro factors and physical-geography spillovers explain the observed distribution dynamics across the region. Especially, the differences in initial endowments lead to large dissimilarities in income levels and rates of growth. On the other hand, growth factors as: human capital, financial development and institutions appear to be significant mostly in major countries. The results also show the beneficial impact of natural resources exploitation on regional developing countries. On the other hand, there are signals of immiserizing growth (i.e. terms of trade volatility) in most of the countries, the evidence is quite robust on most of the countries, but merely during 1960-1982.

The remainder of the chapter is structured in the following way. We revisit some of the economic literature and empirical evidence in Section 2. Section 3 provides an analysis of growth accounting for the national economies and the dynamics on GDP per capita. Section 4 presents the methodology of the estimation models. Results for the baseline model and for national-economies are presented in Section 5. Concluding remarks come in Section 6.

2. Growth dynamics and externalities

We mainly base this research on the growth models by Kaldor (1970), and Dixon and Thirlwall (1975), which operates under the assumptions of capital accumulation, the ability to spread to other sectors, and a relation-response between output and productivity growth. Additionally, the authors emphasize the model on balance-of-

payments constraints, cumulative causation, technical change, and different endowments, providing useful and relevant theoretical guidance to understand the determinants of regional growth. The model concludes that growth rates are not necessarily convergent in the sense that all countries end up with the same growth rate; in fact the approach is more likely to lead to divergent growth path between regions.

We try to demonstrate that the external effects on the accumulation of production factors affect the regional convergence. Recent models of economic growth have underlined the importance of external effects on the accumulation of factors of production (Romer, 1990; Lucas, 1988). On this base, we consider that the effects of human and physical capital accumulation are geographically marked and influence economic convergence in other countries. Empirical evidence has reported how linkages across economies may have an important role in explaining growth. A well-known source would be through foreign investments basically among trade partners (Coe and Helpman 1995; Park 1995). López-Bazo et al. (1998a) goes along with this point, considering a simple growth model in which accumulation of factors has an impact in its neighbors. As a result, the growth rate in a country depends on the stocks of factors in the neighboring countries.

Although it is customary to think of labor and capital as potential factors of production, increasing attention has been paid, latterly, to the contribution of investment to economic growth. The capacity to attract foreign investment is an indication of confidence in the economy and its future prospects. However, a critical point is that it is drawn by a combination of factors, rather than being responsive to a single variable, such as low labor costs. The investment level of a country depends on a range of influences. In part, there is a need for physical infrastructure, proximity to markets, the quality and availability of labor and technology transfer centers, etc.

We assume that the investment decision depends not only on the economic process but also on a society's social order. Alesina and Perotti (1993) study this relationship in a sample of 70 countries from 1960-1985, found that income inequality increases socio-political instability which in turn decreases investment. On the other hand, in an economy endowed with natural resources, foreign investment

will come even if income inequality is high, however, it will not help to reduce inequality.[49]

Bourguignon and Morrison (1998) find that specialization in natural resources has a negative effect, except in the case of agricultural goods, though income inequality will rise or fall depending on the initial concentration of land holdings and the advantage of its exports.

The underlying hypothesis on the contribution of export expansion is that it positively influences economic growth,[50] because it will increase the resource allocation efficiency and capacity utilization; these factors allow a country to take advantage of scale economies and promote technology change that increments productivity (Balassa, 1989).

For exports affect economic growth, a country must attain a minimum level of development with an outward-oriented development policy; however, exports and economic growth have to be preceded by a long and complex process of structural reforms (Edwards, 1993). This indicates that the impact of exports on economic growth across countries depends on the level of development and economic structure, subject to a dynamic interactive process of economic development and structural change.

In the same way, Galor and Weil (1999) shows that industrialization can be initially driven by the market size. Then, capital accumulation will be facilitated by financial development. However, it is necessary higher human capital will raise the technological progress and economic growth.

3. GDP per capita disparities in South America

Between 1950 and 1983, South America experienced a rapid growth: GDP -measured in adjusted purchasing power- expanded at an annual rate of 4.3%, with GDP per capita increases averaging 1.2% a year. In the other hand, during 1984 to 2008, the

[49] These investments would increase income inequality and decrease the level of socio-political stability. Thus, the country would find it more difficult to escape its poverty trap, unless the State applies policies that modify its initial resource endowments.

[50] In modern growth theory, when trade costs have just crossed a certain threshold, industrial agglomeration occurs. Agglomeration triggers a take-off in growth because the geographic concentration exploits technological externalities. Since the cost of transport goods and trading ideas decreases, then the industrialization in the South is driven by the access to northern technologies. See Acemoglu and Zilibotti (1997).

region's GDP grew only at 3.0%, with GDP per capita at 1.7 %. Tables 4.1a and 4.1b provide the country detail.

The clear star performer is Brazil, whose share in regional product increased from 29.7% to almost the half of the regional GDP (45.3%) in the second sub-period. At the other extreme, there are two groups: the Southern Cone, Argentina, Chile and Uruguay, who had a leading position at 1950, where economic performance was eroded after the turbulences of the 1970s. The second group includes a variety of smaller countries, Ecuador and Paraguay, whose share on regional output remains equal, and Bolivia (1.8%) with a decreasing participation of almost a half (1.0%).

On the other hand, analyzing GDP per capita growth rates during the second sub-period, the best performers are Chile and Uruguay, with an annual growth rate of 3.9% and 2.4%, respectively. Instead, the less developed countries Paraguay and Ecuador, show null growth rates, though Bolivia doubled up its growth rate (1.1%) in the same period. To a graphical perspective, see Figure 4.1 for the evolution of GDP per capita for national economies.

Table 4.1a GDP per capita growth rates of the South American countries
(percent and dollars of 1990[a])

	GDP per capita dollars of 1990			**Growth rate of GDP per capita** (% per year)			**Debt crisis**	**Asian-Russian crisis**
	1950	**1980**	**2008**	**1950-2008**	**1950-1983**	**1984-2008**		
Chile	3.670	5.680	13.185	2,4	0,8	3,9	1,0	0,9
Argentina	4.987	8.206	10.995	1,4	1,2	1,6	-2,3	-1,3
Venezuela	7.462	10.139	10.596	0,2	0,5	0,8	-2,2	-2,6
Uruguay	4.659	6.555	9.893	1,4	0,5	2,4	-0,2	-1,6
Brazil	1.672	5.195	6.429	2,1	3,0	1,3	0,1	0,1
Colombia	2.153	4.257	6.330	2,0	2,0	1,6	1,1	-0,3
Peru	2.308	4.263	5.388	1,2	1,3	1,5	-2,7	0,4
Ecuador	1.863	4.129	3.987	1,2	2,2	0,0	-0,6	-2,4
Paraguay	1.584	3.301	3.295	1,6	2,0	0,2	-0,1	-1,0
Bolivia	1.919	2.572	2.959	1,3	0,5	1,1	-1,8	0,2
AL 10	**3.228**	**5.430**	**7.306**	**1,4**	**1,2**	**1,7**	**-0,9**	**-0,8**

Countries ordered by GDP per capita of 1990.
[a] Geary Khamis dollars

Two important combined factors made the South American growth performance seem less positive during 1950-1980. First, the dramatic reversal in the 1980s made South America retrogressed with GDP per capita falling at a rate of 0.9%, see Table 4.1a. It has truly been a lost decade, and one may underestimates earlier

achievements. The second circumstance has been the surging performance of Asian countries on worldwide economy. Rodrik (1999) comparing the two world-regions performance, argues that the errors of the import substitution strategy by Latin America through much of the post-war period brought negative macroeconomic distortions (e.g. governmental intervention and barriers to trade) over the past decades.

Table 4.1b. GDP growth rates of the South American countries

(percent and dollars of 1990[a])

	Share in total population (percentages)	**Share in regional GDP** (percentages)		**Growth rate of GDP** (% per year)	
	2008	**1950**	**2008**	**1950-1983**	**1984-2008**
Brazil	50,6	29,7	45,3	5,7	2,8
Argentina	10,4	28,4	16,0	2,8	2,8
Colombia	11,6	8,3	10,2	4,7	3,4
Venezuela	6,8	12,4	10,0	4,0	2,7
Chile	4,2	7,4	7,8	2,7	5,3
Peru	7,5	5,8	5,6	4,0	3,3
Ecuador	3,7	2,1	2,1	5,1	2,0
Uruguay	0,9	3,4	1,2	1,5	3,0
Bolivia	2,5	1,8	1,0	2,6	3,2
Paraguay	1,8	0,8	0,8	4,6	2,9
AL10	**100**	**100**	**100**	**4,3**	**3,0**

Countries ordered by Share in GDP of 2008.

[a] Geary Khamis dollars

In this context, questions arose with uncertainties about its economic structure and capability to support external forces. The combination of mediocre growth rates, and the decline in the investment ratio, questioned the economic potential of the region to return to sustained growth, since the phases of high growth have always coincided with heavy net inflows of foreign capital (1960-1973).

The post-oil shock experience was substantially conditioned by mounting indebtedness and the deterioration of domestic policy in a more difficult external environment. The beginning of the 1970s saw the rise of international monetarism as a mean of reducing inflation in the Southern Cone at the expense of a substantial increase in external liabilities. The precariousness of most South American economies only became fully apparent in 1978, when a new oil price raised, increasing real interest rates on developed countries.

The balance of payments crises translated into higher interest rates and credit rationing as well as inflationary pressures generated by realignment of exchange rates (i.e. currency depreciation). In the 1980s, the low debt capacity increased the debt service. The countries financed the purchase of foreign exchange by issuing domestic debt or currency emission, which generated inflationary problems.

To analyze the different approaches explaining economic growth in South America, it requires studying various factors and characteristics within the region (i.e. national economies and trading blocs), highlighting the impact of structural reforms, trade openness brought the sustainability of economic liberalization strategies.

The onset of structural reforms and globalization of financial markets led to the return of foreign capital, initiating a new cycle. The high growth phase culminated at the end of the 1990s, both in terms of economic growth and as external transfer of resources. The Asian and Russian crisis marked a new turning point, although there was once again the heterogeneity of national dynamics, where the major economies (Argentina and Brazil) were more affected by the capital outflows and economic downturn (-1.3% and 0.1% GDP per capita growth rates, respectively; see Table 4.1a). On the other hand, the rest of countries were mostly affected by contagion effects especially due to the currency depreciation of the major commercial partners.

The 1990s opened a new era for the analysis of economic interactions among South American countries, external shocks were transmitted by two -real and financial- channels. Intraregional trade increased thanks to the wave of trade liberalization and the resumption of economic growth after the crisis that marked the 1980s. But economic growth was accompanied by higher volatility, due to the nature of the new foreign investment. As a result, shocks initiating in one country will have direct impact upon trade and other real variables (i.e. financial spreads and exchange rates) in its neighboring geographical area.

In the mid-2000s, the favorable external economic environment brought back investment encouraged partly by economic reforms (i.e. strong opening to foreign capital), more exports of manufactured goods and tertiary services; however, most of the external conditions are referred to high commodity prices and a stronger and open financial sector that boosts private consumption.

- Regional aggrupation

The progressive integration of the South American economies is widely expected to enhance in the future factor mobility. Theoretical models anticipated gains from economic integration and mobility. Theoretically, the elimination of barriers should permit a better allocation of resources and thus improve economic performance.

The trade theory and economic geography models featuring economies of scale and trade costs show that sectors with increasing returns to scale tend to locate in regions with better access to markets (Krugman, 1980; Helpman and Krugman, 1985). Moreover, Baldwin et al. (2004), highlights the benefits of infrastructure, which affects the magnitude of transport costs and location. In particular, better infrastructure means lower transaction costs that expands the effective size of the local market. The removal of trade barriers increases the relative importance of foreign markets and thereby the value of being located close to international markets.

Regional integration is not new to Latin America; agreements played an important role in the early Post-War period. Indeed, at its peak in the late 1960s, the topic of integration was hard to avoid in the discussion of regional development. However, disillusionment with integration process had clearly set in by the external crisis of the early 1980s. The 1990s witnessed a rebound in the region's trade boosted by economic reforms, especially trade liberalization.

Regional trade arrangements have proliferated over the last two decades. Trade barriers have accordingly declined significantly in recent years. Thus, for instance, simple tariff average in larger Latin American countries fell from 41.6% in 1985 to 9.1% in 2008.

Brazil established MERCOSUR together with Argentina, Paraguay, and Uruguay in 1991. Trade for most products was gradually liberalized among member countries in 1991–1995. On the other hand, the Andean Community (CAN) was signed in 1969 with its original members -Bolivia, Chile, Colombia, Ecuador and Peru and Venezuela-.[51]

[51] Chile originally was a member (1969-1976), but dropped out during the military regime of Pinochet because of incompatibilities between the country's economic policy and integration policy in the CAN. However, Chile is an associate member since 2006; this did not require re-entry into CAN. Venezuela joined the Andean Community in 1973 and was a full member until 2006, announced his retirement due to the Free trade agreement to be signed by Colombia and Peru with the U.S.

The momentum of the 1990s' crisis -episodes of the Asian and Russian crisis- was accompanied by the devaluation of the Brazilian currency that occurred in 1999, and was a turning point in the history of MERCOSUR. The Brazilian currency crisis coincided with a downfall in international and domestic economic conditions, and gave way to a highly conflictive period in relations between the bloc's two largest countries, Argentina and Brazil, see Carranza (2003).

South America's specialization principally in primary products means that the countries from these two trading blocs[52] share the same (short-term) trends for terms of trade variations. For developing economies, terms of trade fluctuations are a major source of instability. Short-term fluctuations in relative prices are perhaps more damaging to investment than long-term trends, as volatility increases systemic uncertainty and diminishes the capacity for sound decision-making (Baghwati, 1958a).

4. Specification of the empirical model

In this section, we explore the main factors that influenced growth disparities in South American economies for the last half century. The analysis is based on two different estimates, being the first one a general framework of panel data regressions, which emphasizes the regional experience; in the second one, individual specifications are measured for national economies. This former approach allows us to understand the evolution and characteristics of economic growth disparities associated with different patterns of economic growth. We have placed a particular emphasis on the preparation of the data and the econometric model; the results allow considering the GDP per capita disparities and growth determinants in most South American economies.

The data makes possible to examine changes in the growth patterns and the economic cycle for all the countries of the sample. The advantage of our data base comes in a variety of ways: i) it increases the number of observations; ii) it adds more variability and more information for each country; iii) it can be treated in two dimensions separately, cross-section and time-series (there are enough time

[52] The CAN countries have a respective specialization in oil exports (Ecuador and Venezuela, but also Colombia) or in other minerals (Bolivia, Peru). On the other hand, MERCOSUR intraregional trade is based on manufactured products, allowing national economies to diversify their export base (Benavente, 2001).

periods); and iv) it makes the econometric specification rich because it controls individual effects models, in addition to some exploration on endogeneity issues.

This is essential to the examination of growth disparities in South America, which experienced important economic events (i.e. debt crisis, devaluations, liberalization of the economy) that affected the development of the countries in different ways.

4.1 *Modeling GDP per capita disparities*

Our regression applies to a panel set of cross-country data over 1960-2008. Since our sample is small (10 countries), it was advisable to exploit the temporal dimension of the data in order to obtain robust estimates by working with more degrees of freedom (Caselli et al., 1996). In that way, panel data models consider explicitly the information on within-country variability and allow for differences in the dependent variable in the form of unobservable individual effects, (Islam, 1995; Fölster and Henrekson, 2001).

- The baseline estimates

First, we estimate a baseline model by generalized least squares (GLS), which considers explicitly the within-country variability information, allowing for differences in the economic growth model in the form of heteroskedasticity and cross-country variations. The GLS methodology leads to more efficient estimators than fixed-effects or random effects estimators, GLS is capable of accounting for various patterns of correlation between the residuals. It is very appropriate when the number of cross-sectional units (N) is relatively small and the number of time periods (T) is relatively large, as it is in this case.

In this kind of models, the time dimension prevails and serial autocorrelation appears to arise as in pure time-series data. It is also well-known that heteroskedasticity tends to be present in cross-sectional data allowing for a different residual variance for each cross section. This is particularly true in cross-country comparisons where it can be expected a high variation in all variables. In that way, it

seems reasonable to allow correlation of the disturbances across cross-sectional units, restricting residuals in different periods to be uncorrelated.[53]

Therefore, we must select an estimation method capable of producing efficient estimates in a fixed-effects panel data model when there are problems of intra-country serial autocorrelation, heteroscedasticity, and cross-country correlation. This is the case of the Feasible Generalized Least Squares (FGLS) specification, which is reached in iterative form until the coefficients and weights converge.

4.2 *Measuring GDP per capita disparities on national economies*

The country individual model is estimated using Seemingly Unrelated Regressions (SUR), a convenient method for estimating simultaneous-equation models in the presence of lagged variables (Arellano, 1990; and Baltagi, 2001). By taking into account the cross-equation correlation between the equation's residuals, as well as heteroskedasticity, the SUR yields more efficient estimates for equation-systems than and single-equation ordinary least squares (OLS). In multivariate time-series models, the SUR estimator is a natural alternative to OLS. Empirical evidence on the theme shows that results can be substantially more efficient than OLS (Kim, 2004, Creel et al., 1996). The SUR model has better properties for large-samples and it is considered as a multivariate time-series regressor. In fact, by using SUR regressions, we have estimated a set of growth equations allowing different independent variables for each national economy.

Estimating Eq. (1) coefficients embed the direct impact of investment and physical capital accumulation on economic growth, but also other effects via macroeconomic disturbances. The estimation results reported in Table 2 are quite interesting. Furthermore, for all cases the results show economically relevant point estimates for the economic growth model.

- The model specification

The equation estimates the effects of a group of fundamental variables and other exogenous factors on economic growth, measuring the log of GDP per-capita growth (gr) as a function of other variables. According to the economic growth

[53] A complete information on GLS can be found in Greene (2008) and Maddala and Lahiri (2006).

theory, we estimate Eq. (1) with a set of variables that -as stated previously- are assumed to have a deeper effect on South American economies:

$$\ln(gr)_{it} = \beta_0 + \beta_1 \ln(g0)_{it} + \sum_{f=1}^{F} \gamma_f \ln\left(x_f\right)_{it} + \sum_{e=1}^{E} \gamma_e \ln\left(x_e\right)_{it} + u_{it} \qquad (1)$$

where $g0$ is the initial GDP per capita; x_f is one of the F fundamental variables (the investment ratio, gross fixed capital formation, external debt, real openness and human capital); x_e is one of the E expansion variables (natural endowments, manufacture exports, macroeconomic shocks and quality institutions).[54]

The aim is to investigate how and through what mechanisms growth disparities were produced considering what have been described as the prime sources of growth, factors accumulation, productivity and the effect of external variables. The selection of the variables is based on Barro (1991), Hall and Jones (1999). The relationship between the economic growth and productivity can be found in Verdoorn (1998) and Stiroh (2001), this causal link is the basis of models in the cumulative causation, as put forward by Dixon and Thirlwall (1975) and León-Ledesma (2000).

Additionally, this document tries to integrate two lines of the literature that have been developed. First, it examines the links between domestic political instability and economic growth, while there seems to be a general agreement that political instability is negatively correlated with economic growth (Alesina and Perotti, 1993; Ades and Chua, 1997). Second, political instability in neighboring countries might block trading benefits, and communications (e.g. transit routes become unreliable). Bottlenecks and trade restrictions became quantitatively important to production inputs imports.

(a). *Specification features*

All the variables in Eq. (1) have been transformed in logarithms, with the exception of *Institutions Quality, Civil liberties and Contract-Intensive Money*.[55]

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[54] Considering the institutional framework is important and provide relevant information for the regional economic behavior, however given the model specification, the time period of the data is quite large; in this setting, it was difficult to find other good variables as proxy for the institutional framework.

[55] See in the Data Appendix a complete specification of all the variables. The macroeconomics information used in this document was provided by official statistics and corresponds to each of the countries considered in the analysis.

Moreover, we used first-differenced and log lagged variables as in Sung-Shen (1990), De Gregorio (1992), Loayza et al. (2005) and Astorga (2010), and in order to avoid potential endogeneity in some of the regressors.

For the construction of the indicator of terms of trade volatility we apply the Kalman filter methodology, which has recently received intensive attention (see Clark, 1987; Álvarez et al., 2000; Cunningham et al., 2007). We considered the stochastic volatility as an attractive alternative to measure volatility processes since it is theoretically consistent with continuous-time modeling specifications. The model captures the time-varying variances and it is formulated in the state space form.

We opted for the results of the Kalman Filter since it is an interesting instrument in time series model, especially in financial exercises. On the other hand, the results adapt very well to the estimation we have in mind, other instruments, such as, the GARCH residuals are not statistically significant. To measure the volatility of terms of trade we model the process of volatility as function of terms of trade in logs. The underlying volatility was defined as a hidden process, with a form of an auto-regressive process, allowing the trend component to be either an irregular random walk with a smoother series, which moves irregularly over time. In that way, we consider the Kalman Filter as a method for inferring the predictable components and trends in the price evolution process. Additionally, the filter offers an optimal way including unobservable variables that is reached in iterative form until the coefficients converge; finally it estimates them in any further empirical application (Hamilton, 1994, Ch. 13).

On the other hand, we consider *quality institutions* as a good proxy for political instability, since it distinguishes the changes of political systems, coups of regimens, and institutions credibility. Additionally, due to its exogenous nature, its advantage stands in contrast with the endogeneity problems present in growth models, we use a two other variables, the first one measures the level of the financial depth (i.e. financial development) (*depth*); the second one, Contract Intensive Money (*cim*), measures the enforceability of secure property and contract rights for economic growth and investment.

(b). *The estimation method*

We follow a similar estimation strategy than in Baldwin and Seghezza (1996). First, we begin by testing specifications that include fundamental factors (i.e. physical and human capital, demographic changes, investment, etc.). Then, we move

to augmented specifications where we can assess the role of a number of additional factors commonly found in the empirical literature, such as, macroeconomic stability, sectorial development, and institutions.

The empirical model seeks to capture the effects of additional variables, such as external shocks, which have an important effect on growth rates especially for less developed countries. The results are nested specifications, and include only those determinants that were significant in each regression.

Additionally, we present results for the correlation of residuals of per capita GDP, as a brief economic evidence of spatial dependence in growth equations, which is of great interest for the agglomeration process of countries. That is, economic growth caused by factors that drive economic performance of the neighbor country contributes to growth in the rest of countries (See Table 4.5).

5. The results of the model

The results of the baseline models (FGLS estimates) are reported in Table 4.2, considering the entire period (1960–2008). The results are quite interesting and consistent with the growth literature and other empirical evidence. All variables have the correct sign and are statistically significant. The coefficients in the core specifications (See Table 4.2, column 1) embed the direct impact of not only fundamental variables (investment and capital accumulation) on economic growth, but also exogenous variables.

- The baseline model

The shortfall in growth rates in South America is due not only to lower investment rates, but also to differences in the productivity (TFP), which measures the efficiency of factors of production (capital and labor). Apart from its technological components, external constraints on technology may produce inefficient aggregate results in terms of low TFP.[56] The factor accumulation has been consistently slower over time, but its direct effect in growth accounting terms represents one of the main determinants for

[56] Our measure of TFP in part reflects available technology and also incorporates the degree to which available factors of production, both physical and human capital are utilized. This is so because we chose accounting for all available capital (i.e. including unutilized physical capital and unemployed labor), so that any waste in these available resources due to market forces gets reflected into a lower TFP.

economic growth; in that way, capital accumulation and the investment ratio have a positive impact on growth.

Regarding the institutional background, *secondary enrollment* is statistically significant. It is also likely to reveal other important contributing factors to long-term growth, such as the accumulation of human capital, structural and institutional changes. The positive sign of the educational variable indicates a direct positive association between economic growth and capital accumulation, especially in developing countries, which are actually converging to human capital international standards (Barro and Sala-i-Martín, 1997). Additionally, *human population* (in differences) has a positive impact on economic growth, which is also significant in the second sub-period, but we consider being incorrect due to possible bias problems in the results.

- Sectorial development

There is a belief that sectorial low diversification of South America has been one of the key obstacles to sustainable economic growth and there is also evidence to support that affirmation; for example, fuel and mineral exports represent approximately 37% of the total exports and agricultural and manufacture exports about 25%. That is why we introduce sectorial exports (agriculture, services and food exports) and sectorial production (agriculture) to check whether sectorial development has significant effects on economic growth.

Contrary to the idea that raw material exports are harmful to economic growth, the results from the model are interesting and show different conclusions (see the outcome tables), especially for agriculture and services exports, which are highly significant with a direct and positive impact on economic growth. On the other hand, the food exports variable is only significant at the 10% with a positive impact on economic growth, possibly due to higher foreign prices and better production techniques.

- Macroeconomic shocks

The results of macroeconomic volatility (U.S. interest rate and terms of trade volatility) have a negative effect on economic growth, being highly significant. The U.S. interest rate has the expected and significant negative sign; it is negatively associated with growth because capital outflows are affected by increments of foreign interest rates. It has also other important effects on economic growth in developing

countries, for example, if foreign interest rates increase, debtor countries will have to pay more for their external debt, forcing them to reduce future projects and hampering the potential output.

Table 4.2
Determinants of GDP per capita growth
Panel settings: Yearly frequency
Estimation method: Feasible Generalized Least Squares (GLS). FIXED EFFECTS

VARIABLES	(1) lggdp	(2) lggdp	(3) lggdp
SUB-PERIOD	1960-2008	1960-1982	1983-2008
gdp0	-0.0925***	-0.0927***	-0.158***
	[-5.856]	[-3.616]	[-7.787]
Capital accumul.	0.0681***	0.0487***	0.0981***
	[8.002]	[4.112]	[8.306]
Investment	0.00409**	0.00661***	
	[2.336]	[2.683]	
Factor Produc.	0.00432***		0.0109***
	[2.677]		[3.759]
Secondary enroll.	0.0244***	0.0192***	
	[4.409]	[3.364]	
Population (d)	0.0119**		0.0218***
	[2.102]		[3.036]
Agric. prod (-1)	-0.0652***		
	[-3.337]		
Food exp (-1)	0.000316*		
	[1.795]		
Agric. exp (-1)	0.00100***	0.00101**	
	[2.604]	[2.451]	
Services exp (-1)	0.00114***		0.00138***
	[4.123]		[4.296]
Terms of trade volatility	-0.00293**		
	[-2.196]		
US rate (-1)	-0.00290***	-0.00625***	-0.00456***
	[-4.666]	[-8.711]	[-4.846]
Openness (-1)		0.0498***	
		[2.850]	
Life exp (-1)		0.218**	
		[2.124]	
Manuf. exp (-1)		0.00638*	
		[1.857]	
Terms of trade (-1)		0.0103	
		[1.632]	
Oil exp (-1)			0.00655**
			[2.487]
Inflation (-1)			-2.85e-06*
			[-1.769]
Institutions quality			0.000291***
			[3.207]
Observations	437	168	250
Number of iden	10	10	10

z-statistics in brackets: *** p<0.01, ** p<0.05, * p<0.1

Since it is common knowledge that the major macroeconomic distortions in South America occurred during the 1970s and the 1980s (e.g. sudden oil price changes, and economic distortions by the protectionist policy), the volatility of terms of trade exhibits a negative impact on economic growth. A plausible explanation for our result may lie in the regional productive structure. Since South American economies depend in part on commodity exports, it seems plausible that high raw material prices may boost the negative effect of macroeconomic disturbances.

- Growth over sub-periods

More open economies with pro-growth institutions seem to experience faster economic growth with higher rates of productivity (besides the short-run cyclical factor). Despite, we did not find statistically significant evidence on trade openness in the baseline model.[57] Other empirical evidence (Rajan and Zingales, 2003) shows that only openness has a positive effect on foreign investment, which is mainly due to better institutional settings.

Considering the results for both sub-periods models, we found that openness is significant in the first sub-period (See Table 4.2, column 2), due to the positive interaction with investment.

Regarding the institutional variables, secondary enrollment and life expectancy are both significant reflecting social convergence respect to developed countries. On the other hand, manufacture exports have a positive effect on growth; we assume it could be mainly due to the industrialization strategy of the first sub-period. The U.S. interest rate appears with a highly significant negative sign on growth and we found that terms of trade has a positive effect on economic growth only in the first sub-period.

Finally, the panel estimations for the second sub-period (1982-2008) are specified with an existing temporary inertia effect of economic growth, that is common to all the panels (0.24), this allows us to use more information and to produce a more reasonable estimation of the regression coefficients. This only occurs in this sub-period. (See Table 4.2, column 3)

[57] The strict version of the openness hypothesis requires the marginal effect of trade openness to be non-positive when the capital account is relatively closed to trade. Rajan and Zingales (2003) suggest that for Latin America, the episodes of financial repression to protect industrial incumbents prevented financial development. Similarly, the marginal effects of financial openness are expected to be negative or zero when an economy is not open to trade.

The results are the following: among the fundamental variables, capital accumulation, productivity and changes in human population show a positive effect on economic growth and are highly significant.

We suggest that the export promotion strategy of the 1990s led to a somehow biased economic growth in countries specialized in merely exporting commodities; this may also increase the region's output gap and growth disparities within the region. A theoretical description of this can be a part of the immiserizing growth theory by Bhagwati et al. (1978), where terms of trade might worse the country's capital inflows, resuming that the negative effect on foreign investments depends on the country's trading mode, that is, import substitution or export promotion.

We surprisingly found that oil and gas exports are significant at 5% with a positive effect on growth, most of the economies exports this commodity; on the second hand, the services exports appears with a positive effect on growth, suggesting that major economies shifted abruptly from manufacture goods to services activities. Furthermore, high *inflation rates* appears with a negative effect, reflecting the adverse consequence on economic growth at the beginning of the debt crisis that even persisted in some economies depth into the 1990s. Regarding the U.S. interest rate variable, it has the expected negative sign and it is statistically significant on both sub-periods.

Finally, the only significant institutional variable (*quality institutions*) has the expected sign, with a positive effect on economic growth; this may be due to the favorable advances of democracy regimes on the region and sustainable policies.

5.1 *Results by national economies*

This section sums up key results for the individual country estimates through a varying parameter and cross-correlated model (see Table 4.5). Before proceeding to the discussion of the results, it is important to mention that most of the countries have capital accumulation as one key growth determinant; it is foreseeable to consider the positive impact of capital accumulation on economic growth.

- **Argentina-** The first sub-period, 1960–1982, was characterized by relatively stable economic growth in GDP per capita; the second period, 1983-2008 saw sustained growth rates. Analyzing the econometric results, we found the significance and positive association with growth of the two institutional

variables; *life expectancy* and *contract-intensive money* (cim) show the country's security to attract foreign investment and the sustainability of laws to protect private property. *Financial development* (depth) shows that the capital-deepening process of mid-1970s benefited economic growth. Regarding sectorial exports, the period 1970–1990 witnessed an annual decline in the agriculture sector, the increments in the capital-output ratio and the stock of human capital per worker grew affecting the structure of production and employment that shifted to services production at the expense of employment in agriculture and manufacturing; in that way, *agricultural exports* variable shows a negative sign, while *services exports* play a key role on economic growth. On the other hand, policy shocks are at least partially responsible for Argentina's low growth performance in the mid-1980s and 1990s; the fiscal deficit problems increased the external debt overhang, which has the correct sign and negative effect on economic growth.

- **Bolivia-** Bolivia developed as an economy centered on exploiting high-value minerals and agriculture. The results confirm the fact that it is highly dependent on raw material exports: *oil and gas exports* are significant with a positive impact on growth rate; even *agricultural exports* have a positive effect, which reflects the primary level of developing economies. However, there is an interesting result: the *civil liberty* variable has a positive impact on economic growth, which reflects the level of freedom and positive effects of democracy, which we consider was more remarkable during the end of the 1970s. On the other hand, the economy is still vulnerable to foreign distortions -U.S. interest rate changes- have a negative effect on growth rates. In that way, the economy is characterized by an overvalued exchange rate that reduced the profitability of manufacture exports. On the other hand, the results show that the distortions of the exchange rate have a negative effect on growth. In that way, the outcome from the equation agrees with Hausmann and Rigobon (2003) remarking on the concept of inefficient specialization, which implies higher volatility of exchange of rate and a slowdown of economic growth.

- **Brazil-** The results show that the Brazilian economy is vulnerable to macroeconomic distortions. The foreign shocks stood out in terms of a negative impact on economic growth; the harmful interrelation between the U.S interest rate and external debt shows that the Brazilian economy was affected by large fiscal deficits: the 1980s show a blank GDP per capita growth (0.06%, see Table 4.1a). On the other hand, the results agree with other evidence (De Gregorio and Lee, 1999), where the *agricultural exports* are one important growth determinant in the economy. Additionally, the *financial development* variable is significant reflecting the economic development of the country in the financial market; we suggest that the sectorial allocation of resources is through the agriculture sector, where capital accumulation and growth are linked. On the other hand, the stock of human capital reflected by *life expectancy* expanded

significantly prior to the 1980s; in that way, economic performance was driven by improved quality of the workforce.

- **Chile-** during the reform periods, starting at mid-1970s the economy faced positive changes in its productive structure. The results show the importance of the sectorial development, where *the manufacture and services exports* have a positive impact on growth, demonstrating the improvement of the economic performance. Additionally, economic growth is subject to foreign shocks -*terms of trade volatility*- what hides the risk of mineral exports (e.g. cooper). In this case, the economy is also affected by the *U.S. interest rate*, which we think is associated to external debt and capital outflows, as it is usual in developing countries. In addition, the *quality institutions and secondary enrollment* variables show the nation's human development, competitiveness, economic freedom, and the stability of its democracy that positively influence economic growth.

- **Colombia-** the results are quite interesting in general, since this is one case where the results for the sectorial development -*oil production, manufacture and agriculture exports*- have a positive effect on economic growth, reflecting the high degree of the development of economic and political institutions. On the other hand, the economy still depends on primary exports (e.g. coffee exports), that partially were occupied by oil and coal, which, taken together, accounted in 2000 for just over 43% of total exports. In that way, Colombia is subject to *terms of trade volatility*, which has a negative impact and it is highly significant, since a major part of exports depends on international prices. Additionally, the economy is negatively affected by *U.S interest rate* (e.g. fiscal imbalances and external debt). Like the rest of more developed countries in the region, the development of the financial sector shows a positive effect on growth.

- **Ecuador-** it is well known that the Ecuadorian economy has based its economic performance on a few commodities (e.g. the agricultural sector and oil exports). In that way, the results have the correct sign (*processed agricultural goods*), except for *the agriculture exports* variable that shows a negative influence on growth. On the other hand, *foreign investment* is positive; we assume it can be due to its interrelation with and the attraction of oil exploitation, which highly demands for *capital imports.* This last variable is significant and has a positive impact on economic growth; in that way, *terms of trade* is significant with the correct sign. Additionally, we consider that *foreign investment* has a positive influence on growth positive due to its relationship with the *contract-intensive money* variable, which is significant and positive, favoring private entrepreneurship. However, the economy was highly exposed to crisis episodes (e.g. the early 1980s and end of the 1990s), being characterized by a situation where fiscal troubles combined with terms of trade volatility, in that way, the external debt variable affects negatively growth rates.

Table 4.3
Growth Disparities on South America
Panel setting: Yearly frequency
Estimation method: Seemingly Unrelated Regressions (SUR).

VARIABLES	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
Initial GDP p.c.	-0.857***	-0.933***	-1.411***	-0.091	0.176***	-0.692***	-0.400***	-1.593***	-0.387***	-0.790***
	[-25.60]	[-7.505]	[-21.76]	[-1.394]	[3.450]	[-16.01]	[-3.976]	[-19.58]	[-6.950]	[-17.05]
Capital format.	0.519***	0.037***	0.320***	0.077***	0.103***			0.386***	0.287***	0.097***
	[22.84]	[5.511]	[13.08]	[5.352]	[11.14]			[8.987]	[8.795]	[5.579]
Investment						0.095***		0.018***		
						[12.19]		[5.181]		
Population (d)										
Life exp (d)	5.470**									2.024***
	[2.453]									[2.643]
Life exp (-1)			2.323***							
			[11.18]							
Secondary enroll (d)										
Secondary enroll (-1)				0.493***			0.340***			
				[6.874]			[6.390]			
Openness (-1)										
Factor Produc. (-1)										
Agric. exp (-1)	-0.047***		0.091***		0.110***	-0.330***	0.017***		-0.110***	-0.167***
	[-6.998]		[9.131]		[6.230]	[-22.46]	[3.648]		[-5.884]	[-13.63]
Agric. prod (-1)		0.606***		-3.223***				4.365***		
		[4.767]		[-4.696]				[18.20]		
Food exp (-1)						*0.133***				*0.168***
						[6.930]				*[14.11]*
Manuf. exp (-1)				0.113***	0.113***				0.415***	
				[4.149]	[5.049]				[5.699]	
Services exp (-1)	0.0968***			0.500***					0.506***	
	[9.602]			[8.064]					[9.872]	
Oil exp (-1)										0.772***
										[9.819]
Oil prod (-1)		0.150***			0.099***					0.197***
		[13.13]			[5.515]					[5.141]
Terms of trade (-1)						0.258***		0.210***		
						[7.307]		[8.689]		
Capital imp (-1)						0.079***				
						[3.505]				
Financ. Dev	*0.004***		*0.002***		*0.004***		0.010***			0.009***
	[10.36]		*[3.884]*		*[3.575]*		[10.51]			[8.994]
CIM (-1)	0.452***					0.475***				
	[7.286]					[12.50]				
Civil liberties		0.011***					0.015**			
		[3.979]					[2.047]			
Institutions quality				0.001**				0.001**	0.004***	
				[2.209]				[2.263]	[3.771]	
External debt (-1)	-0.016***		-0.063***			-0.225***	-0.034***		-0.074***	
	[-3.137]		[-12.80]			[-12.21]	[-2.739]		[-3.303]	
US rate (-1)		-0.004***	-0.005***	-0.008***	-0.008***					-0.008***
		[-4.065]	[-4.231]	[-7.218]	[-6.293]					[-3.050]
Inflation (-1)			-8.48e-04***							
			[-2.898]							
Exchange rate disturb.		-0.003***								
		[-6.454]								
Terms of trade volat.				-0.015***	-0.023***					
				[-6.390]	[-11.40]					
Constant	5.599***	1.934***	1.468**	20.57***	-3.431***	4.955***	3.055***	-23.75***	-0.249	0.590
	[23.92]	[7.678]	[2.331]	[5.149]	[-5.751]	[11.43]	[3.653]	[-17.13]	[-0.317]	[0.899]
Observations	16	16	16	16	16	16	16	16	16	16
R-squared	0.988	0.924	0.925	0.922	0.953	0.986	0.866	0.974	0.931	0.964

z-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1
Note. Coefficients in italics are lagged in one period

- **Paraguay-** the 1950s and 1970s coincide with an influx of foreign capital that increased its capital market and developed the financial sector; in that way, the regression coefficient for the financial market is significant with a positive sign on economic growth. Besides, the results reflect the characteristic of a developing country that is dependent on *agricultural exports*; it appears that Paraguay's relatively strong performance in the 1960s was associated with an expanding agricultural frontier which triggered economic growth. However, the economy suffered of policy shocks during this period. One of its main problems was the external debt overhang which had higher levels according to the size of its economy. On the other hand, the two institutional variables are significant and have a direct result on economic growth; *secondary enrollment* indicates a positive association between growth and human capital accumulation and the *civil liberty* variable also is positive, reflecting the advances in democracy.

- **Peru-** the economic performance of Peru is characterized by buoyant domestic demand and external conditions (e.g. better terms of trade) and by a moderate GDP per capita growth in the last fifty years (1.2% annual average growth, see Table 4.1a). The results shows that the *agriculture production* has a positive effect on economic growth, joined with *foreign investment* which. We consider it is allocated to the extraction and production of natural wealth (mining exports). Therefore, the *terms of trade* variable plays and important role as a growth factor, though prices volatility worse economic prospects. Additionally, the inclusion of the *quality institutions* appears with the correct sign, showing a favorable institutional framework for economic growth and foreign investment; robust institutions are associated to positive changes in political factors during the 1980s, and especially from mid-1990s.

- **Uruguay-** the Uruguayan economy is associated with the Argentinian one, and its concomitant currency crisis, which triggers a banking and debt crises in Uruguay, hence, we found, the *external debt* variable is significant with a negative effect on economic growth that reflects fiscal and financial imbalances. However, the economy has a strong sectorial development (excluding the *agricultural exports* variable that has a negative sign), where the *manufacture and services exports* are significant and have a positive effect on growth due to determining policy changes in mid-1970s and the 1990s, when Uruguay joined MERCOSUR, the southern cone free trade association, which concurrently instituted a series of market-oriented reforms. Overall, behind every potential economic growth there is the presence of a solid institutional framework -*quality institutions*-, which induces higher investment and a faster pace of economic growth, which primarily benefits a process of human accumulation, resulting in a higher level of long-term income.

- **Venezuela-** Venezuela growth experience in the last fifty years is characterized by a low GDP per capita growth (0.2% annual average growth, see

Table 4.1a). Despite its natural wealth, even though, the results show that the two related variables (i.e. *oil production and exports*) have a positive effect on growth mainly due to revenues, on the other hand, the *food exports* has a positive effect on growth that contributed to economic growth during the mid-1980s to end of the 1990s, except for the agricultural exports, which exhibited a negative sign. The economy shows favorable advances in *life expectancy and financial development*; both are significant with a positive sign on economic growth, which reflects important contributing factors to long-term economic growth; however, we think that the *financial development* merely had a positive effect on growth during 1960-1974. Regarding human capital (e.g. life expectancy), Saéz and Pineda (2004) consider that the investment in the sector does not guarantee benefits for the lower social strata of the population. Finally, the country is susceptible to changes in the *U.S. interest rate* that has a negative effect on growth.

5.2 *Growth over different sub-periods*

An empirical explanation of the division into two sub-periods is the appearance of the debt crisis during the 1980s and the adjustment process followed after 1987, which cost real GDP per capita growth and welfare deteriorations in most countries of the region. The fiscal deficits incurred by these economies in the 1970s produced high levels of foreign borrowing in order to ride out the effects of the oil price rises in 1973 and 1979. Moreover, unfavorable terms of trade (except for major oil exports) and U.S. interest rate shocks resulted in an unleashing of the crisis that brought regional growth to a halt for almost a decade and a painful process of economic reforms.

According to the conventional view, the fundamental causes were worldwide inflation, which almost tripled global interest rates while the debt-service jumped to unmanageable levels (e.g. Mexico defaulted on payment in 1982; later other countries followed default problems and were forced to reschedule their outstanding debts), but behind that was debt overhang and, for the rest of the developing countries an unfavorable dependency on raw material exports. Results are presented in Tables 4.4a and 4.4b.

- Fundamental variables

The investment ratio, in the neoclassical growth models shows that higher values of the ratio increase the steady-state of growth. Our results confirms partially

this statement, we found that investment is frequently significant in the Southern cone and during the first period, except for Argentina, where it is only in the second sub-period. For the rest of countries, there is only evidence for Colombia and Venezuela, but in different periods. For example, De Gregorio (1992), using a five-year data panel for 12 Latin American countries, finds the low investment rate to be one of the most important factors inhibiting economic growth.

In the same way, we found that significant accumulation of physical capital boost GDP per capita but mostly in the Southern cone, except for Chile in the first sub-period and Ecuador in the last period.

The Andean region shows different results, but coincide that it is not significant during the 1960-1982 episode, excluding Bolivia, where capital accumulation is only significant in the first sub-period, and Ecuador, which is not significant in both sub-periods. Since physical capital is complementary to human capital, failure to accumulate it necessarily impairs the accrual of capital and prospect of economic growth.

Moreover, the importance of *secondary enrollment and life expectancy* reflect the meaning progress in human capital accrual in South American economies specifically in the first sub-period, where it is significant at 1% and has a positive effect on economic growth; for the second sub-period (1983-2008), the *secondary-enrollment* variable is significant and exerts a positive effect on growth, reflecting a possible convergence within the region in terms of human capital specially for developing economies: Bolivia, Colombia and Ecuador. Regarding *life expectancy* is only significant in a few countries and mostly in the first sub-period.

The institutional and political framework of South America changed at the beginning of the 1980s, with a higher participation of population and the introduction of more democratic regimes. Thus, we found that quality institutions and civil liberties are significant in most of the economies (except Ecuador and Venezuela), and merely significant at the second sub-period; it would be possible to assume that the absence of favorable results for Ecuador and Venezuela may be due to oil wealth that in some way hurts institutional development and growth (Ross, 2001).

The coefficients for the rest of the variables CIM and DEPTH are significant in most economies (except in Chile and Uruguay). We consider that the behavior of these variables is strictly to inner domestic policies; CIM varies over time in response

to political and economic events. We show that CIM is positively related to growth rates. Surprisingly, we found that it is significant mostly in the Andean region (except for Colombia) during the first sub-period (1960-1982), and Venezuela, where it is significant only in the second sub-period.

In the rest of the countries, the *CIM* variable is significant in the second sub-period for Argentina, and also has a positive effect on Brazil in the first sub-period (1960-1982). We consider that it is mostly significant in the first sub-period, due to the more stable economic situation rather than the unfortunate episodes (e.g. the debt crisis during the 1980s). Instead, for Ecuador, the variable CIM shows a stable behavior during the whole period apart from the end of the 1990s domestic crisis.

The *financial development* (DEPTH) is only significant for a small set of countries considering the results of both sub-periods estimates (Paraguay, Peru and Venezuela). We assume that the financial development of these countries was in great part positive influenced by the traditional exports (agriculture exports, and oil production) and other events that demanded capital inflows (e.g. Itaipu Dam in Paraguay). In that way, the second sub-period (1983-2008) results lead us to think that terms of trade fall affected the financial market until the beginning of the 1990s.

We firmly believe that the rising internal constraints in economies (structural and cyclical), and macroeconomic imbalances exacerbated the inherited economic problems, which made it even more difficult to manage economic policies. By the 2000s, South America achieved moderate growth, but it appears that economic growth is still not high enough for small countries to revert to the lower growth path.

Table 4.4a
Growth Disparities on South America (Sub-periods results)
Panel setting: Yearly frequency
Estimation method: Seemingly Unrelated Regressions (SUR)

	Argentina		Bolivia		Brazil		Chile		Colombia	
VARIABLES	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008
gdp0	-1.003***	-0.690***	-1.049***	-0.747***	-0.333***	-0.904***	-0.826***	-0.613***	-0.279***	-0.163***
	[-12.39]	[-18.64]	[-13.91]	[-12.57]	[-9.618]	[-15.18]	[-6.794]	[-9.199]	[-5.277]	[-3.317]
Capital accumul.	0.228***	0.250***	0.037***		0.145***	0.284***		0.072***		0.101***
	[6.811]	[19.33]	[6.426]		[6.506]	[11.21]		[4.417]		[10.11]
Investment		0.036***					0.031***		0.015***	
		[11.14]					[3.635]		[4.748]	
Population (d)	605.3***		373.3***							
	[6.235]		[10.30]							
life exp (d)							23.46***			
							[7.027]			
life exp (-1)						1.894**		4.875***	1.214***	
						[2.439]		[7.676]	[7.156]	
Secondary enroll (d)	0.270***	0.121***				0.020***				
	[4.835]	[4.160]				[6.360]				
Secondary enrol (-1)				0.183***		0.229***				0.156***
				[3.418]		[4.656]				[2.810]
openness (-1)							0.564***			
							[5.484]			
Factor Produc. (-1)										
agric. exp (-1)	-0.132***						0.068***		0.011***	
	[-9.706]						[4.510]		[3.950]	
agric. prod (-1)		-0.938***	1.047***	0.502***		0.835***			0.764*	
		[-8.246]	[10.65]	[6.937]		[3.624]			[1.871]	
Food exp (-1)		0.191***				*-0.179***	*0.055***			
		[6.050]				*[-7.872]*	*[4.034]*			
Manuf. exp (-1)										
Services exp (-1)			0.200***						0.061***	0.123***
			[13.82]						[3.797]	[3.998]
Oil exp (-1)		0.022***				0.048***				0.0179**
		[5.646]				[8.965]				[2.094]
Oil prod (-1)				0.111***		0.094***	0.304***			
				[5.885]		[5.658]	[13.77]			
Terms of trade (-1)						0.381***	0.135***			
						[9.087]	[4.324]			
capital imp (-1)					0.119***		0.155***			
					[8.055]		[2.846]			
Financ. Dev										
CIM		0.241***	0.182***		*0.328***					
		[5.636]	[3.886]		*[4.596]*					
Civil liberties		0.007*		*0.006***		*0.016***		0.009***		
		[1.779]		*[2.003]*		*[3.352]*		[2.886]		
Institutions quality					0.002***				0.002***	0.001**
					[6.439]				[4.359]	[2.051]
external debt (-1)	*-0.038***		*-0.058***				*-0.058***	*-0.108***		
	[-8.613]		*[-10.93]*				*[-5.308]*	*[-5.761]*		
US rate (-1)						-0.005***	-0.034***	-0.006***	-0.007***	
						[-5.162]	[-12.50]	[-4.086]	[-11.57]	
Inflation (-1)			-0.001***	-2.e-04***			-1.3e-04*			
			[-8.854]	[-4.496]			[-1.939]			
Exchange rate disturb.	-0.00***			-0.002***	-0.003***					
	[-5.953]			[-5.183]	[-7.419]					
Terms of trade volat	-0.001***		-0.002***		-0.005***			-0.009***		*-0.00***
	[-5.500]		[-4.287]		[-2.728]			[-3.870]		*[-3.472]*
Constant	5.735***	10.31***	-0.255	1.493***	1.761***	-11.25**	1.830	-15.26***	-2.915***	-5.653
	[11.31]	[9.074]	[-0.743]	[5.080]	[7.194]	[-2.162]	[1.364]	[-7.217]	[-8.086]	[-1.511]
Observations	17	26	17	26	17	26	17	26	17	26
R-squared	0.914	0.954	0.979	0.922	0.910	0.862	0.970	0.844	0.935	0.816

z- statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1
Note. Coefficients in italics are lagged in one period

Table 4.4b
Growth Disparities on South America (Sub-periods results extension)
Panel setting: Yearly frequency
Estimation method: Seemingly Unrelated Regressions (SUR)

	Ecuador		Paraguay		Peru		Uruguay		Venezuela	
VARIABLES	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008	Period 1960-1982	Period 1983-2008
gdp0	-0.661***	-0.780***	-0.516***	-0.859***	-1.215***	-0.976***	-0.950***	-0.422***	-0.382***	-0.544***
	[-5.768]	[-14.25]	[-7.609]	[-7.602]	[-10.85]	[-17.74]	[-8.716]	[-9.279]	[-6.573]	[-8.112]
Capital accumul.			0.115***			0.181***	0.084*	0.327***	0.192***	0.135***
			[4.743]			[5.520]	[1.733]	[10.20]	[5.713]	[6.551]
Investment			0.011***				0.035***			0.011
			[3.004]				[4.116]			[1.643]
Population (d)		570.4***	135.6***	260.2***						269.4***
		[14.18]	[2.649]	[9.180]						[2.914]
life exp (d)	15.06***		22.51***							
	[5.610]		[5.360]							
life exp (-1)	0.935*					6.172***				
	[1.851]					[6.240]				
Secondar enrol (d)		0.384***					0.008***			
		[3.265]					[2.744]			
Secondar enrol (-1)					0.420***			0.882***	0.110***	
					[9.167]			[3.734]	[2.856]	
openness (-1)		0.199**	0.281***	0.072***			0.504***			
		[2.528]	[9.373]	[5.470]			[3.987]			
Factor Produc. (-1)					0.018***	0.114***	0.011***	-0.008**		0.022***
					[5.259]	[3.951]	[3.393]	[-2.278]		[3.360]
agric. exp (-1)							0.117***	-0.034**	0.021***	-0.027***
							[3.191]	[-2.321]	[4.412]	[-3.457]
agric. prod (-1)	1.556***				0.856***	-2.152***	-1.357***			
	[5.816]				[8.307]	[-3.831]	[-4.639]			
Food exp (-1)		*0.056***								
		[2.732]								
Manuf. exp (-1)								0.466***		
								[7.441]		
Services exp (-1)				0.095***		0.101***		0.357***		
				[8.812]		[5.307]		[10.97]		
Oil exp (-1)	0.009***							0.010***	0.778***	
	[3.693]							[3.627]	[4.280]	
Oil prod (-1)		0.237***				0.235***				0.100*
		[10.13]				[6.457]				[1.923]
Terms of trade (-1)	0.034***				0.321***					0.086***
	[2.997]				[12.69]					[3.889]
capital imp (-1)	*0.100****									
	[2.669]									
Financ. Dev			0.014***		0.011***	0.021***			0.003***	
			[3.616]		[10.60]	[9.965]			[3.627]	
CIM	0.114*	*0.430****			0.198***					0.346*
	[1.845]	*[6.672]*			[8.374]					[1.890]
Civil liberties										
Institutions quality						4.82e-04***	0.001***	0.002***		
						[3.064]	[4.132]	[8.333]		
external debt (-1)		*-0.135****		-0.036***						
		[-6.679]		[-4.102]						
US rate (-1)	-0.006***								-0.002*	
	[-4.116]								[-1.653]	
Inflation (-1)					1.4e-04**					
					[2.022]					
Exchange rate disturb.										-5.9e-03***
										[-4.804]
Terms of trade volat.			-0.013***		-0.007***	-0.017***	-0.009***		-0.0146***	
			[-3.131]		[2.845]	[-6.468]	[-3.551]		[-3.395]	
Constant	-9.765***	-0.061	2.120***	5.961***	1.806***	-4.130***	12.99***	0.050	-0.607	2.267***
	[-9.799]	[-0.0704]	[5.447]	[6.945]	[9.333]	[-3.091]	[6.038]	[0.107]	[-0.697]	[2.936]
Observations	17	26	17	26	17	26	17	26	17	26
R-squared	0.904	0.879	0.843	0.708	0.928	0.959	0.874	0.882	0.864	0.825

z-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1
Note. Coefficients in italics are lagged in one period

- Empirical extension variables

Given its long history of unsustainable macroeconomic imbalances (policy reversals, bad policies, and political repression and turmoil), the dismal economic performance is deeply engrained. The average annual growth rate of GDP per capita during 1950 and 2008 was only 1.4%. During the 1980s' "lost decade", the region had a yearly GDP per capita growth rate of -0.9% (see Table 4.1a). The next decade, South America was essentially stagnant (1.6%), but major countries registered higher growth rates (2.0%) compared to the developing ones (0.8%).

Tables 4.4a and 4.4b show the results for sub-periods for each country: the first column shows the outcome for the first sub-period (1960-1982), and the second one for 1983-2008.

The first sub-period shows a negative influence of macroeconomic disturbances. The external debt coefficient on economic growth confirms the findings of previous studies, but this result is only significant for Argentina, Bolivia and Chile. Alternatively, we found that most of the economies were affected by terms of trade volatility; the results coincide with the high turbulences of raw material prices (e.g. oil and agriculture). De Gregorio and Lee (1999) consider the terms-of-trade shock as an exogenous variable that affects the growth rate of an individual economy.

Since it is common knowledge that the major macroeconomic distortions in South America occurred in the first sub-period (e.g. sudden oil price changes in the 1970s, and economic distortions of the protectionist policy), the volatility of terms of trade appears to be significant and to have a direct negative effect on economic growth.

Elsewhere in the Andean region, other macroeconomic variables had an important effect on economic growth; the high inflation rate[58] and the U.S. interest rate have a negative effect, and are significant in most of the countries, plus the Chilean economy, which shows inflation problems during mid-1970s.

The result for the first sub-period reflects the initial impact of the accumulation of fiscal imbalances and debt overhang on the regional economy. This effect exacerbated the debt problems of the 1980s that were greatly compounded by

[58] In recent years, the contours of an inverse connection between inflation and growth across countries have begun to emerge from econometric studies. For example, Barro (1991) reports a negative relationship between inflation and the growth rate of real GDP during 1970–85 in a cross section of 117 countries. We find similar results in the cross-section regression estimates of Fischer (1993).

higher levels of external debt and a sudden cut of the flow of loans to South America, which increased the risk of recession and debt payments. The negative impact of the U.S. interest rate indicates that increments in foreign interest rates produce capital outflows from less developed countries. Accordingly, the exchange rate disturbances may be a cause of higher capital inflows, especially for Bolivia and Venezuela during (1983-2008), where raw material exports represent a vast amount of resources to the economy. On the other hand, the results for Argentina and Brazil are merely a cause of volatility in prices in the 1970s.

With respect to sectorial exports, we found that manufacturing and services exports are mostly significant in the second sub-period (1982–2008), as shown in Table 4.4b. It could be said that the region did not achieve a complete industrialization: it merely became a region of services exporting (Colombia, Paraguay, Peru and Uruguay) and commodities. Only Uruguay has a significant manufacturing export coefficient in the second sub-period; we believe that this result is due to favorable conditions for investment in the manufacturing sector.

Finally, we show that food exports attracted foreign investment, possibly as a result of favorable foreign prices in Argentina and Chile. Alternatively, in the case of Ecuador, it is just the result of sectorial development, where the economy passed to produce more elaborated food products.

Although the region has undergone substantial economic changes, it shows a high dependency on the agriculture and oil sectors. Therefore, the agricultural sector is more noticeable in the Andean economies with a poor record of structural transformation especially in the first sub-period, except for Peru and Venezuela, which it is replaced by services or oil exports. The productive structure of the Andean region shows poor results in terms of discovering new export activities. Otherwise, the Southern cone diversified its production, passing from agriculture to manufacturing or services activities, reflecting higher growth rates, and lower risk to external disturbances (i.e. terms of trade volatility).

Regarding to oil exports, it is significant mostly in the second sub-period for Argentina, Brazil and Uruguay; on the other hand, the oil production in Chile is consequently limited, and has been dwindling over the past two decades; from 2,257 barrels per day (bbl/d) in 1980 to 127 bbl/d in 2008. Uruguay has had one of the strongest and most stable economies in South America, the role of oil and natural gas is expected to grow over the next few years due to recent discoveries. The

Argentinean economy has a strategic play in the energy sector in South America, due to its pipelines that connect the entire Southern cone region through Brazil and Bolivia.

It is instructive to associate sectorial exports with de-industrialization in South America, which was based on the remarkable slowdown in productivity growth in the mid-1970s. This process was accentuated and probably has been caused by "mistaken" and "wrong" structural policy decisions (particularly in the 1980s) that over-intensified the processes of de-industrialization, which damaged the long-term growth prospects for the region (See Palma, 2003; 2005).

5.3 *Two not-so-different groups of countries*

In order to analyze the development process in the Southern Cone countries over the past 48 years it is important to study the structural changes in the pattern of economic growth. To tackle this issue, we focus on the per-capita economic growth rate and its contributing factors, comparing the experience of Southern Cone countries with the Andean region.

In this point we will sum up the results of the previous tables, in that way, we grouped the countries in clusters that initially and not necessarily coincide with the two trading blocs of the region (MERCOSUR and CAN). The results confirm these economic relationships and distinguish between "winners" and "losers" within each aggrupation. We include a table of correlation guides through the analysis of this point (See Table 4.5).

The analysis sheds light on the strengths and weaknesses of long-run growth of these countries by identifying similarities and differences among them and evaluating their economic performance on that comparative basis. Explanations of poor economic performance and divergence in South America have included geographic constraints, institutional barriers, political instability and political economy factors, among others. In a low-growth, low-investment and low-productivity economy, however, after the economic reforms of the early 1990s, positive modifications were done in the region, for example, more open economies to trade, a group of non-traditional exports experienced outstanding growth between

1970 and 2008, and for a set of countries a more developed financial sector.[59] On the other hand, there are still other exogenous variables that drive macroeconomic shocks on growth performance (the U.S. interest rate, and terms of trade volatility), which are more persistent in the developing countries and others with natural wealth.

The main relationship was trade and used to be relatively small among South American countries. For this reason, the composition of factor endowments as well as levels of competitiveness was similar within the region. Nevertheless during the recent episode of economic opening, there is evidence on the issue of regional disparities; Taylor (2003) expects ambiguous results at the level of specific nations, with improvement in some cases and deterioration in others.

- The southern cone and Brazil

The first group includes: Argentina, Chile, Paraguay and Uruguay (the southern cone) and Brazil. A cursory look at some basic development indicators suggests a lack of positive association (see Table 4.5). Generally speaking, GDP per capita increased as well as health and education indicators, while the underlying economic structure turned more integrated to global trade and there were improvements in institutional quality and macroeconomic management, however, the results show that the negative impact of macroeconomic and foreign distortions were in the same magnitude on both groups.

The results show that the U.S. interest rate is negatively related to growth throughout the entire period, indicating that increments in foreign interest rates may produce capital outflows; additionally, the debt overhang is significant almost for all Southern Cone countries, except Chile.

Growth rates of GDP per capita for the Southern Cone countries during the entire period (see Figure 4.1) reveal a number of features. First, all the Southern Cone countries experienced progress during the overall period and, with the exception of the 1980s, where only Chile was not so negative affected and grew at 1.0% (see Table 4.1a) annually. However, one noticeable difference is that while

[59] The literature relating to the links between a country's degree of financial development and its per capita income level and rate of growth is large (Lucas, 1988). Since a free capital market brought about a better allocation of credit and helped bring down capital-output ratios, financial liberalization may also have contributed to greater employment growth and to an improvement in the income. Most recently (King and Levine, 1993; Beck, Levine and Loayza, 2000) showed that financial development and growth are not just contemporaneously correlated.

Argentina, Chile and Uruguay experienced their best growth performance during the nineties, Brazil and Paraguay saw their best performance in the seventies. In other words, Argentina, Chile and Uruguay did better over time while Brazil and Paraguay did worse.

Southern Cone countries performed significantly better than the rest of South America during the 1980s and 1990s (with the exception of Argentina). All of the Southern Cone countries ended up in a better position by the early 2000s than where they started at the beginning of the 1960s. We found that agriculture is the one of the main factor accounting for the slower growth of the Southern Cone countries, however, they present an advanced level of industrialization (e.g. manufacture and services exports play an important role for economic growth) showing less vulnerability to terms of trade volatility.

- The Andean region

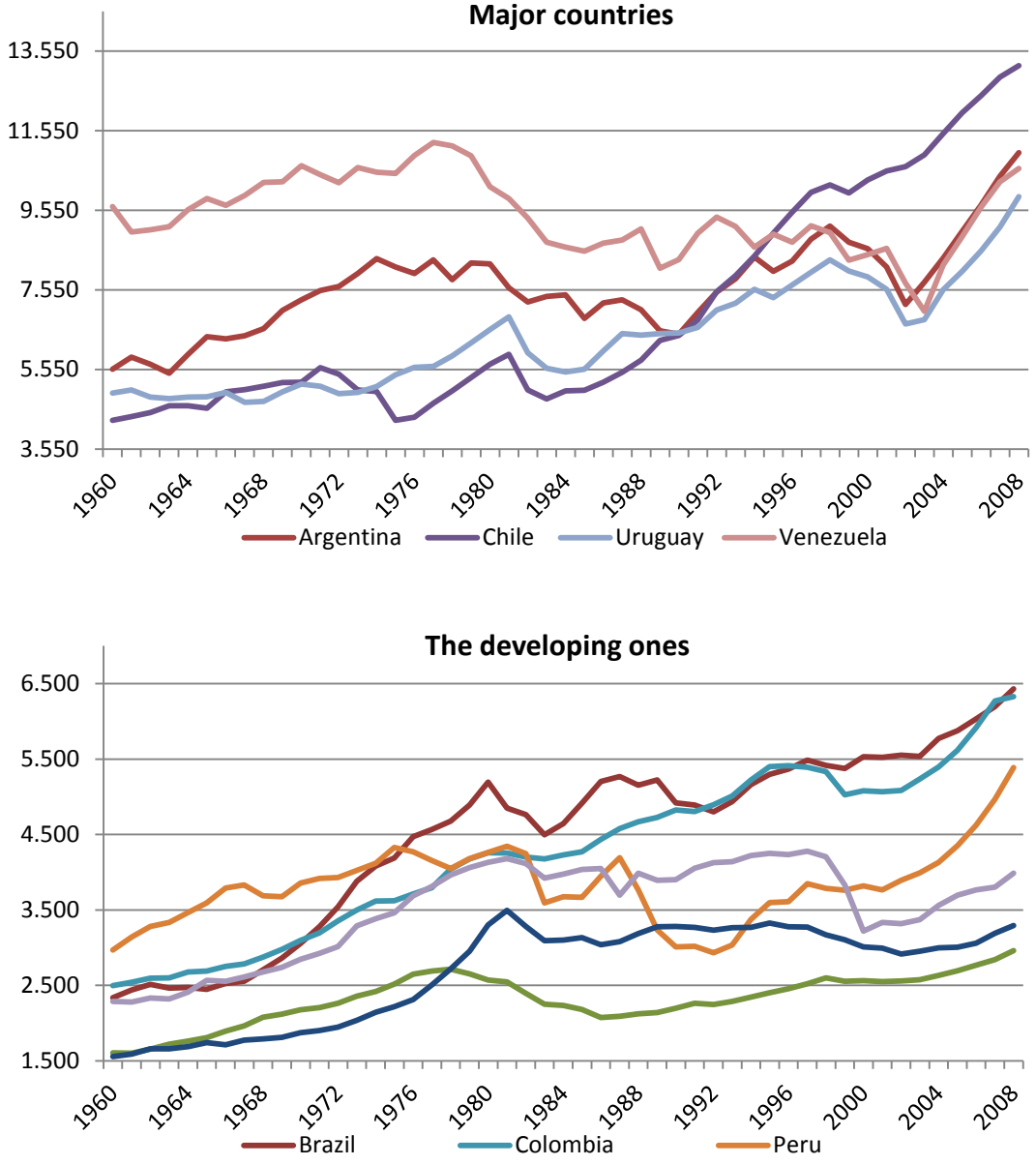
This group includes the Andean economies: Bolivia, Colombia, Ecuador, Peru and Venezuela. During the past four decades, the Andean countries, like many other countries in the region, went through several episodes of economic crises, political instability, external shocks, and social unrest. In the same period, they also experienced episodes of economic stabilization, political reorganization and structural reforms.

The patterns of performance over time were similar among countries: medium to strong economic growth during the 1960s and 1970s, des-acceleration during the crisis of the 1980s, all of them showing significant losses in GDP per capita except for Colombia (which grew annually at 1.1%), and recovery during the 1990s. In spite of the early 2000s, part of the Andean region showed high growth rates due to commodity exports.

Regarding the sectorial development mainly component by agriculture, food exports, and oil exploitation, it is one of the main factors that accounted for economic growth of the Andean countries. In that way, it is reasonable to assume that these countries attract foreign investment, due to the positive interrelation with terms of trade, which both have a positive effect on growth. Since it is common knowledge that the major macroeconomic distortions occurred in the Andean region (e.g. sudden oil price changes during the 1970s, and economic distortions of the protectionist policy, fiscal imbalances), the volatility of terms of trade and U.S.

interest rates changes appear to be significant and to have a direct negative effect on growth.

Figure 4.1. The Evolution of GDP per capita



Overvaluation was a common problem in South America in the 1990s, many countries excessively leveraged nominal exchange rates in order to obtain anchors for domestic price stability; however, the only significant case for this issue took place in Bolivia. This approach, coupled with irregular financial regulation, made countries vulnerable to unsustainable current account deficits, and balance of payments crises.

- GDP residuals correlations

As the empirical technique above made clear, what is of concern here is not whether there is strong correlation across countries; instead we try to underlie regional associations. In carrying out this part, it provides a detailed picture of the dynamics of spatial and national output disparities across South America. Such empirical analysis aids our understanding of the convergence and cohesion possibilities and macroeconomic policies.

López-Bazo et al. (1998a) goes along with this point. It considers a simple growth model in which technology depends not just on accumulation of factors within the region but also on accumulation in its neighbors. As a result, the growth rate in a region depends on the stocks of factors in the neighboring regions. Besides, a certain amount of the growth experienced by any regional economy may be due to a "contagious effect" where rates of growth are larger when neighbors are also growing at high rates and smaller when neighbors are stagnated or growing slowly. This effect can be thought to be related to a demand-side externality as, for instance, demand for final goods or inputs produced in a region from their neighbors. That is, economic growth is caused by factors that permanently drive economic performance in national economies contribute to growth in the region. Therefore, an economy would be strongly interested in its neighbors.

The residual correlation coefficients of the OLS estimation reveal -for the 1960–1982 sub-period- two important results: first, there is a quite clear relationship between major countries of the region (Argentina, Brazil and Colombia, this last one highly associated with the first) and a positive relationship between Peru, Uruguay and the Chilean economy. Secondly, there is an association among countries of the Andean region, Venezuela and other three economies (Bolivia, Ecuador and Paraguay).

The early 1990s opened a new era for the analysis of economic interactions among South American economies. Economic shocks were transmitted by real and financial channels. Intra-regional trade recuperated strongly thanks to the wave of trade liberalization and the resumption of economic growth after the "lost decade" that marked the 1980s.

But the restore of growth was accompanied by higher volatility, due to the nature of the new international financial market, where contagion has become a prominent reality. As a result, shocks initiating in one country had direct impacts

upon trade and other real variables, financial spreads and exchange rates in its neighboring geographical area, as well as upon the international business climate, if the troubled country is large enough (e.g., Argentina, Brazil or Mexico). Thus, exchange rate devaluation by one of the regional trading partners could have a strong impact on regional trade flows, triggering regional tensions (as occurred in MERCOSUR after devaluations in Brazil or Argentina).

Table 4.5
Correlation matrix of residuals for GDP per capita
Method correlation: Seemingly Unrelated Regressions (SUR)

Period: 1960-2008

	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
Argentina	1									
Bolivia	0,0448	1								
Brazil	0,4376	0,4407	1							
Chile	-0,2228	0,2931	0,1399	1						
Colombia	-0,0467	0,1578	0,0369	0,5587	1					
Ecuador	-0,3183	-0,314	-0,0461	-0,0483	0,1341	1				
Paraguay	0,1782	0,0945	-0,3925	0,2227	0,6102	-0,3358	1			
Peru	0,2827	0,1547	0,1643	-0,4693	-0,341	0,1498	-0,3973	1		
Uruguay	0,46	0,1158	0,6268	0,2332	0,378	0,0618	-0,0211	0,03	1	
Venezuela	0,5115	-0,0407	0,5839	-0,1648	0,2691	0,076	0,0405	0,0669	0,6871	1

Breusch-Pagan test of independence: chi2(45) = 71.857, Pr = 0.0067

Sub-period: 1960-1982

	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
Argentina	1									
Bolivia	-0,5053	1								
Brazil	0,6613	-0,5624	1							
Chile	-0,5929	0,2543	-0,6067	1						
Colombia	0,4057	-0,3348	0,2822	-0,1286	1					
Ecuador	0,1568	0,0556	0,2176	-0,3808	0,1839	1				
Paraguay	-0,3375	0,0523	-0,1113	-0,2853	-0,2233	0,3652	1			
Peru	-0,2732	-0,0922	0,0874	0,5078	0,1983	-0,4092	-0,4761	1		
Uruguay	-0,3315	0,061	-0,2734	0,5835	-0,0321	0,0921	0,0006	0,4581	1	
Venezuela	-0,1431	0,3099	-0,1966	-0,1824	-0,0961	0,4494	0,6928	-0,4874	0,1239	1

Breusch-Pagan test of independence: chi2(45) = 93.094, Pr = 0.0000

Sub-period: 1982-2008

	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
Argentina	1									
Bolivia	0,0327	1								
Brazil	0,4249	-0,2415	1							
Chile	0,1049	-0,1647	0,228	1						
Colombia	0,4916	0,2162	0,3667	-0,07	1					
Ecuador	0,6476	0,1017	0,3001	-0,0612	0,1979	1				
Paraguay	-0,1056	0,0705	0,3018	-0,4282	0,0498	0,0618	1			
Peru	0,4483	0,0792	0,2187	-0,1247	0,1832	0,3894	0,3381	1		
Uruguay	0,085	-0,01	0,5103	0,2351	-0,0228	-0,1059	0,3085	-0,165	1	
Venezuela	-0,0866	-0,1198	0,6606	-0,0279	0,157	0,0362	0,3687	0,0876	0,4373	1

Breusch-Pagan test of independence: chi2(45) = 90.077, Pr = 0.0001

Note.- This table shows the correlation matrix of residuals from Tables 3a and 3b

In addition, the regional integration served as a magnet for foreign direct investment. The attraction of investment was a significant growth-instrument in the 1990s, given the strong macroeconomic reliance on foreign capital. Apart from that, it seems that merely the major economies (Argentina, Uruguay, and Venezuela) benefited significantly from free access to the large Brazilian market, which soon became the major export outlet for industrial sectors. On the second hand, three Andean countries: Colombia, Ecuador and Peru show a relative high correlation with the Argentine economy. Finally, the results for the other countries show lower correlation of the residuals, only suggesting regional institutionalized agreements with no strong evidence of association among them.

6. Conclusions

The GDP per capita across South America are not equal and do not stay constant. Consequently, the regional GDP per capita distribution has fluctuated over time. Such a process could have many possible limiting outcomes: complete equality (convergence), stratification, and continually increasing growth disparities. While regional disparities in South America have been the subject of a continuing policy concern, factors driving regional growth have also been the issue of a considerable research effort, although it is fair to say that much of this has been primarily motivated by questions about the determinants of long-run growth.

This chapter showed evidence that nation-state macro factors and physical-geography spillover effects help to explain the observed distribution dynamics across the region. We constructed a regional growth model, analyzing the contribution of different macroeconomic and policy factors. The results of the econometric model stress the unequal growth rates of South American economies, motivated by the wide disparity existing among countries, especially in less developed ones, which they seem to follow major neighbor economies. Considering the initial endowments of each particular economy, the results primarily indicate that differences in initial conditions across countries lead to large differences in income levels, and rates of growth.

Faced with this outcome, this chapter took an eclectic approach on the growth disparities problem. Although we believe that in South American economies, investment and technological progress are endogenous to economic dynamics, this

enormous influence can not materialize without a set of economic and institutional conditions capable of boost economic activity. It is worth noting that an improvement physical capital accumulation increases economic growth in the region, jointly with the investment ratio, both are ones of the main determinants of economic growth.

The degree of openness of the economy and the total factor productivity (TFP) are found not to have significant effects on growth, but there have a positive effect mostly on developing countries. For example, openness is significant in the first sub-period mostly for Southern cone economies (e.g. Chile made reforms in the 1970s). On the other hand, merely factor productivity has a positive effect on economic growth in Peru, Uruguay and Venezuela.

Turning the attention to human capital (secondary enrollment and life expectancy), there is strong empirical support for the view that as people become healthier, better nourished and more highly educated, they contribute to economic growth. Being the Southern cone with the most human capital accumulation, and only recently (during the 1980s), the Andean region shows signals of improvements in access to education and healthier human population. Secondary education represents critical elements in the development of key institutions in the areas of government, law and the financial system, among others, which are all essential for economic growth.

Financial development appears to be significant in only major countries (Argentina, Brazil) and in a few developing ones (Paraguay, Peru, and Venezuela) we assume mostly due to high capital inflows to extractive activities.

Not surprisingly, the institutional development also has a major presence on regional developed countries (Chile and Uruguay), and those where high political changes occurred (Colombia and Peru) most visible in the second sub-period. On the other hand, the significance of civil liberties variable shows considerable advances in democracy, expressing the national cohesion and political stability (Argentina, Bolivia, Brazil and Chile).

The sectoral structure of production and the share of exports in output show that there still a clear dependence on agriculture production and exports, on the other hand, there are two changes in production towards more produced agricultural goods, services and oil exploitation. Between 1983 and 2008, the share of agriculture decreased in seven countries, while in five countries the share of produced

agricultural goods and services increased. Contrary to traditional results, we show that raw material exploitation (e.g. oil and gas) increase economic growth, eight countries show significant effects on economic growth, although a higher share on output may damage the business network and political institutions.

In addition, exogenous shocks of international prices in primary export sectors, notably oil, mining and plantation agriculture, caused a steep decline in export incomes before the 1980s, which led to an output collapse and significant collateral damage to the political and financial systems, interrupting capital inflows. The results also show the dramatic collapse in the terms of trade after the East Asian crisis, which corresponds to a disruption of the recovery from the deep growth collapse two decades earlier.

This study also draws other main conclusions on macroeconomic stability; the analysis confirms the importance of other four macro-variables on economic growth. Where, external debt overhang, and U.S interest rates show a major presence with negative effects almost, being the Southern cone countries mainly affected by debt overhang, and the Andean countries mostly damaged by U.S interest rate. The inflation rate is highly significant but only during the 1960-1892 sub-period, where most episodes of inflation were registered (Bolivia, Brazil, Chile and Peru).

The permanent problem of disparities and income inequality not necessary disappears once a country is growing. By contrast, the landlocked countries (Bolivia and Paraguay), with a poorly developed infrastructure and a more distant location from major markets, are the least efficient economies in terms of production. It is this major contrast between the more developed coastal and the trailing landlocked countries that has helped to create these disparities.

We believe the region could exploit its economic potential, in turn; this corresponds, among others to structural factors and the effect of public policies in various areas, including investment in infrastructure or human capital and technology. However, given the deficiencies in primary and secondary education, the countries fail to take off economically. Since human capital is complementary to physical capital, it necessarily impairs the accumulation of physical capital.

Not surprisingly, economic growth has been higher in countries where the shares of industry and exports have had the largest increase, and where the change in the share of agriculture has been the lowest, it is reasonable to assume that the productive structure changed a little in the region, mainly due to unequal

endowments, low regional growth cohesion and institutional instability in the first decades, which have specifically increased growth disparities.

The possibility of immiserization still exists in our model, but it is most distinguished in the first sub-period (1960-1983). Analyzing the effects of terms of trade volatility, the results show that there exists the possibility of immiserization on the South American economies. We have believe that this process is highly correlated with the de-industrialization phenomenon, which is illustrated with the high dependence of raw material exports, though it shows benefit results on welfare for the Andean countries.

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Chapter 5

Growth under disturbances: the experience of South America in the Import-Substitution Industrialization

Growth under disturbances: the experience of South America in the Import-Substitution Industrialization

Summary

A considerable debate has taken place among economists and policymakers over the merits of the Import-Substitution Industrialization (ISI) as a strategy for economic development in modern South America. We study quantitatively the effect of the ISI policy and their impact on long-run growth. To deal with this challenge, we establish the chronology of fluctuations of the economic policy; then, we investigate the extent to which these policies affected capital accumulation and economic growth. Therefore we build an index of macroeconomic distortions (IMD) to measure the relationship between economic disturbances and economic growth. We believe that the anti-growth institutions help to explain the disappointing growth performance. Additionally, this chapter adds an historical dimension to the ongoing debate by assessing the economic effects of market-oriented reforms on capital accumulation and productivity. Without the stabilizing and liberalizing policies of the "Washington Consensus", the GDP per capita would have been significantly lower in the 1990s.

Keywords: Growth fluctuations, Latin America, Dynamic panel data, Distance indicators.

JEL Classification: F41, N16, C43, O43.

1. Introduction

Economic welfare in the long-run has been an essential focus of the Latin American historiography; slow growth and relative retardation have been seen as having important implications for institutional, social, and political development in the region. Since the post-World War II, the South American countries have experienced many changes: a population enlargement, migration from the countryside to the cities, increasing levels of manufactures, political changes, etc. All these transformations and more happened in the region while the same-old protectionist policy (ISI) remained almost unchanged, which have brought swing results to the economy.

Furthermore, to appreciate the impact of globalization on the developing countries, one has to study South America, as historians of the area understand; this is the region whose economic fortunes have been mostly shaped by harmful external forces and anti-growth institutions.

From the 1930s to the end of the 1970s, South American economic policies were characterized by an inward-looking model. The model emerged during the Great Depression that later was codified by the application of unorthodox theories, especially during the 1950s.[60] The regional analysts were passionate with Latin-American development failure; in particular, the colonial heritage and the 19th century nation building were always viewed as an underlying cause of modern underdevelopment. It is important to mention that different initial conditions and circumstances provoked dissimilar results of apparently identical policies in the entire region.[61]

It was foreseen that a long-run restrictive policy will bring macroeconomic distortions; the economic results showed that the performance was disappointing by the 1960s. The distortions persisted and worsened into the mid-1970s and finally in the 1980s a major downturn became evident. Even though policymakers and

[60] In the 1950s, Prebisch attributed the failure to reach sustained economic growth in Latin America to the international division of labor. Based on evidence from the terms of trade between manufactures and primary goods, he concluded that terms of trade moved against primary products. If prices decline as productivity increases industrial goods -where the technology improved-, the prices should have declined in price more than agricultural goods. Singer (1950) not only argued that the gains from trade had been distributed unequally, but also that foreign investment in the tradable sector was not part of the domestic economy. This interpretation served to cause the policy move in Latin America in the 1950s and 1960s, which had clearly autarkic outcomes.

[61] The literature analyzing the consequences of national economic policies on growth and poverty is substantial. See for example, Easterly (2005) and De Haan et al. (2006).

scholars tried to relax the measures, for example, implement integration policies and trade agreements to solve the old structural economic problems, still there was the presence of a week institutional framework. Indeed, the political costs and pressures from the economic elites were high enough to change the model; their actions were backed by an overwhelming flow of capitals.

Most analysts and economic historians of the modern economy carry a pessimistic belief in historical persistence to explain South America's poor economic performance. In that sense, we base this chapter in the classic tradition of Kuznets and Abramovitz to identify the obstacles to capital accumulation as the main growth culprit. The argument here is that the variation in cross-section growth performance during the postwar period can be attributed primarily to accumulation differences.[62]

In contrast, the other point in this research is to separate these accumulation patterns of growth accounting, which will allow us to see how South America's failure to achieve rapid capital deepening was attributable to an array of economic distortions deriving from mistaken policy choices.

Following this premise, we can indeed provide a different approach of how costly were the inward-looking development policies and macro distortions on economic growth.

This chapter examines the effects of distortions, and explores the structural differences between growth dynamics in ten South American economies that represent the 91.2% of Latin American GDP. The economic distortions of the ISI had profound effects on many aspects of the growth process, and help to explain the divergent course in the region, additionally, raise important questions about the evolution of political institutions. Our contribution is to study and develop a new instrument to measure the effects of the ISI based on the comprehension of macroeconomic variables' real force that intervened on economic growth.

Following this purpose, the South American experience provides a singular historical evidence for inward policy distortions. Consequently, we add a long-run dimension using time series, which is missing in the ongoing debate of policy changes (from pro-global to anti-global and vice-versa), natural resources availability

[62] Beyond growth accounting, the role of capital accumulation (physical and human) as an explanatory variable of cross-sectional differences in postwar economic growth, has received overwhelming support from econometric studies (e.g. Levine and Renelt, 1992).

and its vulnerability to external factors, and institutional stability. Furthermore, we try to measure the effects of institutions on South American development.[63]

Our main goal is, then, to test and measure the widespread costs of ISI distortions on the region's growth performance. To do so, we construct an index of macroeconomic distortions (hereafter IMD) using the method of Distances (DP2) (Montero et al., 2010). For this purpose, we considered a sample of ten countries in South America from the 1950 to 2008.[64]

The results confirm the negative effects of distortions on growth and productivity. The subsequent economic reforms of the 1980s that were aimed at liberalizing the economy reduced drastically the macroeconomic distortions, whereas, the previous one during the 1970s failed to slow down the inefficiencies and costs on the economy. On the other hand, the results show that international trade doesn't have a direct impact on growth and it is only efficient through capital accumulation and investment.

The rest of the chapter is organized as follows. Section 2 reviews Import-Substituting Industrialization's growth records and the economic policy. Section 3 introduces the IMD index, which allows determining major policy changes in South America. Section 4 studies the growth determinants highlighting the deterrent role played by macroeconomic distortions. Section 5 concludes and suggests some avenues for further research.

2. Economic performance during the ISI

The Import-Substituting industrialization was an attempt by economically less-developed countries to break out of the world division of labor which had emerged in the early part of the 20th century. The import-substitution consisted of establishing domestic production facilities to manufacture goods that were formerly imported.[65]

[63] Recent empirical evidence shows that the effects and consequences of institutions are not observable in the long-run. For example, institutional crisis episodes may cause an immediate contraction of the economy; Felix (1965) points out that overvaluated exchange rate is a second type of institutional "distortion", which produces investment outflows.

[64] The importance for covering this period is because it channels the events and facts that lately define the strategy of the ISI, its growth-effects and lately its collapse.

[65] The industrialized countries went through a stage of huge investment in manufacturing industries, which were undertaken mainly to replace imports.

Before the 1920s, the internal concerns had risen over with the increments in world trade, they were accompanied by serious figures of massive unemployment rates and output slowdown, which later would be supported by the social problems of the post-war episode. Based on these real circumstances, economic policy was led to the local promotion through strong protectionist measures and subsidies.

It was a process of industrialization oriented to the inner market, which was designed to help infant businesses and to maintain the level of employment. The 1930s crisis and the Great Depression that followed sustained these pessimistic views: the fall of income and employment in the industrialized countries was reflected in a low demand for primary products, collapse of prices and world trade. Even when the recovery of trade was sooner than expected, the long period of the depression confirmed the idea that the trade boom had finished; then, the developing world decided to follow a protectionist policy, looking to their domestic markets as the main determinant of aggregate demand (Prebisch, 1950).

However, it was merely after World War II that the ISI became a policy tool for the development economics. Most of the larger countries of South America accepted gearing their economies toward the commitments of the policy. The persistent reliance on the export of primary products was thought to be precarious due to the instability of such exports and world prices. Thus, it would not conduce to a long-run development because of the relatively slow growth of world demand. It was thought that the ISI would introduce a dynamic element into the South American economies and increase their rates of growth.

In this sense, the post-World War II scenery allowed the South American economies to diversify their economic activities. But, the region converted and consolidated in one of the strong commodities' supply of the world, with the exports rising significantly. At the same time, the ISI continued as a consequence of commercial restrictions applied in developed countries.

According to ECLAC (1966), the ISI had a positive impact on industrial production[66] for Argentina, Brazil, Chile and Colombia during the 1930s and the

[66] Argentina was based on the exploitation of staples: agricultural and cattle products that found an outlet in international markets. The sector was labor intensive (backward linkage sector). The intensive use of labor permitted a better distribution of income and increments in the demand. It provided an added incentive for investments in other activities within the domestic market (Cortes Conde, 1992). On the other hand, Hirschman (1963) considers that Argentina grew, due to foreign and domestic investments before the 1930s (mainly in railroads) reinforcing its comparative advantage and facilitating exports. On the second hand, by the 1950s Brazil came fairly close to the industrialized

1960s. On the other hand, Peru and Venezuela counted on intermediate industries and large natural resources exports, which later drove to more open economies; for example, Venezuela boosted its industrialization as a channel to absorb oil revenues (Bethell, 1991). The countries with the lowest degree of industrialization were Bolivia, Ecuador and Paraguay, which highly depended on natural resources and could not follow a path to industrialization.

2.1 *The nature of protectionism in South America*

By the 1950s after the World War II, the ISI policy was flourishing and South America was highly committed to protectionism.[67] Coatsworth and Williamson (2004) argue that protectionism was established as a natural barrier, as the transportation costs began to disappear. Considering this statement, there have been plenty of incentives for manufacturing interests and lobby for protectionism.

The opportunity to diversify manufactures was unequal within the region; at the beginning only the major countries could sell its manufacturers in abroad markets. The economic opportunities and growth rose unequally (for example, in mining countries such as Bolivia, Chile and Peru), as the commodity price was fixed by consumer countries (industrialized economies) and the delay of payments to these developing countries impeded additional incomes, postponing public expenditure.

At the beginnings of the 1960s, the region passed through a new industrialization stage led by the state support, and played a significant role in major countries. Due to its success it was transmitted to the latecomers group of economies.[68] The principal instruments used to promote and to intensify the ISI were: protective tariffs,[69] exchange rate controls, special preferences for capital

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countries, under a sustained and rapid progress of steel, chemical and capital goods industries driven by development institutions that increased the supply of capital and investment. However, what looked like a hopeful case in the region, it was thrown into disarray by the political crises and related economic and social setbacks of the 1960s.

[67] The results from Bértola and Williamson (2003) over the tariff growth paradox, found that the coefficient of the log of tariff rates for Latin America was 0.36 for 1875-1908 and 1.45 for 1924-1934. Thus and in contrast with the late 20th evidence, tariffs were associated with trade barriers and low growth.

[68] We define the 'latecomers' group as the less developed countries of the region: Bolivia, Ecuador, Paraguay and Peru. They were countries that have a low initial GDP compared to their major partners, in 1950: their GDP was 53% lower than the major economies.

[69] The first explanatory hypothesis seemed that the Latin American governments pursued protectionist policies because they learned through trial and error that high tariffs do not promote

imports for the new industries (subsidies), preferential import exchange rates for industrial materials (e.g. fuels and intermediate goods), cheap loans by government banks, and the construction of infrastructure (railways, telecommunication, and subsidized energy). Later, the state intervention participated directly in certain sectors, especially heavy industries, like steel, where neither domestic nor outward capital was willing or able to invest.

No matter what was its original impulse, the ISI started predominantly with the manufacture of finished consumer goods that was previously imported, then moved on to manufacture intermediate goods and machinery, through backward linkage effects. Such process needed in a connection with agricultural or transportation activities.

However, one of the difficulties of the South American countries was the institutional instability and the discontinuity of policies. For example, in 1955 when Brazil defined foreign capitals as a fundamental instrument for the strategy, years later the authorities changed the previous role played by foreign investment. In this case, the multiple exchange rates and tariffs defined the further outward-policy.

There was not a common policy in the region, and cooperation among countries didn't reach any consensus. One of the main problems in the approach of the strategy was the lack of political will to develop strong institutions and open financial markets.

- *The export-led growth stage: the policy shift*

After the post-World War II periods (1930-1950), the objective of the strategy was to attract foreign investment to boost local industries, by the mid-1950s, there were designed instruments to draw foreign investment through credit subsidies, fiscal rebates, preferential treatments, and a combination of protection and restricted right of establishment. This new spurt of capitals initially geared to domestic markets only in the 1960s. Then, multinationals became relevant exporters of manufactures after the 1970s (Taylor, 2003).

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economic growth. The literature evidence shows instead that high tariffs served to increase government revenues and to protect domestic industries. Although tariff average fell during the first part of the century (1930-1950), by the mid-1960s it decreased to the half. Clemens and Williamson (2001) assumed that specific duties seem to be much more common in poor and non-industrial countries.

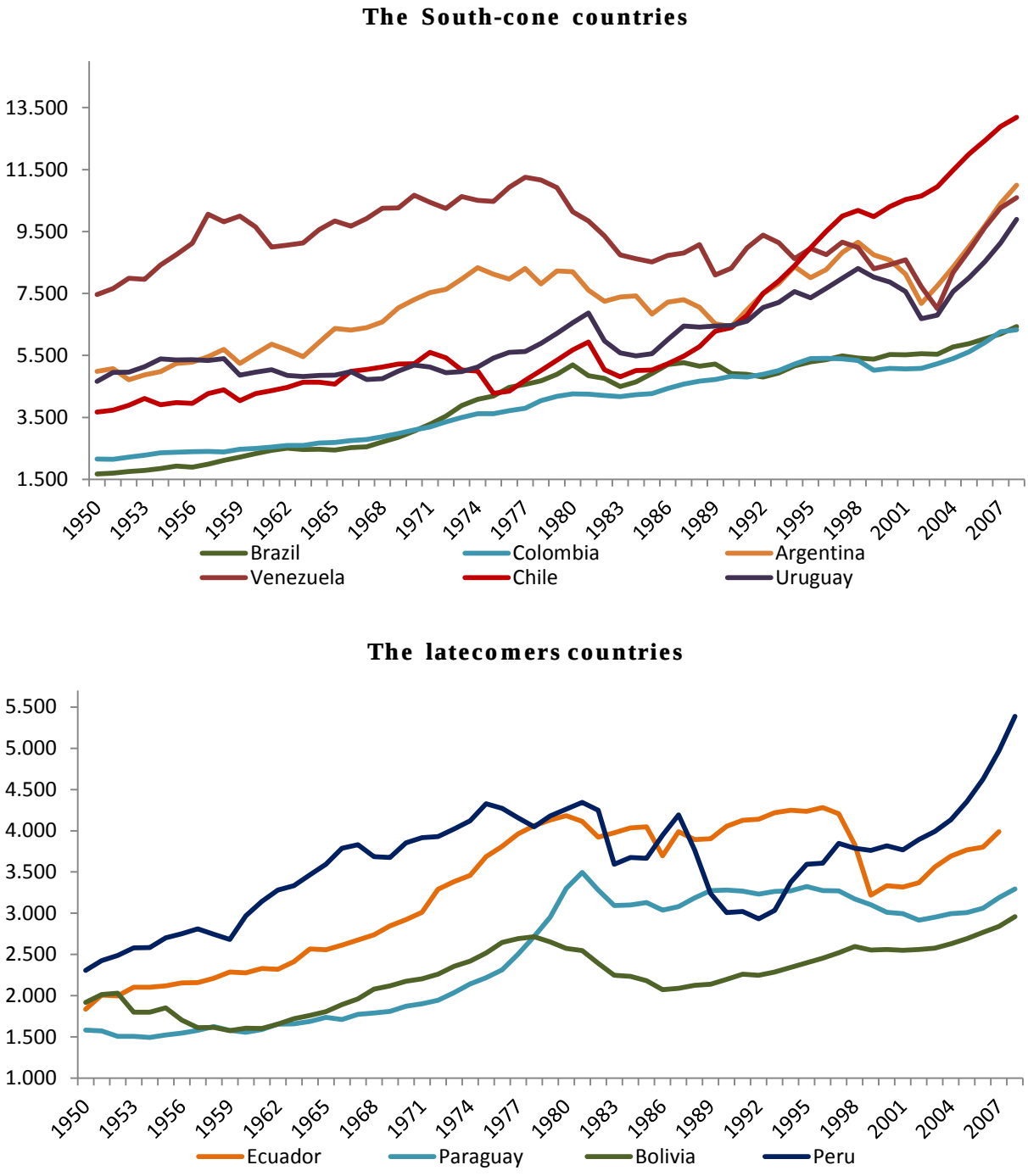
By the 1970s many of the South American countries were taking measures to eliminate some of the unpleasant distortions of the ISI, during which the tariff level was slowed (e.g. Argentina; Brazil and Chile reduced in a 17% the tariff rate), and added fiscal and credit incentives for foreign ventures. This was done to decrease the level of effective protection. In that way, authorities attempted to shift from protectionism to an outward strategy. The new export promotion policy became a pillar of the foreign economic strategy in most of the larger economies.

Under the new trade boom between 1967 and 1973 with an exports expansion of 17.9%, the economic performance was low with an annual rate of 1.9%, below the world average (2.7%). In the time span, most South American economies suffered a macroeconomic slowdown, affected by a balance of payments crisis and a sharp acceleration of inflation. However, Brazil and Argentina stood out by its economic performance; GDP increased almost 3.1% and 6.2% respectively. Colombia was among the better performance countries (3.2%); and the worst performer was Chile, where GDP increased at 0.0% yearly. Regarding, the latecomers: Ecuador's growth rate was outstanding (3.4%), jointly with Bolivia (2.7%), and the last was Paraguay (2.0%). Figure 1 shows the evolution of GDP per capita of major countries and the group of latecomers.

During the 1970s, the region again started to have negative trade balances - imports grew faster than exports- although the increment of manufacturing exports was temporary. The raw material prices fell, especially in 1973, the price trend anticipated that this phenomenon would last a long time. In mid-1980, there was a steady decline trend, and terms of trade volatility remained high until 2002.

It is indeed difficult to classify the shift of the strategy for most of the South American economies from mid-1970s as a truly outward-looking model. Indeed, it seemed more reasonable to think of a cross-eyed strategy, incorporating inertial elements of protectionism and new ones of an open economy, geared to export promotion and attraction of foreign investment. However, state policies of protectionism and subsidizing remained present, based on aids to national elites and lobbies (pick-the-winner), helping local firms heavily to be protected against foreign competition.

Figure 5.1
The GDP per capita: South-cone vs. latecomer countries



2.2 *The protectionism instruments*

Here we briefly develop the instruments of the import-substitution strategy that had detrimental effects on the economy. Some of them are considered for the

construction of the IMD index, which will be explained in the next section. Considering the historical literature of protectionism in South America, the traditional means through the substituting-imports strategy acted were: tariff rates, multiple exchange rates, and rules over foreign capital. By the 1950s, when the ISI policy flourished, a complex set of instruments were introduced to make effective and profitable the state intervention, including myriad non-tariff barriers, regulations on capital flows, tax exemptions, subsidies, credit facilities, transport and energy subsidies, and state-enterprises.

- *Tariff rates*

The South American governments during the postwar period were confronted by chronic problems of balance of payments.[70] The upshot, economies had to find ways to either increase exports or decrease imports. Given the political cost associated with each option, the South American countries tended to choose the latter one, based on the following reasons: increasing exports takes years, decreasing imports can be done overnight (Haber, 2006). The conjecture of institutional and economic constraints meant that once protective tariffs were in place, authorities cannot subsequently remove them.

By the 1960s protectionism became enshrined, but tariffs were actually lower than those in Asia and the European periphery. Although at the late-1970s the structural economic reforms varied across sectors and countries, the South America economies started to liberalize the international trade, capital inflows and the domestic financial sector. The policy decisions included: tariff reductions, dismantling non-tariff barriers, eliminating restrictions on foreign investment and phasing out many foreign exchange regulations (Taylor, 1998).

- *The exchange rate and development institutions*

A second set of the protectionist instruments were the use of multiple exchange rates and the creation of development institutions. In fact, both came together in the strategy implementation; the monetary instrument (the exchange rate) was often dependent on the institutional management, both instruments were

[70] The South American countries were losing market share to other developing countries in mineral and agricultural exports. Some sense of this can be gleaned from the following data points: in 1946, South America accounted for 13.5% of world exports, by 1955, that figure stood at 8.9%; by 1965, at 6.2%, and by 1975, at 4.4%.

complementary tools. In short, the preferential exchange rates became a set of complicated implicit taxes and subsidies. In that way, authorities settled institutions to manage the exchange regimes, subsidies and loans; for example, in Chile, the Consejo de Comercio Exterior (CONDECOR) oversaw the system and had the power to ban outright specific exports or imports. Argentina had a similar system of multiple exchange rates that were designed to subsidize industry by taxing agriculture; this was the Instituto Argentino para la Promoción de Intercambio (IAPI).

The multiple exchange regimes were based on a differential treatment for buyers and sellers of the foreign currency; it eventually came to extend in those economies opting for the import-substitution strategy, and was combined with sustained incentives to export. In that way, manufacturers could import necessary capital goods at special exchange rates that lowered the domestic currency cost of the imported machinery. Instead, foreign-produced manufactured goods were subject to a different exchange rate making imports look extremely expensive at the local currency.

By the 1960s, the state institutions appeared in almost the entire region to assist industrialization and other sectors (e.g. mining, agriculture). The most notable institutions were the Banco Nacional de Desarrollo Económico (BNDES) in Brazil, and the Corporación de Fomento de la Producción (CORFO) in Chile, which developed financial instruments to boost industry and nontraditional exports. For example, in Chile, the industry and agriculture were assisted particularly in production; the CORFO also funded technology institutes and universities. In the meantime, the multilateral loans slowly started to fund development projects, especially those who offered visible economic performance; in practice these loans were mainly channeled to transport and energy projects.

Summarizing, the development institutions showed modest results in manufacture. There were two important problems: the lack of a tax reform and no controls over the accountability in state-enterprises. When the debt crisis exploited, there were no clear figures about the indebtedness level of state institutions and enterprises.

- *The role of the state: enterprises and banks*

Its appearance was at the latest stage of the strategy (the 1970s); state enterprises made its first appearance by the hand of subsidies. On the other hand, state banks were as a consequence of earlier protectionism -constrained financial market- and operated through the development institutions.

The state firms participated in the production of 'strategic goods' such as: steel, petrochemicals and fertilizers, and were disposed to produce inputs for other industries. The persistent logic of subsidies produced state ownership of manufacturing industries; however, due to political grounds, the price was fixed by the authority and was below market-prices.

Behind the productivity growth, there were significant changes in organization and technology[71] at the time, which reinforced the institutional evolution; however, the region suffered political disturbances by a number of military and nationalist-minded governments that led behind the research labor, which had negative effects on output productivity.

By the 1970s, once that many state enterprises were operating and consolidated, pressures and problems started on the fiscal side of the economy. A study (ECLAC, 1966) reflects that state enterprises only financed 5% of their investment through internal sources.

2.3 *The final stage of the ISI, amid policy changes and foreign shocks*

The existence of the import-substitution strategy has no longer been exclusively a matter of market forces reacting to lower growth rates of income or to dreadful events (e.g. wars and depressions). It has been undertaken in many countries as a matter of a conscious development policy, carried out by protective duties, with a wide array of credit and fiscal devices, and through the establishment of state-owned industries and development corporations (state banks), which were entrusted with the promotion of specific ventures.

[71] The creation of technical progress occurred in large R&D laboratories inside state enterprises, such as YPF (Argentina), Petrobrás (Brazil) and Pemex (Mexico), around them grew a wide network of production, copying or repairing local machines and designs that were old respect to the technology-frontier. Many firms managed to run rapidly in their learning curve despite the retirements of research funds and inflation problems (Katz and Kosacoff, 2000).

The rise of oil prices and the necessity of international banks to lend financial resources increased the mobility of foreign funds. Oil prices were multiplied by four in 1973-1974 and by three in 1978-1979. The impact on the balance of payments of South American oil importers was severely affected by the first oil shock (1973-1974) and crippled to many countries during the second oil shock (1978-1979), which also were affected by the substantial rise of US interest rates.

The first oil shock affected in great part to those countries whose imports were mainly agriculture and energy. In the case of oil-exporting countries, the subsequent effect was an abrupt overvaluation of the exchange rate, damaging international trade, as the industrialized countries began to protect themselves from foreign shocks.

The strategies to counteract the price shock varied across the region. The major economies deepened their commitment to export promotion; that was the case of Argentina, Brazil and Colombia. This policy shift was combined with an import-substitution effort, since it was the explicit policy to reduce dependency on imports. However, with imports representing only 11.9% of the supply of industrial products in 1974, it was unlikely that import-substitution could serve as a bootstrap to ensure growth in the region.

Another group of economies (Chile and Uruguay) adopted export policies to promotion manufactures. They concentrated efforts on policies to promote nonindustrial exports; this tool also included economies specializing in primary commodities and services (Paraguay and Peru). In the case of the South America's oil and gas producers -Bolivia, Ecuador and Venezuela-[72] only Ecuador had a good performance during the rise of oil prices, with GDP increasing 3.3% during the first part of the 1970s, while the major economies grew at 1.8%.

There was a sharp deterioration of the international environment in the wake of the second oil shock (1978-1979); the U.S. economy adopted a different macroeconomic posture compared with the soft post-1973 policy. A stringent monetary policy led to a tough increase in interest rates. This increment in nominal interest rates after 1978 led to a soaring rise in foreign debt services.

At the beginnings of the 1980s, a default crisis engulfed the South American economies. A new recession in industrialized countries, high interest rates, weak

[72] In all these economies, the oil sector passed to be controlled by stated-owned enterprises, including Venezuela, where the oil industry was nationalized in 1975 (Bethel, 1991).

commodity prices, and debt overhang in developing countries caused a serious slowdown in the region.

The door to global financial markets was temporarily shut once again, and the region endured the political and economic turmoil as fiscal adjustments ensued. Inflations and hyperinflations were tamed, and regimes (democratic or otherwise) came and went.

At the end of the 1980s, after the crisis episode among debt negotiations and an orderly workout, some of the instruments of the ISI remained valid. It still represented a resource of national policy or perhaps regional, but not being accepted in world trade.

With the beginning of the 1990s, the U.S. authorities launched the Brady Plan to consolidate the discussions of the debt under new instruments, renegotiating or cancelling it. The U.S. interest rate decreased again, and foreign capitals arrived firstly to Argentina and Brazil.

By the mid-1990s, the regional integration and new emerging economies had a greater effect on economic performance, which also attracted external capital. The structural reforms (the Washington Consensus), were applied at different years in diverse countries, and went from market liberalization to serious and complex institutional reforms,[73] trying to imitate the NICs policy[74] and, to experience income convergence (IDB, 1997).

2.4 *Losing credibility: structural problems and economic failures*

By the 1960s, the ISI was exhausting its benefits to industry; for too long the region had been depending on the strategy, rather than putting any effort to fix the

[73] While the concepts of the "Washington Consensus" focused on orthodox fiscal reforms, opening and the cut of state role on economy, by the 1990s, the aims were different and comprehended important reforms (e.g. privatization of state enterprises, development of the financial market, etc.). In 1997 the supervision and evaluation from the Inter-American Development Bank (IDB) shows that the process of the reforms accelerated in the region.

[74] The East Asian economies were not bereft of policy intervention. Rodrik (1998) highlights the potential for certain policies in East Asian (NICs) to promote and coordinate private investment initiatives. Such coordination strategies might was possibly missing in South America, which favored investment-led growth rather than export-led growth. On the other hand, the NICs solved their macroeconomic and financial difficulties at the end of the 1940s, long before they started on the path of export-led growth. Moreover, the successes of the policy management in East Asia have likely depended on the presence of a highly educated and well trained professional bureaucracy, a human capital base that is currently lacking in many other developing countries.

structural problems, the size of domestic market, the infrastructure deficiency, the institutions' instability, the continuity of policies and poor regional integration.

The regional economies could not react to terms of trade changes and prices distortions, while still depending on the exports of natural resources. As the increase in industrialization offered a certain independence of commodities exports, the latecomers still relied upon primary exports after thirty years of the industrialization strategy.

The first disturbances appeared under a balance of payment disequilibrium in the 1970s, when commodities' exports decreased along with the nontraditional ones caused by an overvaluation of the exchange rate. Additionally, the fiscal deficits contributed to a growth slowdown.

These problems represented the beginning for more difficulties, and a rescue plan led by the International Monetary Fund (IMF) as the deterioration of capital inflows started; the measures adopted were a devaluation of the exchange rate that conduced to a higher inflation rate, especially in input costs and a salary reform in the public sector. The reduction of current expenditure and public investment joined with a slow adjustment of commodity exports prolonged the economic turmoil and weakened future growth prospects (Thorp, 1998). These difficulties persisted and worsened into the 1980s.

A probable relation of the structural problems that the import-substitution strategy faced were: first, the ISI was apt to get trapped after its first successes, due to the exhaustion of opportunities, leaving the economy with a few relatively high-cost industrial establishments and with a vulnerable balance of payments, since imports consisted of semi-finished goods, spare-parts and machinery, indispensably for maintaining and the production function. And second, the ISI was affected by a seemingly congenital inability to move into export markets and integration.[75]

[75] The emphasis of regional integration was based on Prebish, obtaining market sizes compatible with further deepening of import substitution, in 1960, the Latin Free Trade Association (LAFTA) was created by the Treaty of Montevideo, including all South America and Mexico with an open area as a target for 1972. One of the initial objectives was to reduce trade barriers but opposition by protectionist lobbies managed to freeze trade liberalization and no advance was made on a common tariff; in 1968 the time limit to establish free trade area was extended to 1980. Although not was a great success, the LAFTA was the first serious step regarding economic integration.

3. Building the index of macroeconomic distortions (IMD)

One of the empirical contributions in this Dissertation is to assess quantitatively the effect of protectionism policies and their impact on long-run growth. Our strategy to deal with this challenge will be, firstly, to establish the chronology of key economic policy fluctuations and afterwards to investigate the extent to which these policies affected capital accumulation and economic growth.

An important problem in analyzing the impact of economic policies is the simultaneity and connections between distinctive policies given that they are not absolutely independent and are many often implemented simultaneously with others. From an econometric point-of-view, this may cause that the different explanatory variables are correlated among them. For this reason, we begin by constructing a synthetic index of macroeconomic distortions (IMD) for South American economies.

The IMD tries to capture the basic features of macroeconomic policies that could influence on output performance avoiding the cross-correlation problems between different policy indicators. The selection of the variables compounding the index is not "ad-hoc", since we include those variables which seem more representative in economic policy during the import-substitution strategy.[76] Specifically, the index was combined using a new methodology for composing variables: the Pena Distance Index (Pena, 1977).[77] Six keys macroeconomic variables are used in the estimation; later in this point we show the linkage between growth and these variables: inflation rate, interest rates, price of capital, average tariff, depreciation rate of the currency and 'black market' premium.[78]

High and volatile rates of inflation have a negative impact on economic growth, implying an absence of sound money policy. Additionally, it alters the

[76] Our variables closely resemble those employed by Fisher (1993), Barro (1996), Cardoso (1993) and Durlauf et al. (2008) to account for the impact of macroeconomic policy on cross-country differences in GDP growth. The empirical evidence has reinforced the growing consensus on the importance of macroeconomic instability on economic growth. The results reflect its usefulness to ensure sustainable growth environment, avoiding problems of hyperinflation, financial crisis and steep devaluations, which can lead to deep recessions.

[77] See the Appendix chapter at the end of the Dissertation for a detailed explanation of the Pena Distance Index and other empirical applications.

[78] The fact that we do not include any openness measure in the IMD index is because openness was not part of the economic policy instruments; rather it was determined as a result by government decisions. Moreover, some of the variables –tariff rates, black market premium- partially capture the degree of openness in national economies.

fundamental terms of long-term contracts leading to a decrease in economic confidence.[79]

On the other hand, the exchange rate depreciation holds back international trade, foreign investment and private confidence in monetary behavior; Glick and Rose (2000) consider the effect of external factors (e.g. terms of trade deterioration) and a misalignment of domestic policy, showing that a currency devaluation lead to greater inefficiencies and lower economic growth.

The domestic interest rate is frequently related with monetary policies and objectives (i.e. price stability); for example, Roubini and Sala-i-Martín (1992) shows that it is used to repress the financial market under protectionism policies. It is important to mention that the South American authorities after suppressing the financial market, negatively affected inflation rates, private banks reserve ratios and economic growth (Apergis et al., 2007).

Concerning the price of capital, it is associated with government policy interventions at many levels in the domestic economy; it is associated with higher investment prices and changes in the rate of capital accumulation (Taylor, 1998).

As a final point, high tariff rates cause disruptions in trade flows, especially in manufacturing imports and are disadvantageous to population's welfare. The empirical evidence shows that tariff rates had a negative influence on productive sectors and reduce economic growth (Irwin, 2000). The South American economies have always been considered as a highly protectionist region long before the World War II (Clemens and Williamson, 2001). However, by the 1970s and mostly the 1990s -after a progressively affiliation to the GATT-, the South American economies changed their commercial policy, which diminished the protectionist measures.

3.1 *Using DP2 to build the index of macroeconomic distortions*

We decided to carry two estimations for the IMD due to the availability of the series. The first estimation starts in 1950, and the second one from the 1960s. In that way,

[79] The relationship between inflation and growth has provoked an intense debate since Barro (1995)'s seminal contribution. Economists tend to agree that a high and volatile inflation will have a negative impact on growth. Solimano (1993) notes that when inflation is high and erratic, it imposes economic costs, increasing relative prices that impair the allocation resources; inflation is seen as a tax on real balances having a cost in welfare -consumption of households and firms. Additionally, it discourages the accumulation of physical capital; indeed the investment is sensitive to prices instability.

the last estimation does not consider the black market premium variable due to data limitations.

In order to build the global synthetic index, we opt to use a distance indicator, the Pena distance index (DP2), as an alternative methodology to the Principal component analysis (PCA).[80] Comparing the two indexes, among the PCA's restrictions, it violates the property of exhaustivity, since an indicator derived from this methodology explains only the variance of the first component, ignoring non-redundant information due to its orthoganality property. By contrast, the DP2 allows the inclusion of a greater number of variables with different degrees of correlation between them,[81] using all the valuable information contained in the partial indicators and eliminating duplicities or unneeded variances. Furthermore, amid its principal advantages, it is a cardinal measure (i.e. it enables us to compare the numerical results between units across space and/or time).

The DP2 index has mostly been used to compute welfare indicators and environmental indexes due to its good statistical properties (multidimensionality, comparability and comprehensibility); recently, it has been considered as a multidisciplinary instrument for the research on social sciences.

3.2 *Assessing the impact of IMD on economic growth*

The next issue is to estimate the effect of IMD on economic growth, which we hypothesize, would be negative. More specifically, our starting point is to measure a Mankiw et al. (1992) model in which the log of real GDP per-capita growth (*gr*) is dependent on the log of the ratio of gross capital formation to GDP (*gfkf*), the ratio of foreign investment to GDP (*fdi*), life expectancy (*lifex)* and the log of labor productivity (*lp*). The growth equation is not fully defined because we do not include land production in our calculations. The importance of our results are in concordance with other studies that show that income differences across countries

[80] See Prados de la Escosura et al. (2009 and 2012) for some applications with the PCA index, which construct indexes merely related to economic growth exercises considering long-run time series.

[81] The more data included in the partial indicators (related to the subject) the more complete will be the final synthetic index, since each variable contains unique and specific information that is not present in the others. Additionally, the weights of the partial indexes are determined through an iterative algorithm that achieves convergence when the indicator fulfills a set of desirable properties. The above mentioned methodology has been checked empirically in a case study: the elaboration of a Mixed Environmental quality index for Madrid, the results and the methodology of the Pena Distance are satisfactory explained in Montero et al. (2010).

are explained taking differences in capital endowments and productivity (Hall and Jones, 1999; Easterly and Levine, 2003).

$$\ln(gr) = a_0 + a_1 \ln(lp)_{it} + a_2 \ln(gfkf)_{it} + a_3 \ln(fdi)_{it} + a_4 \ln(lifex)_{it} + \varepsilon_{it} \quad (1)$$

Our hypothesis is that higher macroeconomic distortion (the IMD index) decreased efficiency gains and disrupted capital accumulation and investment. For this reason, the productivity, investment ratio and capital accumulation had been endogeneized in order to consider the irregular impacts over them and to allow for additional exogenous variables. However, we did not apply the same procedure with labor since we assume that this is mainly driven by demographic forces (i.e. independent of macroeconomic policies).

In that way, there are several channels through which macroeconomic policy may affect productivity and economic growth, since it is the result of both efficiency gains and technological changes in the production function (Harberger, 1998). We postulate that productivity depends on capital accumulation, investment ratio and life expectancy; the last one is likely to reflect other contributing factors of long-run growth, such as the accumulation of human capital and structural and institutional changes (Astorga, 2010). We also considered indirect variables in Eq. (2) that in somehow affect productivity, the degree of openness in logs (real openness),[82] the initial level of GDP per capita, capital accumulation, life expectancy and the IMD index.

$$\log(lp)_{it} = b_0 + b_1 \ln(lifex)_{it} + b_2 \ln(gfkf)_{it} + b_3 \ln(fdi)_{it} + b_4 \ln(open)_{it} + b_5 (IMD)_{it} + \varepsilon_{it} \quad (2)$$

In order to explain capital accumulation, we have related the share of capital formation with the price of capital, real openness and the IMD index (Taylor, 1998) and the initial GDP per capita (*g0*) -accounting for the accelerator principle-. Furthermore, we considered the interest rate and currency depreciation *(X_f*

[82] Anti-trade policies decrease productivity as international trade is a significant carrier of R&D knowledge (Coe and Helpman, 1995). Similarly, policies limiting or impeding investment may also damage productivity gains given that multinationals transfer knowledge to the domestic market (Haskel et al., 2007). In consequence, we introduce openness as a control variable, because some policy changes in trade like modifications in quotas are not well captured by the IMD index.

variables). We used financial deepening (*depth*) and Contract-intensive Money (*CIM*) (I_i *variable*s) as a proxy for institutional development.[83]

$$\ln(gfkf)_{it} = b_0 + b_1 \ln(open)_{it} + b_2 \ln(g0)_{it} + b_3 \ln(caprice)_{it} + b_4 \ln(IMD)_{it} + \sum_{f=1}^{F} b_f \ln(X_f)_{it} \quad (3)$$
$$+ \sum_{i=1}^{I} b_i \ln(I_i)_{it} + \varepsilon_{it}$$

Specifically, the investment ratio represented in Eq. (4) is related to initial GDP per capita, real openness, the IMD index, and as well as Eq. (3), we take into account other variables (X_i *variables)* and the financial deepening (*depth*) and Contract-intensive Money (*CIM*) (Borensztein et al., 1995; Figueroa, 1998).

$$\ln(fdi)_{it} = b_0 + b_1 \ln(open)_{it} + b_2 \ln(g0)_{it} + b_3 \ln(IMD)_{it} + \sum_{i=1}^{I} b_i \ln(X_i)_{it} + \varepsilon_{it} \quad (4)$$

3.3 *Specification of the model*

To investigate deeply the relationship between IMD index and economic growth, we construct a structural model as a system of simultaneous equations. In the estimation, we have employed the Three Stages Least Squares (3SLS) methodology that solves the problem of contemporary correlation between the equations' residuals and deals with the endogeneity problem often present in this kind of exercises. An exhaustive analysis is carried out using panel data models; this guarantees a series of benefits that can enrich the empirical analysis.[84]

We estimate the econometric model by 3SLS, since it permits measuring a full-system estimation. It is an asymptotically more efficient technique when right-

[83] We introduce institutional variables to contrast the income differences within countries that partially share the institutional and ethnically background (Kormendi and Meguire, 1985). These two variables as subjective institutional measures capture relevant macroeconomic uncertainties, which have a direct effect on income growth (Knack and Keefer, 1995). Additionally, Moers (1998) suggests that the relationship is likely to be from better institutions to growth and not the other way around, and in many cases it has been found as a direct relationship.

[84] The panel considers the longitudinal dimension of data; it controls for heterogeneity among countries, as well as multicollinearity among the variables, producing more reliable parameter estimates. We applied the fixed effect estimators that include the country-specific characteristics avoiding misspecification problems due to possible omitted variables (Baltagi, 2001).

hand side variables are correlated with the error terms, and there are both heteroscedasticity, and contemporaneous correlation in the residuals.[85]

The 3SLS method allows us to measure an open-economy growth model measuring the relation of growth with external shocks and consequently, their effect on economic growth. Based on the discussion in the previous point, we used similar methodologies to those of Loayza et al. (2005) and Sung-Shen (1990) using log retarded variables in differences; furthermore, our results are according to growth literature and other empirical evidence.

4. Results of the estimation

The estimated results of the econometric model are shown in Tables 5.1 and 5.2, and consider the entire period. Table 5.1 shows the effect of the most relevance variables for the growth exercise, includes the results of the equations of capital accumulation and investment on economic growth; all variables have the correct sign and are statistically significant. The results are presented in Table 5.1 (columns 1-8).

The results are in line with our previous expectations; not surprisingly we found that both IMD indexes had a negative impact on economic growth mainly channeled through investment (*fdi*) -via price of capital, and black market premium- (see column 2). Regarding the capital accumulation channel (columns 6-8), all variables have the expected sign at the conventional levels of significance, except the IMD-1950s index that is only significant at 10%, while the IMD-1960s index is not significant at all.

Furthermore, the main results in column (7) show that the capital accumulation is negatively affected by its direct relation with the price of capital and the domestic lending interest rate. On the other hand, the depreciation of the exchange rate has a positive effect.[86] The real exchange depreciation has an inarguable impact on current account and further capital accumulation via

[85] Finally, we consider not using the Arellano-Bond (GMM) estimator, since it was designed for small-T large-N panels, in large-T panels (our case) a shock to the country's fixed effect showed in the error term will decline with time. Similarly, the correlation of the lagged dependent variable with the error term will be insignificant (see Roodman, 2006).

[86] Sen and Turnvosky (1989) argued the effects of macroeconomic distortions on capital accumulation in one direction and vice-versa, where disturbances generate a real depreciation that reduces the price of capital or in response to a terms of trade shock, the price of capital falls and there is an increase in the expectations to depreciate the exchange rate.

reductions in price capital; we believe the linkage may be with a decrease in interest rates and the reduction of tariff rates during the turbulence episodes of the 1970s and 1980s.

Table 5.1

Macroeconomic distortions on GDP growth, Investment, and Capital accumulation.

Panel setting: Yearly frequency

Estimation method: Three Stage Least Squares (3SLS).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	GDP p.c growth	Investment	Investment	Investment	GDP p.c. growth	Capital accumulation	Capital accumulation	Capital accumulation
gfkf	0.0345**				0.0524***			
	[2.153]				[4.390]			
fdi	0.0189***				0.00328*			
	[2.904]				[1.921]			
lifex(t-5)	-0.0554				-0.0265			
	[-1.308]				[-1.548]			
g0	-0.0347**				-0.00427**			
	[-2.530]				[-2.474]			
openness		1.085***	1.162***	1.140***		0.0409	0.0504*	0.108***
		[10.01]	[11.50]	[11.12]		[1.257]	[1.820]	[3.444]
gdp(t-1)		0.341***	0.336***	0.328***		0.0849***	0.110***	0.0834***
		[7.935]	[8.416]	[7.898]		[7.352]	[9.712]	[6.731]
Cap. price(t-1)		-0.499***				-0.234***	-0.239***	
		[-3.987]				[-6.934]	[-7.476]	
Exch. depre(t-1)						0.00185***		
						[3.262]		
interest rate(t-1)							-0.0994***	
							[-7.840]	
Black mark. (t-1)		-0.139***						
		[-4.478]						
IMD-1950s			-0.123***					-0.0128*
			[-5.053]					[-1.690]
IMD-1960s				-0.0971***				
				[-5.390]				
Constant	0.305*	-5.377***	-7.483***	-7.366***	0.0417	2.772***	2.716***	1.612***
	[1.807]	[-5.585]	[-10.48]	[-9.967]	[0.586]	[10.82]	[11.54]	[7.261]
Observations	437	437	437	437	431	431	431	431
R-squared	0.060	0.340	0.329	0.333	0.031	0.213	0.293	0.108

Instrumenal variables: CIM and DEPTH

T-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1

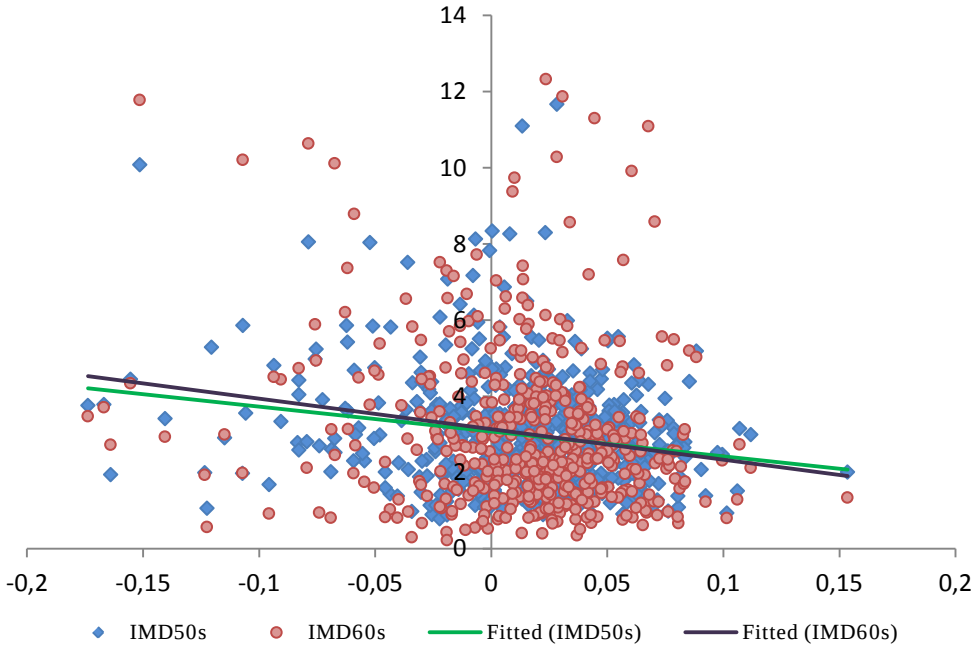
Discussing in detail the results in Table 5.1 (columns 1-4), we can analyze the relation between economic growth and the investment channel. First of all, real openness is highly significant in all equations and have the expected sign; column (2) shows that price of capital is statistically significant with a negative effect, related to interest rate variances; in addition, the black market variable premium is significant, and we think is related to disturbances in the real exchange rate during the mid-1970s. On the other hand, the results of columns (3 and 4) show the expected detrimental

impact of both IMD indexes on investment and are significant at the 1%. These results reflect that the effects of the import-substitution strategy have negative effects mainly on the attraction of foreign investment.

On the other hand, we stand out the result of *life expectancy* in Table 5.1 (columns 1 and 5), which has the incorrect sign, and it is not significant at any level. As discussed earlier, we assume that the IMD index may have negative influence indirectly on institutional changes by reducing both productivity and economic growth. Since it is a fact that protectionism activities are supported by pressure groups (i.e. elites and lobbies), it is possible to consider the extension of these activities damage the institutional development and economic freedom.

As a result, Figure 5.2 shows a scatter plot of the GDP per capita growth rate and both IMD indexes during the 1960-2008 period for all countries in the sample. It shows that the 1960-IMD index has a higher negative effect in long-term GDP growth during this period. In particular, there is a negative correlation between GDP per capita growth and the 1960-IMD that is much higher than the 1950-IMD index.

Figure 5.2
The index of macroeconomic disturbances and the GDP per capita growth



To investigate whether the IMD index affect GDP per capita via lower productivity, we have to take a closer look at the results of Table 5.2 (columns 1-4). We found that a small degree of macroeconomic distortions, greater openness and capital accumulation guarantee a higher productivity and hence economic growth. In that

way, international trade policies (real openness) boost capital funds and increase productivity.

Regarding the impact of distortions on physical capital accumulation, we found that IMD index has a negative influence, but it is only significant at the 10% (Table 5.2, columns 2). In other words, macroeconomic distortions reduced capital accumulation by the interaction of higher interest rates. In the same way, the *capital price* and the lending interest rate have negative effects on capital accumulation, and are only significant at 10% and 1% respectively; furthermore, the result of *exchange rate depreciation* reaffirms its positive effect on physical capital (Column 3), as shown too in the GDP per capita structural estimates.

Table 5.2

Macroeconomic distortions on productivity, capital accumulation and investment
Panel setting: Yearly frequency

Estimation method: Three Stage Least Squares (3SLS).

	(1)	(2)	(3)	(4)
VARIABLES	Productivity	Capital accumulation	Capital accumulation	Investment
L.lifex	0.980***			
	[2.929]			
gfkf	0.387***			
	[4.638]			
fdi	0.116*			
	[1.666]			
g0		0.157***	0.121***	0.641***
		[6.047]	[4.579]	[6.368]
openness		0.170**	0.123*	0.985***
		[2.552]	[1.602]	[3.342]
Cap. price		-0.0894*		
		[-1.877]		
Interest rate		-0.127***		
		[-4.938]		
exchange depre			0.00253**	
			[2.058]	
exchange depre (t-1)				
IMD-1960s		-0.0174*		
		[-1.724]		
Constant	-0.764	1.280***	1.434***	-10.56***
	[-0.525]	[2.824]	[2.881]	[-5.502]
Observations	96	96	96	96
R-squared	0.142	0.248	0.146	0.050

Instrumenal variables: CIM and DEPTH
t-statistics in brackets: *** p<0.01, ** p<0.05, * p<0.1

The results of Table 5.2 (column 4) support the fact that a higher level of openness raises foreign investment. Concluding, we found that the investment ratio is not

negatively correlated with the index of macroeconomic distortions (IMD), however it is positively correlated with openness and initial GDP per capita (*g0*).

We could assume that in our model, the *labor productivity* depends more on inner development factors, such as capital accumulation, investment, strength institutions and technological changes (these two represent by *life expectancy*), as well as a favorable macroeconomic framework.

Lastly, but not least inappreciable, life expectancy has a positive effect on productivity without the interaction of IMD on the equation. In this occasion, the results of Table 5.4 (column 1) indicate that institutional and technological changes reflected by increments in life expectancy have a direct effect on productivity.

5. Concluding remarks

This chapter has analyzed the effects of import-substitution industrialization (ISI) on South America's economic growth; particularly, the macroeconomic distortions before the structural reforms of the 1990s, which gave the region macroeconomic stability.

The analysis of macroeconomic disturbances on economic growth is one of the main focuses on the growth literature. In this chapter, we have contributed to the development of the topic with several practical innovations by building a mixed distortion index using the DP2 methodology, which considers six subjective macroeconomic indicators. Additionally, we added new empirical evidence to South America's growth literature, considering a longer-term perspective, which includes the small regional economies for which there is not much historical or evidence.

Several broad conclusions are derived from this research. First, we have shown the usefulness of the IMD index in long-run time series, which comprises important macroeconomic variables, assessing the impact of economic policies and its distortions on output performance. Second, the results from the econometric model are clear: the determination of autarkic policies combined with an inimical institutional environment to foreign investment had affected sustainable economic growth, which also reflected in a low productivity.

The significance of the IMD index is robust in all equations and has a negative effect on capital accumulation, investment and economic growth. In that way, the evidence shows that the region is still vulnerable to fiscal imbalances, external debt,

and lack of monetary discipline. The currency disturbances are negatively associated with investment decisions

Unfortunately, the episodes of political disturbances in many countries and different periods had a negative effect in the attraction of foreign investment. The foreign capital flowed abruptly at a time when its financial and institutional strength had not changed and been affected by state intervention. This has raised doubts in the literature about the benefits of the ISI.

In addition, the productivity depends more on inner development factors, such as physical capital accumulation, and institutional and technological changes (e.g. increments in life expectancy), which seems as a necessary condition for boosting productivity and (especially) when it is encouraged by a more open economy.

Third, the findings appear to be comprehensible and warrant the stress put on the need for macroeconomic stability to set the basis for sustained economic growth: this appears to be the case of the Washington Consensus policies that included fiscal and monetary discipline, predictable exchange rates and the effort to diversify the export sector to minimize the exposure to foreign shocks. On the other hand, the state intervention on openness trade and financial development, deeply affected the strength of the macroeconomic framework.

However, it seems the case that the Washington Consensus was partly right to establish macroeconomic stability and rather they were incomplete for a sustained development. Since the reforms did not focus deeply on institutional changes, the permanence of anti-growth institutions affected the positive results of the reforms.

As a conclusion, the economic results of any growth strategy depend on a large extent of factors like the institutional framework inherited, which are relied on capital accumulation (human wealth, specifically) that is currently lacking in many of the South American economies. This kind of particular circumstance made difficult the co-existence of an industrialization strategy with financial difficulties, low capital formation and a misguided macroeconomic policy. Some of these harmful determinants still persistent today as the dependence of high terms of trade and political instability, which currently produce restrictions on investment, allocation difficulties of resources, and a weak institutional framework which is unable to boost economic growth.

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Chapter 6

Conclusions and policy economic propositions

The principal feature of the immiserizing growth theory is the phenomenon of positive economic growth and subsequently a slowdown in output; the theory indicates the existence of sufficiently large distortions –by exogenous shocks and mistaken policies- that outweigh the gains from growth.

This dissertation has been devoted to investigate the empirical reality of immiserizing growth. Although this growth theory has been regarded as a theoretical issue rather than a real-world matter, our analysis identified the existence of episodes of immiserizing growth in the post-war South American economies. Our results confirm that these set of countries suffered serious macroeconomic distortions on economic activities and affirm that immiserizing growth is a real-economy issue under certain circumstances of high volatility, resulting in a significant loss of welfare.

1. On Immiserizing growth

The insights of the theory as well as the possibility of immiserizing growth apply to formal neoclassical or endogenous growth dynamic settings. In the absence of distortions, an expansion in an economy's productive capacity enhances growth and dynamic efficiency; however the presence of distortions might create the conditions for a negative correlation between low economic growth and welfare.

Using the theory of distortions to identify policies that affect the level of long-run growth and prevent the possibility of immiserizing growth is an important and relatively unexplored area in the new generation of models which constitutes an avenue for future research. However, the findings in this dissertation make the first steps, especially in the South American economies.

Theoretically, it is possible for a growing economy to experience the adverse effects of growth. This would be the case when, as a result of expanding its productive capacity, the terms of trade of a country deteriorate so much it becomes worse off than before growth. In such a situation all the positive effects of economic growth would be offset by the declining buying power of the nation. In that way, the following lines stress our findings about the Immiserizing growth paradox.

Because growth rates and terms of trade can both fluctuate considerably in the short-run, it should not be surprising that a country may suffer a decline in welfare in particular years. It is, of course, possible that the terms of trade have an effect on the

growth rate; for instance, in the case where the investment goods necessary for growth are obtained in exchange for the export goods, which are facing increasingly adverse international prices.

Evidence from Chapter 4 show that, terms of trade volatility had adverse effects on growth and on most of the South American economies: nine countries met this criterion. We found that in eight countries, their GDP declined in the first sub-period (1960-1982).

Chapter 5 shows the role played by the tariff structure in the region and regarding other empirical evidence (Clemens and Williamson 2001, Tokarick 2009); our results show that specific import duties are similar in the South American countries; in this situation the likelihood that a country will suffer immiserizing growth reduces significantly. However, it partially confirms that increments in the tariff slowdowns economic output.

The evidence supports that extractive economies experience a type of economic growth. According to the growth assessment method used here, natural resources exploitation has positive effects on growth. By extension, if natural resource development is the only means a country has to create growth, then it is better doing it. One of the strongest messages from the analysis presented (Chapter 3 and 4) is that primary exports –agriculture and oil- are positive for developing economies, although it seems that extended periods of positive growth are required.

From a development perspective, the use of additional income resulting from improvements in terms of trade is of crucial importance. For example, if the terms-of-trade gains from higher export prices accrue in the form of higher profits in the export-oriented sector.

Any conclusion drawn from an empirical exercise like this is admittedly tentative and suggestive. This Dissertation makes a new empirical contribution to South America's economic growth, considering a long-run perspective, including the small regional economies, for which there is not much historical and empirical evidence on growth economics.

In addition, the results are quite interesting since we applied a new methodology for terms of trade volatility that brought the expected results according to other empirical works, and the Distance index (DP2) for the construction of the Index of macroeconomic distortions (IMD). The main conclusions that we extract

from this Dissertation are sort by the main findings and contribution on the subject, in the following paragraphs.

a. On the determinants of economic growth

Physical capital accumulation is a necessary condition for boosting long-term growth and it is stimulated in conjunction with foreign investment. In this context (Chapter 3), the impact of foreign investment is country-specific, and it tends to promote economic growth when developing countries adopt an open trade regime, improve access to education and thereby human capital conditions, maintaining macroeconomic stability is a prerequisite. Therefore, the link between foreign investment and economic growth has an important implication for developing strategies, which leads to capital accumulation and might be able to enhance economic growth through spillover efficiency and technology transfers.

On the other hand, the significant advances in life expectancy and access to basic education foster human capital accumulation. Turning the attention to human capital (*secondary enrollment* and *life expectancy*), there is strong empirical support for the view that as people become healthier, better nourished and more educated, they contribute to economic growth. Although the Southern cone usually reveals higher levels of human capital accumulation, recently (during the 1980s), the Andean region also showed increased levels of healthier human population, with higher secondary education.

- *Macroeconomic instability*

We stand out the necessity to secure macroeconomic stability in order to set the basis for high and sustained economic growth, which includes fiscal and monetary discipline, a predictable real exchange rate and a diversified export sector to minimize exposure to terms of trade volatility.

In that way, the presence of macroeconomic disturbances is robust in our results and has a negative effect on both investment and economic growth. We present evidence that the region is still vulnerable to fiscal imbalances, external debt and lack of monetary discipline (exchange rate deviations).

Additionally, terms of trade volatility and interest rate shocks resulted in low growth rates that affected the lower income economies. This study also draws other

conclusions on macroeconomic stability; the analysis confirms the importance of the external debt overhang and U.S interest rates, which show a major presence with negative effects, being the Southern cone countries mainly affected by debt overhang and the Andean countries mostly damaged by U.S interest rate.

- *Political institutions*

The presence of favorable growth-institutions is an important factor for sustainable growth. Despite the methodology applied, we encountered some difficulties in finding a proxy variable for institutions. *Institutions Quality* exhibits frequent changes due to the instability of political regimes in the region during the 1970s and 1980s. Nevertheless, we can consider it as a useful reference variable, since our results are free from perception effects problems.

b. Economic growth disparities

The regional GDP per capita distribution has fluctuated over time. Such a process could have many possible limiting outcomes: complete inequality (divergence), stratification and continually increasing growth disparities. While growth disparities in South America have been the subject of a continuing policy concern, factors driving regional growth have also been the issue of a considerable research effort.

The results of the econometric model (Chapter 4) stress the unequal growth rates among the South American economies, motivated by the wide disparity existing between them, especially in the less developed ones. Considering the initial endowments of individual economies, the results indicate that differences in the primary “growth-donations” across countries led to large disparities in income levels and growth rates.

Although we believe that in the South American economies the investment and technological progress are endogenous to economic dynamics, this enormous influence can not materialize without a set of economic and institutional conditions capable of boost economic activity. It is worth noting that an improvement physical capital accumulation increases growth rates jointly with investment, being both one of the main determinants of economic growth.

Identifying such common factors (within a large and diverse region) improves our understanding of why the South American economies grew faster in the first sub-

period (1960-1982). There are signs of the existence of conditional convergence within the region, more plainly up until the mid-1980s. The results for the 1983-2008 sub-period confirm the process of regional convergence, but with lower intensity and at a slower rate (Chapter 3).

In particular, the permanent problem of disparities and income inequality not necessary disappears once a country is growing. For example, the landlocked countries -Bolivia and Paraguay-, with a poorly developed infrastructure and a more distant location from major markets, are the least efficient economies in terms of production. Therefore, the initial endowments differences and path-dependency matter for subsequent success in the process of industrialization.

On the other hand, greater integration in the region requires specialization along comparative advantages and abandoning the use of distortions in relative prices; in short, any market-distorting policy pursued by the state should be condemned, since creates a rent-seeking behavior with no positive contribution in the productive sphere (Bhagwati et al., 1980).

- *Sectorial development and contribution*

The sectorial structure of production and its exports show a clear dependence on the agricultural sector; however, there are changes in production pattern towards more produced agricultural goods –processed food-, services and oil exploitation.

The GDP per capita growth has been higher in countries where the industry and its exports have had the largest increase, with a lower share of agriculture on output. It is reasonable to assume that the productive structure changed a little, mainly due to unequal endowments, low regional growth cohesion and institutional instability in the first decades, which have specifically increased growth disparities.

- *Main empirical results*

On the other hand, there is evidence that trade openness does not have effects on most economies and it is merely significant in the first sub-period mostly for Southern cone economies.

The financial development appears to be significant in only major countries (Argentina, Brazil) and in a few developing ones; we assume it is mostly due to capital inflows to extractive activities (Ecuador, Peru and Venezuela).

The institutional development has also a major presence on regional developed countries (Chile and Uruguay) and those where important political changes occurred (Colombia and Peru) most visible in the second sub-period.

The possibility of immiserization still exists in our econometric model, but it is most distinguished in the first sub-period (1960-1983). Analyzing the effects of terms of trade volatility, the results show that there is evidence of the possibility of immiserization on the South American economies. We believe that this process is highly correlated with the de-industrialization phenomenon, which is illustrated with the high dependence of raw material exports, though it shows benefit results on welfare for the Andean countries.

c. On economic growth under macroeconomic disturbances

Chapter 5 has analyzed the effects of Import Substitution Industrialization (ISI) on South America's economic growth, particularly, the macroeconomic distortions produced before the structural reforms of the 1990s.

We have contributed to the development of the topic with several practical innovations, building a mixed distortion index using a methodology based on a distance indicator (DP2), considering six subjective macroeconomic indicators, and making a new empirical contribution to the South America's growth literature.

- *The effects of autarkic policies and distortions*

The results are quite clear: the determination of autarkic policies combined with a harmful institutional environment for foreign investment, which affect sustainable economic growth, and is reflected in a low productivity. The episodes of institutional changes in many countries and different periods (1970s and 1980s) had a negative effect on investment: the foreign capital flowed abruptly at a time when its financial and institutional strength had not changed and was affected by state intervention.

The presence of macroeconomic disturbances (IMD) is statistically significant and has a negative effect on economic growth and capital accumulation. The evidence shows that the region is still vulnerable to fiscal imbalances, external debt and lack of monetary discipline; the real exchange rate disturbances are negatively associated with investment decisions.

Additionally, it seems that the Washington consensus' policies were partly adequate to establish macroeconomic stability and rather they were incomplete for a sustained development. Since, they did not focus deeply on institutional changes; lately these anti-growth institutions affected the previous results of reforms.

Perhaps, the main conclusion is that economic results of any growth strategy depend the institutional framework inherited, which in some way relies on the capital accumulation (physical and human) that actually is lacking in many South American countries.

Other several particular historical circumstances made difficult the co-existence of an industrialization strategy with macroeconomic and financial difficulties, low capital formation, and external and domestic pressures on fiscal balances. The state intervention produced: restrictions on investment, government allocation of credit and a weak institutional framework unable to boost economic growth.

2. Economic and policy implications

No simple analogy can be easily drawn among the South America's historical experience and the expected outcomes of similar policies in today's world economy, but it is possible to find some past problems persist in nowadays' economy. The region's reliance upon natural resource exports leaves it highly vulnerable to terms of trade shocks; a vulnerability that is apparent now, as the South American economies are being benefited by the increments of commodity-prices. This economic exposure demands a policy response to reduce the impact of shocks on the domestic economy and population welfare. An extended discussion of these issues would take us too far, and we merely note some important revisions for the fiscal policy, the public debt management and in the regulation and supervision of the domestic financial system.

- *A seasonal eyesight*

In one of the latest *World Economic Outlook*, the International Monetary Fund (IMF) points out that growth in Latin America are driven by domestic and external demand. According to the IMF figures, the current account deficit remains on a deteriorating path but strong capital inflows, both foreign investment and portfolio, are keeping the balance of payments in positive territory.

Alternatively, most of the regional economies suffer from rising inflation dynamics; however the domestic demand pressures have stayed relatively calm. Moreover, international reserves are not likely growing since there are expectations to appreciate the currencies.

The U.S. real interest rate is unusually low, and is likely to stay on the low side for some time, given the weak state of the U.S. economy. The data shows that domestic demand tends to be stimulated by low foreign interest rates; this response comes mainly from the private sector that reacts strongly to cheap foreign money. Finally, it is unlikely that central banks react to capital inflows with currency intervention holding the exchange rate at a weak level or putting limits to the rate of currency appreciation, since it further will cause an exchange rate volatility.

- *Containing today's risks*

In general, the financial system has managed correctly many of their old problems of inefficiency, which stemmed from government interventions, badly regulated and neglected oversight. Evidence of these improvements is that South American banks have come out of the world financial crisis. However, the depth of the credit systems continues to be very shallow by international standards and in many countries, they have not regained the levels achieved in the early 1980s. In this way, scarce credit is one of the reasons why there are different levels of productivity. The lack of credit has another damaging effect on the region, because it disincentives informal firms to comply with tax and labor regulations.

To achieve a sustainable supply of credit and financial stability, it is necessary to correct the fiscal deficits, which threat macroeconomic stability, beef up financial supervision, and strengthen creditors' property rights, so, banks can lend with collateral to small- and medium-sized firms.

Since real interest rates are low, episodes of easy foreign money give rise to a range of risks. Our analysis underscores the usefulness of allowing flexibility of the exchange rate (controlling the appreciation), maintaining fiscal discipline and applying prudential financial policies to dampen unwanted credit booms. If this approach turns out to be insufficient, then a careful design of taxes on capital inflows might also be of help, on a temporary basis. However, the elevated global risk aversion under tighter money could potentially hurt the domestic economy and capital inflows.

Assuming that it might be a long term crisis, it would be necessary to adopt a package of adjustment policies, limiting increases in lending (avoid large scale debt) and devaluing the currency.

a. After a decade of reforms, what are missing and what failed?: Policy lessons for exogenous risk and distortions

South America is growing today, under tremendous auspicious of international conditions. But nothing guarantees that the region will grow again once commodity prices fall back and interest rates recover to normal levels. If performance in the recent past (before 2003) is a good predictor of future performance, we have reasons to worry. The South America's GDP per capita growth in the 1990s was insufficient, in spite of pro-market reforms.

The results of the dissertation provide new evidence suggesting that most of South American countries are suffering from a common symptom (insufficient growth), and likely several different growth-diseases: weak institutions, macroeconomic disturbances, and high exposure to external shocks; also physical capital and human capital accumulation, as well as technology are deficient and varies widely across countries, probably increasing divergence.

In contrast, macroeconomic outcomes as a whole have been less volatile during the 2000s than they were during the reform and pre-reform period (1980s and 1990s). This is probably attributable in part to the somewhat more quietly international environment; for example, the volatility of the terms of trade has been low regarding its historical series, though capital flows have remained volatile within countries probably attributed to political distortions.

Much of the improvement is endorsed to measures of monetary and fiscal policy, as well as structural reform efforts. However, fiscal policy must be more stable: maintaining the fiscal surpluses in good times that would permit the budget to face up adverse macroeconomic shocks without falling into large deficits. In this brief section, we discuss the macroeconomic features of the major policy lessons that we can draw from our work.

– *Openness:* A key element of the reforms has been a reduction of barriers to international trade, with the aim of improving the allocation of resources to more competitive sectors, and exposing domestic producers to international

competition. However, it might be argued that greater involvement in the world economy exposed developing countries to foreign shocks. This is likely to be particularly problematic especially when economies specialize in the production and exports of primary commodities, which prices fluctuate dramatically. Our results suggest that concentration in a few commodities is the consequence of the anti-export bias of trade policy during the ISI.

– *Managing international capital flows:* Capital flows have remained volatile and they are likely to remain as an important source of economic disturbance. The exposure to capital flows in the short term is whether these funds are earmarked for development projects, and then the outflows of capital could hurt future economic prospects.

  Investment depends on local and foreign decisions; in that way, a particular constraint in the South American politics is the expropriation risk, which results in high *ex-post* returns for those investments which are not expropriated. Without reasonable guarantees on property rights there can be no capital accumulation or investment in new technologies, and hence no growth.

b. Managing macroeconomic disturbances

Terms of trade risks

Our evidence suggests that terms of trade volatility reduces economic growth, and it is also an important factor underlying the volatility of real GDP and fiscal policy. While there is little that can be done -at the national level- about volatile commodity prices, much can be done to reduce the impact of price fluctuations. The initiatives that we promote to achieve this objective are:

– *Diversified economies through trade and investment:* One way to reduce terms of trade volatility is to diversify exports; economic diversification can be promoted through trade and investment regimes, which are most likely to exploit business opportunities. Diversified economies are characterized by having large tradable sectors, where the volatility of commodities has smaller effects on relative prices, since they have relatively flexible domestic markets.

In fact, South America's diversification of exports has relied on unilateral liberalization and integration agreements among the region. However, terms of trade volatility makes it difficult to sustain more open regimes. While openness promotes efficiency, it also creates risks, and protectionist trade policies are often used as a way of reducing it.

As we have shown in Chapter 4, countries specialized in manufactures experienced much higher rates of growth compared to those specialized in primary products, due to greater potential for eliminating growth divergence and benefiting from rising dynamic gains from trade.

– *Regional economic integration:* One outstanding aspect of trade is that it has increased between members of regional trading blocs –MERCOSUR and CAN. Therefore, trade between members of a sub-regional commercial agreement tends to be more diversified and concentrated in industrial and manufacture goods. While trade with the rest of the world is heavily concentrated in primary commodities.

  One of the central pillars of Prebisch's thought was the promotion of regional integration by means of regional trade agreements encouraging South-South trade and regional financial cooperation. Regional integration in trade provides a source of trade flows with greater content of technology than those in North-South flows; because the Southern manufactured goods that are not competitive in Northern markets, can be competitive in other Southern markets (Ocampo, 2001). [87]

– *Stabilization funds:* Stabilization funds are essentially a spending and a saving rule, and are more suited to smoothing expenditure or consumption. Today's evidence shows that managing an oil exporting economy is an unresolved problem. The traditional idea of stabilization funds may be quite unworkable; for example, the government starts by fixing a baseline projection of oil income, and then saves or uses the difference between the estimated and actual income (the Venezuelan experience). Moreover, matters get more complicated if a negative shock occurs and the government decides to finance

[87] This has been observed for Latin American countries under MERCOSUR, as in 1991 manufactures comprised 81% of intra-regional trade and 65% of total external trade. Complementary to the promotion of regional trading networks, similar attention should be given to the development of regional and sub-regional financial institutions.

the gap by using the resources saved; theory says economic agents may interpret this behavior as non-adjustment to a shock, finally the economic agents won't adapt to the real situation. An outstanding commodity-producer example of fiscal adjustments is the Chilean case (IMF, 2005).[88]

– *Minimize the risk of the fiscal accounts:* Much of the fiscal accounts come through revenues generated by taxes on corporate profits, personal income, consumption, wages, imports, natural resource rents, etc. All these sources carry some volatility: some are more volatile than others. For example, consumption is typically the most stable of the major taxable sources. Taxes on exports or natural resources are particularly unstable, in that way, taxes on imports are also unstable given that the South American countries often need to reduce their import payments to adjust to external shocks.

  By choosing stable taxes, such as consumption, government revenues can be made more stable and predictable, keeping taxes on exports and imports low in order not to distort international trade.

Macroeconomic distortions

When Latin America began its opening to the world economy in the 1980s and 1990s after the immiserizing episodes of the debt crisis, most of the South American economies were prompt to suffer from macroeconomic mismatches: double digit inflation rates, high levels of public debt and overvalued currencies were commonly seen in economies. In the following lines, we briefly develop some policy suggestions to maintain macroeconomic stability.

– *Public debt management*: All countries should accumulate prudent levels of debt and avoid excessive expenditures during boom periods, especially volatile economies which are subject to negative shocks, in this scenery; the economy may not be capable of servicing the debt. This would express itself in a loss of financial market access, debt crises and financial instability. The interaction of

[88] The Chilean government formalized the details of the procedure into law and gives the members of the panel legal independence from authorities. The rule aims at maintaining a cyclically-adjusted surplus of 1% of GDP in the accounts of the central government. Under the law, the government saves all copper exports revenues from the state company (CODELCO) above a long-term reference price for copper. Other central government revenue is smoothed over the business cycle using an estimate of potential output. The two independent panels of experts estimate the structural revenue adjusted for the long-term price and potential GDP. Recently, Ecuador has a similar rule for its oil exports revenues.

the higher public debt with foreign shocks cause destabilizing effects on the real economy, for example, increments in the interest rates and large fiscal deficits.

- *Procyclicality:* Macroeconomic volatility in developing countries arises from foreign shocks -fluctuations in the price of the commodity export-, domestic macroeconomics' problems and political instability.

  Although most of the South American countries brought under control its budget deficits and inflation problems in the 1990s. Most of them are still subject to monetary and fiscal policies that are procyclical, it means, they tend to be expansionary in booms and contractionary in recessions, exacerbating the magnitudes of economic swings. The phenomenon of procyclicality is more pronounced in economies that possess natural resources.

- *Monetary policy:* Fixed and floating exchange rates each have their advantages. A fixed exchange rate reduces the costs of international trade and it is a nominal anchor to achieve low-inflation. On its side, a floating exchange rate provides automatic adjustment to terms of trade shocks; for example, during a commodity boom, the currency tends to appreciate, moderating the excess of capital inflows, as well as the overheating of the real economy, and conversely when the boom in commodity prices are reversed.
- *Reserve accumulation:* Another alternative to save revenues is accumulating international reserves. However, holding the assets in the form of foreign exchange reserves have disadvantages; first, the reserves (typically U.S. treasury bills) do not earn a high return; second, increments in reserves can lead to a rapid monetary expansion (if not sterilized) and thereby to inflation; finally, if Central Bank is not independent from government authorities, reserves could be wasted in public developments.
- *Extractive activities in developing economies*: To the extent that resource extraction increases GDP per capita, the current opportunity for these economies should be directed at enabling policies to develop sustainable extraction profiles. This includes incentives to ensure continued domestic exploration, resource development, and foreign investment in knowledge and relevant technology. To the extent that the "resource curse" is due to declining

extractive output, the cure should not be to avoid the initial extractive boom, but the subsequent decline in extractive output (Wright et al., 2007).[89]

One final point should be made: our analysis has only examined the South American economies and a broader geographic perspective is probably warranted for robust results. For instance, the lower incidence of poverty in the Middle East and North Africa countries may be indicative of an additional benefit of extractive activities (Adams et al., 2003).

– It is important to remark the role of institutions for these countries, where income inequality determines economic activity and hurts the social mobility for poor population stratus.

c. Reflections on South America, the endless long-run

In view of the apparent and inevitable process of globalization, the majority of the historical evidence suggests valuable lessons for the South American countries. First, capital accumulation (human and physical) is a necessary tool to boost long-run economic growth, and a more open economy can be an instrument to stimulate investment. Second, despite the significant advances in life expectancy, basic education and growth institutions, renewed efforts are necessary to strengthen the government's role in fostering human capital. Finally, there is a need to secure macroeconomic stability to set the basis for high and sustained economic growth, including fiscal and monetary discipline, a predictable exchange rate and a diversified export sector in order to minimize the exposure to terms of trade volatility.

We believe that one of the unresolved problem and the backwardness of the South American economies is human capital accumulation and technology adoption; one aspect that attracts our attention was the failure attempts to upgrade the productive pattern, which not achieve the dreamed goals: innovation, increasing productivity and economic growth. Apparently there were not substantial programs within the South American economies to develop technical education and any attempt of innovation was confined to public companies to amend existing designs through essentially modifications to old machines.

[89] For example, Botswana was one of the fastest growing economies for three decades, and increased mining output is thought to have been instrumental to that growth.

Several points deserve attention about the results exposed on this Dissertation, being the main contributions, the new empirical evidence on the immiserizing growth theory, and the growth exercises made for South America. On the second hand, it is necessary to mention the significant challenges we faced during the elaboration of the Thesis, mainly in the construction of the historical data base, especially for the developing countries of the region; in that way, one of the main limitations were to find adequate variables for institutions and trade openness.

Finally, we are making the following steps for future research, mainly in the development of a database that extends the analysis to more countries, which probably will enrich our subjective findings on the growth literature mainly for developing countries. Regarding with the immiserizing growth theory, we imagine, that quite interesting results can be obtained, analyzing the prices' elasticity through this new data base.

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Capítulo 6

Conclusiones y recomendaciones de política económica

La principal característica de la teoría del crecimiento empobrecedor es el fenómeno de un crecimiento económico positivo y, posteriormente, una desaceleración de la producción; la teoría indica la existencia de distorsiones suficientemente grandes -por choques exógenos y políticas equivocadas- que son mayores que los beneficios del crecimiento.

Esta Tesis se ha dedicado a investigar la realidad empírica del crecimiento empobrecedor. Aunque esta teoría del crecimiento ha sido considerada como una cuestión teórica más que un fenómeno de la economía real, los resultados extraídos identificaron la existencia de episodios de crecimiento empobrecedor en las economías de América del Sur durante el periodo de la posguerra. Y confirman que este conjunto de países sufrieron graves distorsiones macroeconómicas en las actividades económicas que afirmar al crecimiento empobrecedor como un problema real, en determinadas circunstancias de alta volatilidad, que resulta en una significativa pérdida de bienestar.

1. El crecimiento empobrecedor

Las ideas centrales de la teoría, así como la posibilidad de un crecimiento empobrecedor se pueden aplicar a los presupuestos del crecimiento neoclásico o endógeno. En ausencia de distorsiones, una expansión de la capacidad productiva de la economía aumenta el crecimiento y la eficiencia dinámica, sin embargo la presencia de distorsiones podrían crear las condiciones para una correlación negativa entre bajo crecimiento económico y bienestar.

Utilizando la teoría de las distorsiones económicas para identificar las políticas que afectan el nivel de crecimiento a largo plazo y evitar la posibilidad de crecimiento empobrecedor, es un área importante y relativamente inexplorada en la nueva generación de modelos, que claramente constituye una vía para futuras investigaciones. Sin embargo, las conclusiones de esta Tesis dan los primeros pasos, especialmente en las economías de América del Sur.

Teóricamente, es posible que una economía en crecimiento experimente los efectos adversos de un incremento en su producción. Este sería como consecuencia de la ampliación de su capacidad productiva, donde los términos de intercambio de un país se deterioran tanto que dañan al bienestar económico a niveles inferiores antes del episodio de crecimiento. En tal situación, todos los efectos positivos del

crecimiento económico se verían compensados por la disminución del poder adquisitivo. De esta manera, las líneas siguientes destacan nuestras conclusiones acerca de la paradoja del crecimiento empobrecedor.

Debido a que las tasas de crecimiento y términos de intercambio pueden variar considerablemente, aunque este fenómeno ocurre con mayor frecuencia en el corto plazo, como a mediano y largo plazo, no debería ser sorprendente que una economía pueda sufrir una disminución en el bienestar en determinados años. Es posible que los términos de intercambio tengan un efecto negativo sobre la tasa de crecimiento; por ejemplo, en el caso en que los bienes de inversión necesarios para el crecimiento se obtengan a través de las exportaciones, cuando estas últimas se enfrentan a precios internacionales cada vez más adversos.

Los resultados en el capítulo 4 muestran que la volatilidad de los términos de intercambio ha tenido efectos negativos sobre el crecimiento en la mayoría de las economías de América del Sur: nueve países están bajo este criterio y en ocho, el PIB disminuyó en el primer subperíodo analizado en esta Tesis (1960-1982).

El capítulo 5 muestra el papel desempeñado de la estructura arancelaria en la región, y con respecto a otros trabajos (Clemens y Williamson, 2001; Tokarick, 2009), encontramos que los aranceles de las importaciones son similares; de esa manera, es menor la probabilidad de que una economía sufra un fenómeno de crecimiento empobrecedor. Sin embargo, se confirma, en parte, que los incrementos de los aranceles contribuyan a la desaceleración económica.

Por otra parte, los resultados apoyan el hecho de que las economías extractivas experimenten un crecimiento económico. De acuerdo con el método de evaluación utilizado aquí, la explotación de los recursos naturales tiene efectos positivos sobre el crecimiento económico. Por tanto, si la explotación de los recursos naturales es el único medio de un país para crecer, entonces es mejor mantenerlo. Uno de los mensajes más sugestivos a partir del análisis presentado (ver capítulo 3 y 4) es que las exportaciones de productos agrícolas y petróleo tienen efectos positivos para las economías en desarrollo, aunque parece ser que se requieren de prolongados períodos de crecimiento.

Desde una perspectiva de desarrollo económico, el uso de ingresos resultantes de las mejoras en los términos de intercambio es de crucial importancia; por ejemplo, si las ganancias de los términos de intercambio se acumulan en forma de mayores ingresos en los sectores orientados a la exportación.

Cualquier conclusión de un ejercicio empírico de este tipo es sin duda tentativa y sugerente. Esta tesis realiza una nueva aportación empírica para el crecimiento económico de América del Sur, teniendo en cuenta una perspectiva de largo plazo, que incluye a las pequeñas economías regionales, para los que no hay mucha evidencia histórica y empírica sobre la economía del crecimiento.

Además, los resultados son interesantes ya que se ha aplicado una nueva metodología para la volatilidad de los términos de intercambio que ha dado resultados esperados de acuerdo con otros trabajos empíricos, utilizando el Índice de Distancia DP2 para la construcción del Índice de distorsiones macroeconómicas (IMD). Las principales conclusiones que se extraen de esta Tesis se describen a continuación en un análisis de los principales resultados y contribuciones.

a. Los determinantes del crecimiento económico

La acumulación de capital físico es una condición necesaria para impulsar el crecimiento a largo plazo y se estimula en relación con la inversión extranjera. En este contexto (ver Capítulo 3), el impacto de la inversión extranjera es diferente en cada país, y tiende a promover el crecimiento económico en las economías que adoptan regímenes de libre comercio más abiertos, además de mejorar el acceso a la educación y las condiciones de capital humano; por lo tanto es necesaria la estabilidad macroeconómica.

Es decir, el vínculo entre la inversión extranjera y el crecimiento del ingreso tiene una implicación importante para el desarrollo de estrategias que conducen a la acumulación de capital y a la potenciación del crecimiento económico a través de la eficiencia de la difusión de recursos y transferencia de tecnología.

Por otro lado, los significativos avances en la esperanza de vida y el acceso a la educación fomentan la acumulación de capital humano. En cuanto al capital humano *(la educación secundaria* y *la esperanza de vida),* se encuentra un apoyo empírico a la premisa de que es la población más saludable, mejor alimentada y educada, la que más contribuye al crecimiento económico. Aunque el Cono Sur ha sido tradicionalmente quien ha contado con los mayores niveles de acumulación de capital humano, recientemente (durante la década de 1980), la región Andina ha mostrado mayores niveles de población sana y con más altas tasas de educación secundaria.

- *La inestabilidad macroeconómica*

Destacamos la necesidad de asegurar la estabilidad macroeconómica con el fin de sentar las bases para de un crecimiento elevado y sostenido, que incluye la disciplina fiscal y monetaria, una tasa predecible del tipo de cambio real y un sector exportador diversificado que minimice la exposición a la volatilidad de comercio.

De esta manera, la presencia de perturbaciones macroeconómicas es significativa en los resultados y tiene un efecto negativo sobre la inversión y el crecimiento. La región sigue siendo vulnerable a los desequilibrios fiscales, la deuda externa y la falta de disciplina monetaria (desviaciones del tipo de cambio).

Por otra parte, la volatilidad de los términos de intercambio y los shocks de la tasa de interés de EE.UU. resultan en menores tasas de crecimiento afectando a las economías de ingresos más bajos. También se resaltan otras conclusiones sobre la estabilidad macroeconómica; los resultados confirman la importancia del sobrendeudamiento externo y las tasas de interés EE.UU, que muestran una presencia importante con efectos negativos, siendo los países del Cono Sur principalmente afectados por la carga de la deuda, así como los países Andinos, en su mayoría desfavorecidos por cambios en la tasa de interés americana.

- *Las instituciones políticas*

La presencia de las instituciones favorables para el crecimiento es un factor importante para el desarrollo sostenible. A pesar de la metodología aplicada, encontramos algunas dificultades para encontrar una variable proxi para las instituciones. La variable *Calidad de las instituciones* presenta cambios frecuentes debido a la inestabilidad de los regímenes políticos en la región durante la década de los 1970 y 1980. Sin embargo, podemos considerarla como una variable de muy útil referencia, ya que los resultados están libres de efectos de la percepción de problemas.

b. Las disparidades espaciales del crecimiento

La distribución del ingreso regional ha fluctuado a lo largo del tiempo. Este proceso puede tener muchos resultados restrictivos: la completa desigualdad (divergencia), la estratificación y, continuas y crecientes disparidades de ingresos. Si bien las disparidades en América del Sur han sido objeto de una preocupación política

continua, los factores que impulsan el crecimiento han sido también el tema de considerables esfuerzos de investigación.

Los resultados del modelo econométrico (Capítulo 4) resaltan las desiguales tasas de crecimiento entre las economías de América del Sur, causadas por la gran disparidad existente entre ellas, especialmente en las economías menos desarrolladas. Considerando las dotaciones iniciales de cada economía, los resultados indican que la disparidad en las "cualidades" originarias de cada país llevó a las grandes diferencias en los niveles de ingreso y tasas de crecimiento.

Aunque creemos que en las economías de América del Sur, la inversión y el progreso tecnológico son endógenos a la dinámica económica, este enorme beneficio no puede materializarse sin un conjunto de condiciones económicas e institucionales capaces de impulsar la actividad económica. Vale la pena señalar que la acumulación de mejoras de capital físico aumenta el crecimiento del ingreso junto con la inversión, siendo ambos uno de los principales determinantes del crecimiento económico.

La identificación de estos factores comunes (dentro de una región amplia y diversa) mejora nuestra comprensión de por qué las economías de América del Sur crecieron más rápidamente en el primer sub-período (1960-1982). Hay indicios de la existencia de convergencia condicional dentro de la región hasta mediados de 1980. Los resultados para el sub-período 1983-2008 confirman el proceso de convergencia regional, pero con menor intensidad y a un ritmo más lento (Capítulo 3).

Específicamente, el problema permanente de las disparidades y la desigualdad de ingresos no desaparece una vez que una economía crece. Por ejemplo, los países sin acceso marítimo, Bolivia y Paraguay, con una infraestructura poco desarrollada y una ubicación distante de los principales mercados, son las economías menos desarrolladas. Por lo tanto, las diferencias de las dotaciones iniciales y la trayectoria afectan el crecimiento posterior en un proceso de industrialización.

Por otro lado, una mayor integración en la región requiere una especialización a través de las ventajas comparativas, evitando el uso de distorsiones en los precios relativos; en definitiva, cualquier política de mercado con distorsiones utilizadas por el Estado debe ser condenadas, ya que crean un comportamiento de búsqueda de rentas sin contribución positiva en la actividad productiva (Bhagwati et al., 1980).

- *La contribución del desarrollo sectorial*

La estructura sectorial de la producción y sus exportaciones muestran una existente dependencia del sector agrícola; sin embargo, hay cambios en los patrones de producción hacia una mayor producción de bienes agrícolas procesados de alimentos, servicios y explotación petrolera.

El crecimiento económico ha sido mayor en los países donde la industria y sus exportaciones han tenido un mayor crecimiento, con una menor participación de la agricultura sobre el producto. Es razonable suponer que la estructura productiva ha cambiado un poco, debido principalmente a la desigualdad en las dotaciones, una baja cohesión regional en el crecimiento, y la inestabilidad institucional en las primeras décadas, aumentado especialmente las disparidades de ingresos.

- *Principales resultados empíricos*

Por otro lado, hay evidencia de que la apertura comercial no tiene claros efectos en la mayoría de las economías, y sólo es significativa en el primer sub-período sobre todo para las economías del Cono Sur.

El desarrollo financiero parece ser significativo sólo en los principales países (Argentina, Brasil) y en unos pocos en vías de desarrollo, suponemos que se debe principalmente a las entradas de capital a las actividades extractivas (Ecuador, Perú y Venezuela).

El desarrollo institucional tiene también una presencia importante en los países desarrollados de la región (Chile y Uruguay), y aquellos donde se produjeron importantes cambios políticos (Colombia y Perú), visiblemente en el segundo sub-período.

La posibilidad de empobrecimiento aún existe en nuestro modelo espacial, pero es más notable en el primer sub-período (1960-1983). Considerando la volatilidad de los términos de intercambio, los resultados muestran que existe evidencia de la posibilidad de empobrecimiento de las economías de América del Sur. Imaginamos que este proceso está altamente correlacionado con el fenómeno de la desindustrialización, que es explicada por la alta dependencia de exportaciones de materias primas, a pesar, de los resultados favorables en el bienestar para los países Andinos.

c. El crecimiento económico bajo inestabilidad macroeconómica

El Capítulo 5 ha analizado los efectos de la industrialización sustitutiva de importaciones (ISI) en el crecimiento económico de América del Sur, en particular, las distorsiones macroeconómicas producidas antes de las reformas estructurales de la década de 1990.

La principal contribución al tema, es a través de innovaciones prácticas, la creación de un índice de distorsiones, utilizando una metodología de índices de distancia (DP2) teniendo en cuenta seis indicadores macroeconómicos subjetivos, que viene a ser un aporte a la literatura empírica de crecimiento en América del Sur.

- *Los efectos de las políticas autárquicas y las distorsiones*

Los resultados son muy claros: la determinación de una política autárquica combinada con instituciones perjudiciales para la inversión extranjera, afectaron el crecimiento económico, que se refleja en una baja productividad.

Los episodios de cambios institucionales en muchos países y diferentes épocas (1970 y 1980) tuvieron un efecto negativo sobre la inversión: la fuga de capital extranjero sucedió en un momento donde su fortaleza financiera e institucional no ha cambiado, pero se vio afectada por la intervención del Estado.

El índice de distorsiones macroeconómicas (IMD) es estadísticamente significativo y tiene un efecto negativo sobre el crecimiento y la acumulación de capital. La evidencia muestra que la región sigue siendo vulnerable a los desequilibrios fiscales, la deuda externa y la falta de disciplina monetaria, la inestabilidad del tipo de cambio real se asocia negativamente con las decisiones de inversión.

Asimismo, parece que las políticas del “Consenso de Washington” fueron en parte adecuadas para establecer la estabilidad macroeconómica, e incompletas para un establecer un proceso de desarrollo sostenido. Puesto que no se centraron profundamente en los cambios institucionales, posteriormente estas instituciones anti-crecimiento afectaron a los resultados de las reformas.

Tal vez, la principal conclusión es que los resultados económicos de cualquier estrategia de crecimiento dependen del marco institucional heredado, que de alguna manera se basa en la acumulación de capital (físico y humano), que en realidad carecen muchos países de América del Sur.

Otras circunstancias particulares históricas dificultaron la coexistencia de una estrategia de industrialización con dificultades macroeconómicas y financieras, la escasa formación de capital y las presiones externas e internas sobre los saldos fiscales. La intervención estatal produjo: restricciones a la inversión, la asignación de crédito y un marco institucional incapaz de impulsar el crecimiento económico.

2. Implicaciones de política económica

Ninguna analogía sencilla puede ser fácilmente extraída entre la experiencia histórica de la América del Sur y los resultados esperados de las políticas similares en la economía mundial actual, pero es posible encontrar algunos problemas del pasado que persisten en la economía de nuestros días.

La dependencia en las exportaciones de recursos naturales deja a la región vulnerable a posibles shocks de los términos de intercambio, una debilidad que es evidente ahora, ya que las economías sudamericanas se han beneficiado por los incrementos de precios de productos básicos. Esta fragilidad económica requiere una respuesta para reducir el impacto de los shocks sobre la economía nacional y el bienestar de la población. Una amplia discusión de estas cuestiones nos llevaría demasiado lejos, y solamente nos limitamos a señalar algunas consideraciones importantes para la política fiscal, la gestión de la deuda pública y en la regulación y supervisión del sistema financiero.

- *Una mirada a la actualidad*

En uno de los últimos informes del Fondo Monetario Internacional (FMI) señala que el crecimiento en América Latina es impulsado por la demanda interna y externa. De acuerdo con las cifras del FMI, el déficit por cuenta corriente sigue deteriorándose, sin embargo, las fuertes entradas de capital, tanto de inversión extranjera y de cartera, mantienen a la balanza de pagos en saldos positivos.

Por otra parte, la mayoría de las economías de la región sufren de una inflación en aumento; sin embargo, las presiones de la demanda interna han permanecido relativamente estables. Por otra parte, es probable que las reservas internacionales cada vez decrezcan más, debido a las expectativas de apreciación de las monedas.

La tasa de interés real americana es inusualmente baja, y es probable que se mantenga así por algún tiempo, dada la debilidad de la economía de los EE.UU. Los datos muestran que la demanda interna tiende a ser estimulada por las bajas tasas de interés extranjeras; esta respuesta viene principalmente del sector privado, que reacciona fuertemente al dinero extranjero barato. Por último, es poco probable que los bancos centrales reaccionen a las entradas de capital con una intervención en el tipo de cambio a niveles bajos o fijando límites a la tasa de apreciación de la moneda, ya que se produciría una inestabilidad de los tipos de cambio.

- *Reduciendo los riesgos actuales*

En general, el sistema financiero ha manejado correctamente sus viejos problemas de ineficiencia, provenientes de las intervenciones estatales, mala regulación y vigilancia. La evidencia de estas mejoras es que los bancos de América del Sur han salido de la crisis financiera mundial. Sin embargo, los sistemas de crédito siguen siendo deficientes a las normas internacionales y en muchos países, no han recuperado los niveles alcanzados a principios de 1980. De esta manera, la ausencia de crédito es una de las razones por los diferentes niveles de productividad. La falta de crédito tiene otro efecto perjudicial en la región, debido a que desincentiva a las empresas informales cumplir con la normativa fiscal y laboral.

Para lograr un suministro sostenible de crédito y estabilidad financiera, es necesario corregir los déficits fiscales, que amenazan la estabilidad macroeconómica, y fortalecer la supervisión financiera, junto con los derechos de propiedad de los acreedores, ya que los bancos podrían prestar con garantías a las pequeñas y medianas empresas.

Dado que las tasas reales de interés son bajas, los episodios de dinero extranjero barato pueden dar lugar a una serie de riesgos. Nuestro análisis pone de manifiesto la utilidad de permitir la flexibilidad del tipo de cambio (controlando el nivel de apreciación), mantener la disciplina fiscal y la aplicación de las políticas prudenciales financieras para amortiguar posibles auges de crédito no deseados. Si este procedimiento resulta ser insuficiente, un cuidadoso diseño de impuestos sobre los flujos de capital podría ser de gran ayuda, sobre una base temporal. Sin embargo, la elevada aversión global al riesgo a la restricción de dinero podría afectar a la economía interna y los flujos de capital.

Asumiendo que esta recesión podría ser una crisis de largo plazo, sería necesario adoptar un paquete de políticas de ajuste, que limite el aumento de los préstamos (evitando la deuda a gran escala) y la devaluación de la moneda.

a. Después de una década de reformas, qué falta y en qué se ha fallado: lecciones de política para el riesgo exógeno y distorsiones

América del Sur crece hoy en día gracias a las favorables condiciones internacionales. Pero nada garantiza que la región siga creciendo una vez que los precios de las materias primas bajen y la tasa de interés retorne a niveles normales. Si las bajas tasas de crecimiento económico en la región antes de 2003 podrían representar un buen indicador del posible crecimiento económico en el mediano plazo, hay razones y motivos para la preocupación. El crecimiento de la América del Sur en la década de 1990 fue insuficiente, a pesar de las reformas pro-mercado.

Los resultados de la Tesis doctoral proporcionan nuevas evidencias y sugieren que la mayoría de los países de Sudamérica sufren de un síntoma común (crecimiento insuficiente) y probablemente varios impedimentos al desarrollo: debilidad institucional, perturbaciones macroeconómicas y una alta exposición a shocks externos; por otro lado, la acumulación de capital físico y humano, así como tecnológico es deficiente y varía en gran medida de un país a otro, probablemente incrementando los problemas de divergencia.

Por el contrario, los resultados macroeconómicos en su conjunto han sido menos volátiles durante la década de los 2000 comparados con los períodos de la reforma y antes de la reforma (1980 y 1990). Esta es, probablemente, atribuible en parte al favorable entorno internacional; por ejemplo, la volatilidad de los términos de intercambio ha sido baja con respecto a su serie histórica, aunque los flujos de capital se han mantenido volátiles entre países, probablemente atribuidos a distorsiones políticas.

Gran parte de la mejora se debe a las medidas de política monetaria y fiscal, así como a los esfuerzos de las reformas estructurales. Sin embargo, la política fiscal debe ser más estable, manteniendo los superávit fiscales en los buenos tiempos que permitan un gasto público suficiente para afrontar los shocks macroeconómicos adversos, sin caer en grandes déficits. En esta breve sección, se discuten las

características macroeconómicas de las principales lecciones de política que podemos extraer de nuestro trabajo.

- *Apertura comercial:* Un elemento clave de las reformas ha sido la reducción de las barreras al comercio internacional, con el objetivo de mejorar la asignación de recursos a los sectores más competitivos, y la exposición de los productores nacionales a la competencia internacional. Sin embargo, podría argumentarse que una mayor participación en la economía mundial expone a los países en desarrollo a choques externos. Es probable, que sea especialmente problemático sobre todo cuando las economías se especializan en la producción y exportación de productos naturales, cuyos precios fluctúan dramáticamente. Nuestros resultados sugieren que la concentración en unos pocos productos o bienes es la consecuencia del sesgo anti-exportador de la política comercial durante la ISI.
- *Manejo de los flujos internacionales de capital:* Los flujos de capital siguen siendo inestables, pero en niveles más bajos, y es probable que permanezcan como una importante fuente de perturbación económica. La exposición a los flujos de capital en el corto plazo, es sólo si estos recursos se destinan a proyectos de desarrollo: entonces la salida de capitales podría perjudicar las perspectivas económicas futuras.

  La inversión depende de las decisiones locales y extranjeras; de esa manera, uno de los obstáculos en la política de América del Sur es el riesgo de expropiación, que se traduce en altos rendimientos ex-post para aquellas inversiones que no son expropiadas. Sin garantías razonables sobre los derechos de propiedad no puede haber una acumulación de capital o inversión en nuevas tecnologías, y por lo tanto ningún crecimiento.

b. Supervisando las perturbaciones macroeconómicas

Amenazas de los términos de intercambio

Nuestra evidencia sugiere que la volatilidad de los términos de intercambio reduce el crecimiento económico, y es también un factor importante que subyace a la volatilidad del PIB real y la política fiscal. Si bien es poco lo que se puede hacer - a nivel nacional- sobre la volatilidad de los precios de las materias primas, se pueden

realizar cambios considerables en orden a reducir el impacto de las fluctuaciones de precios. Las iniciativas que suelen promoverse para lograr este objetivo son las siguientes:

- *Economías diversificadas a través del comercio y la inversión:* Una forma de reducir la volatilidad del comercio es a través de la diversificación de exportaciones; la diversificación económica puede ser alcanzada por medio de regímenes comerciales más abiertos y la inversión, ambos recomendables para aprovechar oportunidades de negocio. Las economías diversificadas se caracterizan por tener grandes sectores de bienes c0mercializables, donde la volatilidad de los bienes primarios tenga pequeños efectos sobre los precios relativos debido a la existencia de unos mercados internos relativamente flexibles.

  La diversificación de las exportaciones de América del Sur se ha basado en la liberalización unilateral y acuerdos de integración regionales. Sin embargo, la volatilidad de los términos de intercambio hace que sea difícil de sostener regímenes más abiertos. Si bien la apertura comercial promueve la eficiencia, también existen riesgos, y las políticas proteccionistas en el comercio a menudo son una herramienta de reducirlos.

  Como se ha señalado en el Capítulo 4, los países especializados en manufacturas experimentaron tasas más altas de crecimiento en comparación con las economías especializadas en productos primarios, debido a su mayor potencial para eliminar las divergencias del crecimiento y beneficiarse de los efectos dinámicos del comercio.
- *La integración económica regional:* Un aspecto destacable del comercio es que éste se ha incrementado entre los miembros de los bloques regionales MERCOSUR y la CAN. Por lo tanto, el comercio entre los miembros de un acuerdo comercial sub-regional tiende a ser más diversificado y concentrado en productos industriales y manufacturas. Si bien el comercio con el resto del mundo está fuertemente concentrado en productos primarios.

  Uno de los pilares centrales del pensamiento de Prebisch fue la promoción de la integración regional por medio de acuerdos comerciales, fomentando el comercio y la cooperación financiera regional. La integración regional es una fuente de los flujos comerciales con mayor contenido tecnológico que los flujos

comerciales existentes entre los bloques Norte-Sur, porque los productos manufacturados que no son competitivos en los mercados del Norte, pueden ser competitivos en otros mercados del Sur (Ocampo, 2001).[90]

- *Los fondos de estabilización:* Los fondos de estabilización son esencialmente una regla de ahorro y gasto, y son más adecuados para suavizar el gasto o consumo. La evidencia actual muestra que el manejo de una economía exportadora de petróleo es un problema aún no resuelto. La idea tradicional de los fondos de estabilización pueden ser bastante inviable; por ejemplo, el gobierno comienza por la fijación de una proyección de referencia de la renta petrolera y, a continuación, guarda o utiliza la diferencia entre los ingresos estimados y los reales (la experiencia venezolana). Por otra parte, las cosas se complican aún más si se produce un shock negativo y el gobierno decide financiar el déficit mediante el uso de los recursos ahorrados; la teoría dice que los agentes económicos pueden interpretar esta acción como una falta de ajuste al shock, no adaptándose éstos finalmente a la situación real. Un excelente ejemplo de los ajustes fiscales es el caso de Chile (FMI, 2005).[91]
- *Minimizar el riesgo de las cuentas fiscales:* Gran parte de las cuentas fiscales vienen a través de ingresos generados por los impuestos sobre las ganancias de las empresas, ingresos personales, consumo, salarios, importaciones, rentas de recursos naturales, etc. Todas estas fuentes tienen cierta inestabilidad: algunas son más volátiles que otras. Por ejemplo, el consumo es típicamente la fuente más estable. Los impuestos sobre las exportaciones o recursos naturales son particularmente inestables; de esa manera, los impuestos sobre las importaciones también son inestables debido a que los países sudamericanos a menudo tienen que reducir el pago de importaciones para ajustarse a los shocks externos.

[90] Esto ha sido observado para los países latinoamericanos en el MERCOSUR; en 1991 las manufacturas comprendían el 81% del comercio intrarregional y el 65% del comercio exterior total. Como complemento a la promoción de redes regionales para el comercio, debe darse la misma atención al desarrollo de instituciones financieras regionales y subregionales.

[91] El gobierno de Chile formalizó los detalles del procedimiento mediante ley y da a los miembros del panel independencia de las autoridades gubernamentales. La norma tiene como objetivo mantener un superávit ajustado al ciclo del 1% del PIB en las cuentas del gobierno central. Según la ley, el gobierno guarda todos los ingresos por exportaciones de cobre de la empresa estatal (CODELCO) por encima de un precio de referencia a largo plazo para el producto. Otros ingresos del gobierno central se suavizan durante el ciclo económico con una estimación del producto potencial. Los dos grupos de expertos independientes estiman los ingresos estructurales ajustados por el precio a largo plazo y el PIB potencial. Recientemente, Ecuador tiene una norma similar para los ingresos de sus exportaciones de petróleo.

Al elegir los impuestos estables, como el consumo, los ingresos del gobierno pueden ser más estables y previsibles, manteniendo los impuestos a las exportaciones e importaciones bajos, a fin de no distorsionar el comercio internacional.

Las distorsiones macroeconómicas

Cuando América Latina comenzó su apertura a la economía mundial en la década de 1980 y 1990 después de los episodios empobrecedores de la crisis de la deuda, la mayoría de las economías de América del Sur fueron expuestas a desajustes macroeconómicos: con tasas de inflación de dos dígitos, altos niveles de deuda pública y tipos de cambio sobrevalorados. En las siguientes líneas, proponemos algunas políticas de estabilidad macroeconómica.

- *Gestión de la deuda pública:* Todos los países deben acumular niveles prudentes de deuda y evitar gastos excesivos en períodos de auge, especialmente las economías volátiles que están sujetas a shocks negativos; en este escenario, la economía puede no ser capaz de pagar su deuda. Esto se refleja en una pérdida de acceso a mercados financieros, una crisis de deuda e inestabilidad financiera. La interacción de mayor deuda pública con shocks externos tienen efectos desestabilizadores en la economía real, como por ejemplo, los incrementos en las tasas de interés y déficits fiscales elevados.
- *Prociclicidad:* La volatilidad macroeconómica en los países en desarrollo son normalmente provenientes del extranjero -fluctuaciones en el precio de las exportaciones-, debido a problemas macroeconómicos domésticos e inestabilidad política.

  Aunque la mayoría de los países de América del Sur controlaron sus problemas de déficits presupuestarios y tasas de inflación elevadas, la mayoría de ellos todavía están sujetos a políticas monetarias y fiscales que son procíclicas; es decir, tienden a ser expansivas en momentos de auge y contractivas en las recesiones, lo que agrava la magnitud de las fluctuaciones económicas. El fenómeno de la prociclicidad es más pronunciado en las economías que poseen recursos naturales.
- *La política monetaria:* Cada tipo de cambio, fijo o variable, tiene sus ventajas e inconvenientes. Un tipo de cambio fijo reduce los costos del comercio

internacional y se utiliza como un ancla nominal para lograr una baja inflación. Por su parte, un tipo de cambio flotante permite un ajuste automático a las variaciones en los términos de intercambio; por ejemplo, durante un auge de materias primas, la moneda tiende a apreciarse, moderando los excesivos flujos de capital; y por el contrario, el tipo de cambio se deprecia cuando los precios de las materias primas se revierten.

- *La acumulación de reservas:* Otra alternativa de guardar ingresos es vía la acumulando reservas internacionales. Sin embargo, mantener los activos en forma de reservas de divisas tiene sus desventajas: en primer lugar, las reservas (por lo general en letras del Tesoro de Estados Unidos) no obtienen un alto rendimiento y, en segundo lugar, los incrementos en las reservas puede conducir a una rápida expansión monetaria (si no esterilizados) y por lo tanto inflación; y por último, si el Banco Central no es independiente de las autoridades gubernamentales, las reservas pueden ser dilapidadas en proyectos públicos.
- *Actividades extractivas en economías en desarrollo:* En la medida en que la extracción de recursos aumenta el ingreso per cápita, la oportunidad actual para estas economías debe ser dirigida a desarrollar políticas que permitan una extracción sostenible. Esto incluye incentivos para asegurar la continua exploración interna, el desarrollo de recursos, e inversión extranjera en conocimiento y tecnología pertinente para la actividad. Hasta cierto punto, la "maldición de los recursos" se debe al descenso de la producción extractiva, por lo que, la cura no debe evitar el auge de extracción, pero sí el posterior declive de la producción extractiva (Wright et al., 2007).

  Aunque debemos realizar una anotación final: nuestro análisis sólo ha examinado las economías de América del Sur, y probablemente, un análisis geográfico más amplio garantizaría resultados más robustos. Por ejemplo, la menor incidencia de la pobreza en el Medio Oriente y los países del norte de África podría ser indicativa de un beneficio adicional de las actividades extractivas (Adams et al., 2003).

  Es importante destacar el papel de las instituciones de estos países, donde la desigualdad de ingresos determina la actividad económica y perjudica a la movilidad social para los estratos de la población pobre.

c. Reflexiones sobre América del Sur, el interminable largo plazo

En vista del proceso aparentemente inevitable de la globalización, la mayor parte de las evidencias históricas ponen de manifiesto lecciones valiosas para los países sudamericanos. En primer lugar, la acumulación de capital (físico y humano) es una herramienta necesaria para impulsar el crecimiento económico a largo plazo, y una economía más abierta puede ser un instrumento para estimular la inversión. En segundo lugar, a pesar de los avances significativos en la esperanza de vida, la educación básica y de las instituciones para el crecimiento, sigue siendo necesario realizar nuevos esfuerzos para fortalecer el papel del Estado en el desarrollo del capital humano. Por último, es evidente la necesidad de asegurar la estabilidad macroeconómica para sentar las bases de un crecimiento económico alto y sostenido, incluyendo la disciplina fiscal y monetaria, un tipo de cambio previsible y un sector exportador diversificado, con el fin de reducir al mínimo la exposición a la volatilidad del comercio.

Creemos que uno de los problemas sin resolver, y que puede ser una causa probable del atraso de las economías de América del Sur, es la acumulación de capital humano y la adopción de nueva tecnología; un aspecto que llama la atención fue el fracaso los intentos de actualizar el modelo productivo, que no alcanzó las metas previstas: innovación, aumento de la productividad y el crecimiento económico. Al parecer, no existían programas importantes dentro de las economías de América del Sur para el desarrollo de educación técnica, y cualquier intento de innovación se limitaba a las empresas públicas, con objeto de modificar diseños ya existentes, a través de modificaciones en maquinarias antiguas.

Varios puntos merecen atención acerca de los resultados que se exponen en esta Tesis, siendo las principales aportaciones, la nueva evidencia empírica sobre la teoría del crecimiento empobrecedor, y los ejercicios de crecimiento realizados para América del Sur. Por otra parte, cabe mencionar que nos hemos enfrentado a retos importantes en la elaboración de la Tesis, destacando la construcción de una base de datos histórica, especialmente para los países en desarrollo de la región; de este modo, una de las principales limitaciones ha sido precisamente encontrar las variables adecuadas, en concreto, para las instituciones y la apertura comercial.

Por último, estamos dando ya los siguientes pasos para futuras investigaciones, sobre todo en la construcción de una base de datos que extienda el

análisis a más países, lo que con toda seguridad enriquecerá nuestros ya interesantes resultados sobre la literatura del crecimiento en los países en desarrollo. En cuanto a la teoría del crecimiento empobrecedor, nos imaginamos, que podrán obtenerse resultados bastante interesantes con el estudio de la elasticidad de los precios a través de esta nueva -y más extensa- base de datos a la que nos referimos.

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Appendixes

a. Data base: sources and methodology

b. Integration among South America

c. The econometric basis for structural model

Appendix A

Data Base: Description and Sources

A common theme throughout the collection of statistical series is that posterior analysis of any variable amid different economies requires information that, as far as possible, has to be compatible with related data series. Once solved the compatibility problem, we can be sure of the analytical usefulness and the reliability of the data by allowing interrelationships with other related macroeconomic data series provided by different sources. Also, compatibility encourages the rationalization of collection procedures, through the integration of domestic and external data (thus lowering the effort of data collection).

Table A.1: Definitions and source

Variable	Definition	Sources
A. Economic growth:		
Per capita GDP (*gr*)	Per capita GDP is equal to the rate of GDP at constant prices in thousands of dollars for 1990 and the total population.	Angus Maddison, Historical Statistics 2010.
B. Fundamental variables:		
Population (*pop*)	Population	Angus Maddison, Historical Statistics 2010.
Initial per capita GDP (*g*0)	Initial per capita GDP	Angus Maddison, Historical Statistics 2010.
Foreign direct investment (*fdi*)	An indicator of foreign ownership of productive assets in an economy, such as factories, mines and land. As a percentage of GDP.	World Development Indicators (WDI), International Finance Statistics (IFS); and "*Foreign Investment into Latin America during the Twentieth Century*", Economic History Services, University of Michigan.
Gross fixed capital formation (*gfkf*)	Statistically, it measures the value of additions to fixed assets purchased by business, government and households less disposals of fixed assets sold off or scrapped. As a percentage of GDP.	World Bank-World Development Indicators (WDI).
Life expectancy	Life expectancy is intended to bring together other factors, such as the accumulation of human capital, and structural and institutional changes (Astorga, 2010). It enters into regression with its differences.	World Bank, Development Indicators (2010).
Civil liberties	The variable represents an indicator that scores the degree of the freedom of expression and opinion, associational and organizational rights. The rating goes from 1 through 7, with 1 representing the highest and 7 the lowest level of freedom.	Series were obtained from The Freedom House.
Real openness (*open*)	We have estimated "real openness" as imports plus exports relative to GDP in parity purchasing power (PPP).	Alcalá and Ciccone (2001)
Secondary enrollment	Refers to enrollment in second grade education	Figures for 1960-1969 are from Mitchell (1993), for 1970-2006 are from UNESCO (2008c) based on Bernanke & Gurkaynak (2001).

C. Other developing variables:		
Capital Imports	Refers to machines, transport, and equipment imports, expressed as a percentage of Imports.	Series for 1960-2000 are from OxLAD, for 2000-2008 are from ECLAC (SYLA 2009)
Oil exports	Percentage of oil exports over total exports.	World Bank-World Development Indicators (WDI)
Oil production (oil)	Oil production in cubic meters (m^3).	ECLAC (2010)
Manufacturing exports	Percentage of manufacturing exports over total exports.	World Bank-World Development Indicators (WDI)
Services exports	Percentage of services and other goods exports over total exports.	World Bank-World Development Indicators (WDI)
Food exports	Percentage of food exports over total exports	World Bank-World Development Indicators (WDI)
Terms of trade (*tot*)	This indicator corresponds to the ratio of export goods prices to import goods, which gives an account of the purchasing power of exports.	The index was derived from the historical series of the respective central banks and the World Bank (WDI).
D. Shocks variables:		
Bilateral real exchange rate depreciation	Defined as: [(XRAT t-1/XRAT t)-1]*100, which avoids depreciations of more than 100%; a decline in the index means real depreciation.	World Bank-World Development Indicators (WDI)
Bilateral real exchange rate deviations	We obtained the exchange rate disturbances as the standard deviation of Bilateral real exchange rates	World Bank-World Development Indicators (WDI)
Variable	**Definition**	**Sources**
Terms of trade volatility	It was estimated as an unobserved variable through the Kalman Filter application, considering terms of trade in logs.	World Bank (WDI) and from the historical series of the respective central banks
US interest rate	US interest rate (lending rate)	World Development Indicators (WDI, 2010), International Finance Statistics (IFS, 2010).
E. Other exogenous variables:		
Capital Imports	Refers to machines, transport, and equipment imports, expressed as a% of Imports.	Series for 1960-2000 are from OxLAD, for 2000-2008 are from ECLAC (SYLA 2009)
The blak-market premium	Measures the divergence between official exchange and black market rates, and distortions in the foreign exchange market due to currency and capital controls, exchange rationing, and other regulations and restrictions.	International Finance Statistics (IFS); The World Currency Yearbook (many editions).
Price of capital	Is the ratio of the local to the international price of investment goods, and measures distortions due to a lack of arbitrage between domestic and world markets, arising from tariffs, quotas, exchange controls or other policies.	Penn World Tables 6.3.
Inflation rate		World Bank-World Development Indicators (WDI)
F. Institutionals variables:		
Institutions Quality (*inst*)	The variable is a measure of the quality of institutions that detects changes in political systems, coups, and institutional credibility etc. The series runs from 0 to 10.	Pippa Norris Data (2009) and Kaufmann, D.; Kraay, A. and Mastruzzi, M. (2009).
Contract-intensive Money (CIM)	Computed as (M2-Cash)/M2	International Finance Statistics (2010) and Mitchell, B.R. (2007). Clague, Christopher, et al, 1999.
Financial development (DEPTH)	Computed as M3/GDP	International Finance Statistics (2010) and Mitchell, B.R. (2007).

Appendix B

In this point we briefly develop the methodology of the Kalman filter and the estimation for the terms of trade volality.

B.1. The Kalman filter

The Kalman filter is a mathematical procedure that operates through a mechanism of prediction and correction. In essence this algorithm predicts a new vector from its previous information by adding a correction term, proportional to the prediction error, so that the error is statistically minimized.

The key advantage of this approach is that it is based in a structural analysis of the problem and considers the different components that make up the series such as trend, seasonal, cycle and calendar variations, with the effects of explanatory variables and interventions, which are modeled separately before being put together in the state-space model. The main contributions from statisticians and econometricians appeared strongly in the 1990s.

The main objective is to calculate a linear estimator, an unbiased and optimal vector t, based on information available at t-1 and updated with additional information available at t. The filter is performed assuming that the system can be described by a linear stochastic model and consists of a set of equations that provide an optimal recursive solution. The error is associated with both the system normally distributed with zero mean and variance determined.

The solution is optimal because the Kalman filter combines all the observed data and prior knowledge about the behavior of the system to produce an estimate with a statistical minimized error.

- *Estimating the terms of trade volatility*

Uncertainty can be measured in many different ways and there is no an agreement on which one may constitute the “correct” method of measurement. The lack of consensus brought an enormous number of suggestions and attempts, and for sure there is merit in considering more than one measure. Currently, there are two commonly used approaches to measure volatility; i.e. the standard deviation applied in spans of 5 or 10 year frequency and the GARCH methodology, more used in financial economics. The

standard deviation approach, which is also used in cross-countries studies, involves treating all movements as indicative of uncertainty by calculating the standard deviation for each country's aggregate commodity price; consequently this is an unsatisfactory measure to account uncertainty in time series. (Rodrick 1999, Blattman et. al. 2007)

In that way, we consider to use a different methodology for the calculation of terms of trade volatility. The framework for this analysis is to measure unobserved components of the series, allowing for a trend component to be either an irregular random walk with drift or a smoother series which moves irregularly over time.

In that way, we consider using the Kalman Filter as a method for inferring the predictable components and trends in the price evolution process. Among its advantages, this technique can include unobservable variables and estimate them in the model, as well as, soften and project the observed variables (Durbin & Koopman 2001). So we estimate a Kalman filter model to account for the evolution of the volatility in the estimation of a State transition dynamic model (State-space model). The representation of State transition equations is compatible with equation (B.1) for volatility and takes the following form:

$$\Delta x_t = \alpha_t + \beta_t \Delta x_{t-1} + t_t + \varepsilon_t \qquad \text{B.1.}$$

where, x is the logarithm of terms of trade and t is the trend component of terms of trade.

As shown, the stochastic process that describes the coefficients of (α_t, β_t) has been restricted to a random walk, implying that shocks to coefficients are maintained indefinitely. The disturbance terms u_{t+1}, v_{t+1}, are assumed not serially correlated and contemporaneously. Where, the α_t and the β_t coefficients are described as the transition vector and the State vector.

First, we made a prior analysis of the structure of the system that generated the data before the estimation for each country; second we followed Clark (1987) and specify a State space model that allows us to distinguish between smooth trend and irregular trend models; it includes a random walk with drift in the stochastic trend component. In order of distinguishing between both trends, we construct an unobserved components model as follows:

$$
\begin{aligned}
Y_t &= T_t + C_t \\
T_t &= T_{t-1} + d_{t-1} + w_t \\
d_t &= d_{t-1} + u_t \\
\Phi(L)C_t &= v_t
\end{aligned}
\qquad \text{B.2.}
$$

Where w_t, u_t and v_t are independent "white noise" processes -not serially or contemporanously correlated- with standard deviations σ_w^2, σ_u^2 and σ_v^2, respectively, while $\Phi(L)$ is a finite polynomial in the lag operator L. The first equation from (B.2) is the decomposition of terms of trade into two possible components, trend T_t and the cycle C_t.

The fourth equation from A.2 specifies the stationary cyclical component as a finite autoregression rather than a more general ARMA process with moving average terms. The elimination of moving average terms simplifies better the parameter estimation, with apparently little cost in terms of fitting the model and forecasting ability.

The nonstationary trend component is modeled as a local approximation of a linear trend due to the methodology and computational program constrictions. Innovation in the level of T_t is given by w_t, while innovations in its first difference are given by u_t.

For the model specification we assume the independence between the trend and cycle components; however, this assumption is not always proper. Thus since there is a small correlation between cyclical and external innovations, it is necessary to specify the variance of u_{t+1}, v_{t+1}; Alvarez, et. al. (2000) use variances, which are very small and proportional compared with those described for the initial coefficients in the Kalman filter methodology. Thus, for our particular case, τ is equal to 0.05 and it was used as a constant of proportionality.[92]

The incorporation of the dependent variable, which is lagged in one period, allows us to regress an integrated process model. We adopt a time series approach, whereby the terms of trade (in logs) is regressed on its first lag plus a trend component (Hodrick and Prescott), with λ =4.65 following the approach of Ravn and Uhlig (2001). In this case, the drift term can be the growth rate of terms of trade and it seems to fit

[92] It is important to clarify that the methodology for variable coefficients using recursive residuals matches the Kalman filter with zero variance for the transition equations (State-equations). In this case, the estimate coefficients trajectory is deterministic. When specifying a nonzero variance, the Kalman filter estimates a stochastic path for the coefficient (Alvarez et al. 2000).

the data quite well. However we cannot handle the drift term, since it is an unobserved and a time varying variable.[93]

The estimation of (B.1) was performed individually and estimated for each of the ten countries, the results obtained are fully reported in Table B.1.

From the results of Table B.2, we can see that almost all the coefficients for the lagged variable are statistical significance emphasizing the coefficient of volatility persistence at the end of the period; almost all the coefficients are significant and have the expected sign for the ten countries. However the intercepts are not significant in any case.

Table B.1.
A Kalman filter estimation for volatility

Country	α	β	Akaike info criterion
Argentina	0.006 (0.331)	0.000 (-0.001)	-2.640
Bolivia	-2.772 (-0.382)	0.234 (2.164)	-1.040
Brasil	0.003 0.114	0.516 (4.588)	-2.230
Chile	0.005 (0.147)	0.389 (2.739)	-1.300
Colombia	0.001 (0.050)	0.358 (2.481)	-1.320
Ecuador	0.001 (0.040)	0.397 (3.817)	-1.010
Paraguay	0.000 (-0.015)	0.359 (3.653)	1.530
Peru	0.002 (0.123)	0.305 (1.834)	-2.350
Uruguay	0.000 (-0.008)	0.401 (4.287)	-0.900
Venezuela	0.007 (0.116)	0.516 (2.596)	-0.260

Values in brackets correspond to Z-statistic

The persistence of the lagged variable stresses a clear direct relationship between the coefficient persistence of terms of trade and the rate of volatility. This indicates that the rate of volatility would be major than the previous periods, what also means that the economic costs for an increase of volatility would be worse over time. Consequently, an attempt of trying to reduce the effects to normal levels will induce a higher cost in recessive terms in the current or next year of the decline.

[93] Extended Kalman Filter (EKF) is used for solving nonlinear state space models. Unfortunately, there is no simple way to do it, since the software package 'Econometric Views' can only handle linear state space models. EKF works by linearizing the nonlinear states first and then apply the usual Kalman filter to obtain the solution.

Similarly, if we want to reduce volatility effects minimizing the impact on output, special policies would be necessary to reduce the persistence of commodity prices, such as dismantling the dependence on commodity exports and certainly improving the productivity and exports of non-traditional goods, which is largely linked to correct policies of the public sector.

B.2 Using DP2 to build the Index of Macroeconomics Distortions

Finally, in order to build a synthetic index for macroeconomic distortions, we propose a distance indicator (Pena Distance or DP2) instead of Principal Components Analysis, which is the leading aggregation method used in the literature (e.g. Nuñez and Domínguez, 2007, see Table B.2.). The DP2 approach overcomes several limitations of PCA, including aggregation of variables expressed in different units of measurement, arbitrary weights and duplicate information (e.g. Pena 1977, Ram 1982a, b). In addition, DP2 offers some good statistical properties and allows inter-spatial and inter-temporal comparisons. Table B.2. lists some applications with distance indicators, mainly for quality of life, with the exception of Montero et al., 2010).

- *Combining macroeconomic variables*

Constructing the IMD involves combining different kinds of data available from various countries. The selection of the variables compounding the index is not ad-hoc, since we include those variables which seem more representatives in economic policy during the import-substitution strategy. The objective variables are six key macroeconomic variables: the inflation rate, the interest rates, the price of capital, the average tariff, the depreciation rate of the currency, and the 'black market' premium. We add a long-run dimension, which is missing in the ongoing debate on the consequences of liberalization and stabilization programs.

- *Using DP2 to build the Index of Macroeconomics Distortions*

Finally, in order to build the global synthetic index, we opt to use a distance indicator, the Pena Distance (DP2, hereafter), instead of the more commonly used

PCA.[94] There are a number of drawbacks associated with the use of PCA as an instrument for constructing synthetic indicators.

Firstly, the PCA violates the property of exhaustivity,[95] since a synthetic indicator derived from this method explains only the variance of the first component (which is often used to make a single index), ignoring any useful non-redundant information present in the data due to the orthogonal attribute of the principal components. PCA is called an 'elitist' index (Mishra, 2007) because of its tendency to pick up the subset of highly correlated variables to make the first component. It assigns marginal weights to a relatively poorly correlated subset of variables, and/or relegates the latter subset to the construction of the subsequent principal components.

As stated before, the DP2 allows the inclusion of a great number of variables with different degrees of correlation between them. It is an 'exhaustive' index because uses all the valuable information contained in the partial indicators, eliminating duplicates or redundant variance in the variables.

Secondly, the synthetic index derived from the PCA cannot measure disparities between spatial units and/or periods of time, since it is an ordinary-type indicator; i.e. it is only capable of determining whether the macroeconomic environment in country 'A' is better/worse than in country 'B'. However, the DP2 is a cardinal measure; i.e. it is also capable of determining how much better/worse the macroeconomic environment in country 'A' is with respect to country 'B'. This is because the partial indicators in DP2 are not the raw variables (as in PCA) but simple distance indicators for each raw variable. Therefore, unlike the PCA, the numerical results of a synthetic index obtained with DP2 are quantitatively meaningful, allowing comparisons between units across space and/or time.

Finally, in the PCA synthetic indicator, the weights of the variables are meaningless in terms of macroeconomic stability. They are the factor loadings in the first principal component. In the case of the DP2, the weights of the partial indicators are determined through an iterative algorithm that achieves convergence when the

[94] PCA and DP2 are complementary—not substitute—methods (see Cancelo and Uriz 1994). The PCA is capable of reducing the information of a group of variables and eliminating redundant information. DP2, though, also allows relative comparisons between different spatial units and/or time periods.

[95] As shown in Pena (1977), the DP2 fulfills all the properties of a good composite indicator; i.e. existence and determination, monotony, unicity, invariance, homogeneity, transitivity, exhaustivity and additivity.

indicator fulfills a set of desirable properties. These weights represent the percentage of non-redundant information that each variable contributes to the final IMD index.

As an alternative to PCA, we propose to use Pena Distance (DP2), an iterative procedure that weights partial indicators depending on their correlation with a global index. Its most attractive feature is that it uses all the valuable information contained in the partial indicators eliminating all the redundant variance present in these variables (i.e. avoiding multicollinearity). This method has mostly been used to compute quality of life and other social indicators (see Table B.2). However, we propose its use in another economic fields such as an index of macroeconomic distortions because of its good statistical properties; i.e. multidimensionality, comparability and comprehensibility.

It is a multidimensional indicator capable of aggregating various macroeconomic variables expressed in different measurement units. On the second hand, the index is a quantitative distance indicator, allowing comparisons of the macroeconomic environment across several spatial and/or temporal units, since it relates to a same base or 'ideal' state. Finally, it is an exhaustive indicator and is not based on a mere reduction of information as PCA is. It uses all the 'valuable information' contained in the partial indicators; i.e. it gets the statistical information that is neither false nor duplicate, which can be interpreted using ordinal or better still cardinal scales.

This property allows the inclusion of a great number of variables since all useless redundant variance will be removed by the process itself, so avoiding multicollinearity. The more data are included in the partial indicators (related to the subject matter) the more complete the final synthetic index will be, since each variable always contains unique and specific information that is not present in the others. The DP2 can eliminate all the superfluous common variance selecting only that part of the information that is original.

These properties of DP2 mean that several sources of macroeconomic distortions, such as the black-market premium, can be included in the same synthetic index together with subjective information. Although these data are measured in different units and can contain more or less repeated information, the DP2 distance method will express all of them in comparable abstract units, taking into account the useful variance alone, to the exclusion of all others.

- *The arithmetic of the DP2*

The DP2 involves several iterations or matrix rearrangements. The point of departure of the whole process is a matrix V of order (*K*,*m*), in which *m* is the number of time periods and *K* is the number of partial indicators. Each element of this matrix, v_{kj}, represents the state of the partial indicator *k* in the country *j*. In this matrix, those partial indicators positively connected with macroeconomic distortions must undergo a change of sign (i.e. all their data must be multiplied by -1). Conversely, the variables that are negatively linked (currency depreciation) with the IMD remain unchanged. As a result, an increase/decrease in the values of any partial indicator will correspond to an improvement/worsening of the macroeconomic environment.

In a second stage, we compute a distance matrix D such that each element, d_{kj}, for each spatial unit *j*, is defined as:

$$d_{kj} = \left| v_{kj} - v_{kj}^{*} \right| \qquad \text{B.3}$$

where v_{kj}^{*} is the k^{th} component of the reference base vector $v_j^{*} = \left\{ v_{1j}^{*} \quad v_{2j}^{*} \quad \ldots \quad v_{Kj}^{*} \right\}$ in the census tract *j*. A reference value must be defined for each partial indicator so as to compare different spatial units (countries). For example, in the quality-of-life applications, it is quite common to consider the minimum value as the reference (Vicéns and Chasco, 2001, Somarriba and Pena 2008). As a result, an elevated value in the DP2 index will imply higher macroeconomic distortions, since it implies a greater distance with respect to a theoretical 'undesired' situation. Additionally, this property allows the spatial units to be ranked in terms of macroeconomic stability. Therefore, d_{kj} measures the distance between the partial indicator *k* in the census tract *j* and its reference value.

In a third stage, in order to express all the indicators in comparable abstract units, we compute a first global index, the Frechet Distance (DF), which is defined as:

$$DF(j) = \sum_{k=1}^{K} \frac{d_{kj}}{\sigma_k} = \sum_{k=1}^{K} \frac{\left| v_{kj} - v_{kj}^{*} \right|}{\sigma_k} \quad ; \quad j = 1,2,\ldots,m \qquad \text{B.4}$$

where σ_k is the standard deviation of partial indicator *k*. For each partial indicator, the distance between two spatial units d_{kj} is weighted by the inverse of σ_k. That is to say, the contribution of each d_{kj} to the global indicator is inversely proportional to the standard deviation of its corresponding indicator. This weighting scheme, which

is similar to those used in heteroskedastic models, accords less importance to those distances with more variability, and vice versa.

The DF is a valid concept of distance only in a theoretical situation of uncorrelated indicators. When there is a direct relationship between the partial indicators (as is usual), the DF will include some duplicated information. Therefore, the DF must be corrected so as to eliminate this dependence effect (i.e. the redundant information existent in other variables), which is assumed to be linear. This is why, for each spatial unit *j*, DF is the maximum value that DP2 can reach, which is defined as:

$$DP2(j) = \sum_{k=1}^{K} \frac{d_{kj}}{\sigma_k}\left(1 - R^2_{k\cdot k-1,k-2,\ldots,1}\right) \;;\; j = 1,2,\ldots,m \qquad \text{B.5}$$

where $R^2_{k\cdot k-1,k-2,\ldots,1}$ is the determination coefficient of the regression of each partial indicator *k* on the others (*k*–1, *k*–2,...,1). It expresses the proportion of the variance of *k* that is linearly explained by the remainder of the partial indicators.[96] As a result, the correction factor $(1-R^2_{k\cdot k-1,k-2,\ldots,1})$ deducts the proportion of the variation of the observed values that is explained by the linear dependence. Notice that R^2 is an abstract concept unrelated to the measurement units of the indicators.

The DP2 index implies a decision about the order of entry of the partial indicators into the computation process. That is to say, it must be decided which partial indicator *k* comes first in contributing its variance to the global index, which comes second, etc. In this process, the first indicator (*k*=1) will contribute all its information to the global index (d_1/σ_1). However, the second indicator (*k*=2) will only add that part of its variance that is not correlated with the first indicator: $(d_2/\sigma_2)(1-R^2_{2\cdot1})$. Similarly, the third indicator will contribute to DP2 the part of its variance that is not correlated with either the first or the second indicators: $(d_3/\sigma_3)(1-R^2_{3\cdot2,1})$ and so forth.

Obviously, the DP2 index will adopt different values depending on the decision. Thus, it is important to find an objective hierarchical method that leads to a unique entrance order of the partial indicators. If the DF is a compendium of all the partial indicators, it seems logical to make the selection taking into account the correlation between each partial indicator and the DF. The indicator most closely

[96] If all the partial indicators are uncorrelated, R2=0 and DP2=DF.

correlated to the DF will be the leader given that it is the most informative; i.e. the indicator that contributes most variance to the global index.

The whole process is a four-step procedure that can be summarized as follows:

- First, we compute the DF values for each spatial unit using the Eq. (B.4); i.e. taking into account the reference base vector v^* of minimum values.
- Second, we calculate the correlation coefficients of the partial indicators and the DF to order the former in accordance with their degree of dependence on the latter.
- Third, we compute the DP index (Eq. B.5) considering the previously determined entrance order of the partial indicators. This first global index is called DP-1.
- Fourth, we make a new ranking with the partial indicators in accordance with their correlation degree with the DP-1 index with the aim of re-computing the DP. We call this second global index DP2.
- We repeat this iterative process until a convergence is reached; i.e. the difference between the two contiguous DP indexes is zero. In the case of non-convergent DP values, we can choose the first DP index (or even the average of the final two).

The numerical value of the DP index has no real meaning but it is useful for comparing the state of different spatial units (countries) in terms of macroeconomic instability. We can rank the South American countries according to this criterion. If we use the same variables and method, we can compare our results for this exercise with those obtained for other regions or even at other points of time. The DP2 can be used to compare changes in relative positions and even to detect their causes.

Table B.2. Principal Components Analysis (PCA) and Distance Indicators applications

Synthesis Method	Reference	Indicator	City/area	Period of time
PCA	Prados de la Escosura et al. (2009)	Institutions and growth	Argentina	1875-2000
	Prados de la Escosura et al. (2010)	Economic stabilization and growth	Spain	1939-1975
Distance indicators	Núñez and Domínguez (2007)	Poverty	EU-15 countries	1993–2000
	Ivanovic (1974)	Economic development (I-D)	World countries	1968
	Pena (1977)	Quality of life (DP2)	Spanish provinces	1974
	Vicéns and Chasco (2001)	Quality of life (DP2)	Spanish provinces	1998
	Royuela et al. (2003)	Quality of life (standardized Z-score)	Catalan municipalities (Spain)	1991, 1996-1998
	Montero et al. (2010)	Environmental economics	Madrid	2001

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B.3 Integration and trade among South America

Every trade agreement must complement the Tratado de Montevideo (1980), to improve regional cooperation in Latin America, to find possibilities of trade that do not offer the market today in industrialized countries; secondly, it must carry out a coordinated action to access industrialized countries markets. Regarding international trade, coordination also must be extended to aid with the construction of infrastructure in developing partners; it much can be done in areas such as insurance and reinsurance, sea transport and land, the physical, technological cooperation, joint investments, etc.

Objectives:

- Forming a Free Trade Area between economies, establishing clear and permanent rules for commercial trade, increasing flow of trade and investment and developing employment opportunities to increase population welfare.
- Removing trade barriers to facilitate cross-border movement of goods and services, to promote firm competition, setting and enforcing appropriate rules and intellectual property rights.
- Reducing the vulnerability of exports to unilateral and discretionary.
- Strengthening the domestic industry through a strong and competitive export sector.

1. *Trade in goods, services and investment*

Market Access

- It permits a permanent and secure access to total exports, by reducing gradually tariff and non-tariff barriers, considering preferential treatment to goods originating in the region, with a tendency to promote competitiveness and protection of domestic industry. Moreover, commercial trade may encourage technological innovation and foster the development of new competitive projects. The benefits of the trade agreements are:
- Improving the coordination of production processes, distribution and sale of goods and services in the region, to remove the sale quotas for Mexican and Central American products.

- Developing and establishing a quality certificate of origin policy for non-traditional exports, to protect inventions through patents and trademarks, as well as the geographical origin of the product.

Services

- It provides easy access in cross-border trade such as: construction, professional services, computers, ground transport, telecommunications, port, aviation expertise, repair and maintenance, tourism and access to financial services.

Investment

- Foreign investment through strategic alliances with residents will increase the output productivity going through with access and exchange of new technology and other forms of sectorial associations to promote the regional integration, improving the international competitiveness of the region. Regarding to institutional principles, currently, authorities do not impose trade barriers on foreign investment; on the contrary, they try to find a way to guarantee free money transfer and convertibility of national currencies.

2. *Economic blocs in South America*

Asociación Latinoamericana De Integracion (ALADI)

Trying to continue the rearrangement process and integration efforts first made by the *Asociación Latinoamericana de Libre Comercio* (ALALC) established by the *Tratado de Montevideo* of 1980, a group of Latin American countries (i.e. Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela) signed the Montevideo Treaty in 1980, which established the Latin American Integration Association (ALADI); Cuba joined in 1999. The ALADI objective is to establish long-term, gradually and progressively, a common market Latin America.

The regional association is based on levels of economic development. It recognizes three categories of countries for the implementation of differential treatment in their mechanisms: the least economic development countries (Bolivia, Ecuador and Paraguay), intermediate development (Colombia, Cuba, Chile, Peru,

Uruguay and Venezuela) and the developed countries (Argentina, Brazil and Mexico).

Among the basic functions of the association, the *Tratado de Montevieo* provides and encourage the promotion and regulation of reciprocal trade, economic complementation and development of measures of economic cooperation, that contribute to the expansion of markets. To accomplish these tasks, the ALADI countries undertook to establish regional economic preferences, establishing tariff preferences and regional trade agreements.

Comunidad Andina De Naciones (CAN)

The Andean Community dates back to 1969; initially five South American countries (Bolivia, Chile, Colombia, Ecuador and Peru) signed the *Acuerdo de Cartagena* in order to jointly improve their population standard of living through integration and economic and social cooperation. But in 1976, a founder member, Chile withdrew from it and Venezuela was a member from 1973 until 2006.

Regarding integration and trade, the Andean countries eliminated tariffs on their trade with each other and in 1993 formed a free trade area. This gave a strong boost to trade within the Community, which increased heavily, creating thousands of new jobs. Trade in services was also liberalized, particularly the different modes of transportation.

Areas of action

Social and Political area: The objective is to contribute to national efforts to reduce poverty, exclusion, inequality and asymmetries by promoting civil society participation and boosting actions to deepen political cooperation among countries.

Environment area: To promote sustainable development as a way of responding effectively to global threats to the environment.

External Relations: The CAN's joint external policy projection reinforces the member countries' negotiating capacity and it is favourable to their national interests within the dynamic international context.

Economic and Trade Area: The aim is to consolidate the enlarged market in order to guarantee the unhampered flow of goods and services within the subregion and to contribute to job creation.

Institutional Area: The purpose is to achieve an efficient management of the integration process by means of the General Secretariat.

Mercado Común Del Sur (MERCOSUR)

Argentina, Brazil, Paraguay and Uruguay signed in 1991, the “Treaty of Asuncion”, creating the *Mercado Común del Sur* herein (Mercosur), which is the most important international project in which this sub region are engaged. Thus, during the Tenth Meeting of the Common Market Council (1996), Bolivia and Chile signed the Protocol of Adherence.

In December 1994, at the Ouro Preto Summit, the partner States established a Common External Tariff; the main institutional structure of MERCOSUR is a customs union, which marked important commercial changes to the economies of the sub region.

The primary objective of the Treaty of Asuncion is the integration of the four countries through the free movement of goods, services and factors of production, establishing a common external tariff and adopting a common trade policy; in the same way, it is important to highlight the coordination of macroeconomic and sectorial policies, harmonizing the countries' trade legislation in relevant areas to ensure the strengthening of the integration process.

The MERCOSUR also defined itself as an element of stability in the region, deepening the economic and political ties between member countries and the region, and counteracts the trends towards fragmentation. In that way the "Protocol of Ushuaia", recognizes the validity of democratic institutions as an indispensable condition for development and integration processes.

Objectives

- Firstly, it generates a commitment to set correct national economic policies, ensuring a coordination process and suppress detrimental actions against partners.
- Secondly, the common tariff and trade policy tends to strengthen and reinforce the processes of opening and integration into the regional market.
- Finally, the objectives listed above are able to reduce the risk to invest in the MERCOSUR and therefore, to encourage new foreign investments.

Appendix C

The econometric basis for structural model

Chapter 3

Table C.1 presents the within-country serial autocorrelation that is tested and found in Eq. 1 (Chapter 3), the correlation AR(1) parameter being significantly different for each panel (see Table C.1).

With respect to the variance-covariance structure of the error terms, only groupwise heteroskedasticity is found by the Wald test (37.66). Nevertheless, the Breusch-Pagan test (41.54) accepts the null hypothesis, pointing out the absence of cross-correlations across countries in the error term. Finally, no serial autocorrelation is found in the errors.

Table C.1

AR(1) cross-country coefficient variations. Eq. 1 and Eq. 2 Full models

Country	Growth (Eq. 1)			Investment (Eq. 2)		
	Period 1960-2008	Period 1960-1982	Period 1982-2008	Period 1960-2008	Period 1960-2008	Period 1960-2008
GENERAL	0.3904***	0.1848***	0.3859***	-0.0389	-0.0454	0.0307
Argentina	0.1658	-0.1746	0.9860***	0.1753	-0.1171	0.0170
Bolivia	0.6397***	-0.7970**	0.3424	-0.2695	-0.6228***	0.0785
Brazil	0.2024	-0.5978	0.1773	-0.0404	-0.1870	-0.0868
Chile	0.3458**	0.3231	-0.2314	-0.1971	-0.2302	0.3744
Colombia	0.4311***	-0.9361***	-0.3079	0.1000	0.0053	0.1736
Ecuador	0.0548	-0.6308	-0.3798*	0.2418	0.0742	0.3254
Paraguay	0.4968***	-0.7523**	0.0931	-0.1726	-0.3846	0.0876
Peru	0.2736*	-0.1979	0.8823***	0.1077	0.2467	0.3815
Uruguay	0.4073**	0.1465	0.0947	-0.5575	0.0053	-0.1278
Venezuela	0.3054**	-0.5492	0.9111***	-0.4687	-0.7171**	-0.4750*

*** p<0.01, ** p<0.05, * p<0.1

Chapter 5

We develop a set of econometric tests over our data before to proceed with estimation of equations 1 to 5 (model of table 3 – Chapter 5). Our initial empirical goal is to find a stable long run relationship between each pair of relevant variables, which will permit us to test for causality. First, we investigate the order of integration of different variables (see Table C.2).

Table C.2

Variables in the Structural Model: Order of Integration

Variables (logs)	ADF Test Level	Order of Integration
GDP	-0.83***	I(1)
GFKF	-0.23***	I(1)
FDI	-0.33***	I(1)
Capital Price	-0.27***	I(1)
IMD	-0.25***	I(1)
DEPTH	-0.14***	I(1)
TFP	-1.60**	I(1)

Sources: See the text.

Notes: All the variables are expressed in logs except INVT and IMD. The ADF level tests have been considered with constant and trend in all cases except for GFKF and IMD, which have been considered with only and without constant and trend respectively. The level of significance is in all cases at 1%, except for TFP, which is at 10%.

Since all these variables are integrated of order one, we test the null hypothesis that there is a co-integration relation between IMD and GFKF, GFKF and INVT, IMD and TFP. The results obtained are presented in Table C.3.

Table C.3

Long-run Relationship between Variable Pairs

Pairs of Variables	ADF Test
IMD and *PRICE*	-3.499***
IMD and *TFP*	2.710
PRICE and *GFKF*	-3.923***
RERD and *GFKF*	-3.514***

Sources: See the text.

Notes: All the variables are expressed in logs except INVT and IMD. The ADF level tests have been considered with constant and trend in all cases except for the relationship between IMD and TFP, which have been considered without constant and trend. The level of significance is at 5% (**) and at 10% (***).

A co-integration relationship has been found between these four pairs of variables. Each of these has a common trend and hence, a stable short-run relationship. IMD is affecting positively PRICE, which in turn affects negatively GFKF, TFP and GDP (as we have predicted earlier). These results lead us to develop a Granger causality test between each variable pair using the residuals from the estimation of the long-run equilibrium relationship.

Table C.4

Granger Causality between IMD, PRICE, and TFP

Pairwise Granger causality test		
	Null Hypothesis:	F-statistic
Row 1	*IMD* does not Granger cause *TFP*	5.13
	TFP does not Granger cause *IMD*	0.22
Row 2	*LPRICE* does not Granger cause *GFKF*	0.48
	GFKF does not Granger cause *LPRICE*	1.18
Row 3	*IMD* does not Granger cause *GFKF*	7.00
	GFKF does not Granger cause *IMD*	0.01

Sources: See the text.

Note. The critical values are 5.11 for F-statistic at 95%