

# Are VAT reforms an effective tool for promoting culture? A quasi-experiment in Spain

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## Abstract

Sponsoring culture is a long-term profit-generating investment that public policy makers can achieve by means of Pigouvian subsidy or tax schemes. This paper evaluates the effectiveness of the three VAT reforms implemented between 2012 and 2018 (one tax raise reform and two tax cut reforms) in the cultural sector in Spain. We first provide visual evidence and empirical estimates of the tax shifting and the distribution of the VAT burden between consumers and producers. We then use a regression discontinuity design to assess the causal effects of these VAT reforms on performing acts and cinema consumption (both in the extensive and the intensive margin). Several interesting findings arise from our results. First, we find that producers only passed through 45% of the VAT cut to consumer prices. Second, the effect of the 2017 VAT reduction on performing arts slightly increased the number of households consuming these cultural services, whereas the 2018 tax cut on cinema had no significant effect in the number of moviegoers (extensive margin). Third, the cultural spending per household conditional on participation (intensive margin) increased after the two VAT rate reductions. Finally, we test for asymmetries in pass-through with respect to the 2012 tax raise and we find (i) no evidence of prices responding more strongly to increases than to decreases in VAT, (ii) a symmetric response of the number of households consuming these cultural services, and (iii) an asymmetric response of the average cultural spending conditional on participation.

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## 1. Introduction

Culture was introduced for the first time in the international development agenda in 2015, when the United Nations agreed on the importance of safeguarding and promoting culture as an end in itself. It was acknowledged that culture may serve both as a driver and an enabler of many Sustainable Development Goals, including reduced inequalities, health and overall well-being, the environment, and the promotion of gender equality and inclusive societies. In Europe, in particular, the role of cultural participation on promoting social inclusion has also been put at the core of the political agenda (European Commission, 2017).

From an economic point of view, the consumption of cultural goods and services is associated with positive externalities. When consuming culture, individuals not only benefit themselves but the society as a whole, for example in the form of improved education or literacy (Krashen et al., 2012) or by boosting economic activity and local development (see, e.g., Herrero et al., 2006). However, consumers account for their own benefits derived from culture consumption but tend to ignore the beneficial impact of their individual cultural-services consumption on their fellow citizens. According to the Welfare Economic theory, this myopic individual behavior constitutes a case of market failure, leading to a suboptimal consumed quantity of cultural goods and services. This hypothesis has become a cornerstone of efficiency-based arguments for public support for culture. Indeed, the efficient allocation of cultural goods and services can be restored by introducing an appropriate Pigouvian subsidy/tax scheme that not only stimulates consumers' demand for cultural goods and services but also enhances the accumulation of cultural atmosphere and cultural capital (Cheng, 2006). In other words, cultural externalities can be internalized with an appropriate cultural public policy that boosts individuals' cultural consumption.

VAT is a general indirect tax on the consumption of goods and services throughout the European Union (EU). With some limitations, each EU Member State can decide on VAT rates and establish lists of products and services that can benefit from reduced or super-reduced VAT rates. Reductions of VAT rates have become one of the available and yet controversial tools in cultural policy, as there is only limited agreement on their usefulness. Despite the quantitative importance of VAT as a source of government revenue and the widespread use of sector-specific and general VAT rate reforms in many countries,<sup>1</sup> relatively little attention has been dedicated to this tax. In the specific case of cultural consumption, only a few papers provide evidence of the effect of VAT reforms on final prices and quantities (Ateca-Amestoy et al., 2020; Borowiecki and Navarrete, 2018; García-Enríquez & Echevarría, 2018; Prieto-Rodríguez

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<sup>1</sup> According to the OECD (2020), the value-added tax has become a key source of tax revenues for governments around the world. Limited to less than 10 countries in the late 1960 s, it is today present in 170 countries, including 36 of the 37 OECD member countries, the only exception being the United States although most states within the US employ some form of retail sales tax. VAT raises approximately a fifth of total tax revenues in the countries that make up the OECD.

et al., 2005). There is, however, a growing interest and concern of policy makers to better evaluate the impact of fiscal policy on culture (Nicolas & Gergaud, 2016).

This paper attempts to fill this void by analyzing the economic impact of different VAT reforms in the consumption of cinema and performing arts. Taking Spain as a case study for the analysis, we evaluate the three large VAT reforms implemented between 2012 and 2018 in the cultural sector. On September 1, 2012, as a response to the Great Recession, VAT was raised in Spain. The VAT full-rate went up from 18% to 21%, and cinema and performing arts, which were previously eligible for the reduced rate of 8%, suffered the most remarkable increment in the tax rates and were reclassified to the full-rate of 21%. This abrupt change raised concern and discontent among cultural agents, as they claimed that the measure would reduce the demand for cultural goods and services. According to available data,<sup>2</sup> in 2015 the frequency of participation in cultural activities<sup>3</sup> was low in Spain compared to other European countries, leaving room for policy makers to stimulate the demand for culture through appropriate fiscal policy instruments. Complaints persisted and, as a result, the Spanish government decided to intervene with a two-step VAT reform to broaden the demand for cultural goods and services, reducing the VAT from 21% to 10% for all live performances in June 2017, and from 21% to 8% for cinema in July 2018. Our analysis aims to contribute to the policy debate on the effectiveness of VAT reforms as a fiscal stimulus tool. Thus, we first provide visual and empirical evidence of the pass-through of VAT reforms (*tax-shifting*) to consumer prices and then we econometrically estimate the causal impact of VAT reforms on consumers' behavior. To that aim, we use households' monthly microdata around the time of the two VAT reforms (2017 and 2018) and a quasi-experimental method (regression discontinuity design) to determine the causal impact of tax cuts on consumer prices and cultural consumption, differentiating the effect on participation (*extensive margin*) from the effect on spending per spectator (*intensive margin*). These reforms implied large tax rate changes and provide a large enough variation to estimate precisely their impact on prices and quantities. Finally, we also compare these tax cut results with the previous tax raise in 2012 to test for asymmetries in pass-through and asymmetries in the consumers' response to these price changes, both in the extensive and the intensive margin. This analysis of tax incidence is crucial, as it may have important policy implications in terms of the optimal sales tax schedule and the expected stimulative effect of tax reductions on cultural demand.

Several interesting findings arise from our results. First, we find evidence of less than full pass-through, as entertainment producers and distributors only passed through the 45% of the VAT cut to consumer prices of cinema and performing arts. Second, the effect of the 2017 VAT reduction on performing arts slightly increased the number of households consuming these cultural services, whereas the 2018 tax cut on cinema had no significant effect in the number of moviegoers (extensive margin). As regards the cultural spending per household (intensive margin), the regression discontinuity analysis yield to positive significant effects. Finally, when comparing the results obtained after the 2017 and 2018 VAT cuts (from 21% to 10% and 8%)

<sup>2</sup> Official European Union Statistics on Income and Living Conditions (EU-SILC) 2015 data available at Eurostat indicate that the average cultural participation rate in Spain was 58.5%, below the EU-28 average (63.7%) and far from Nordic (around 85%) and neighboring countries, such as France (77.7%), UK (74.6%), Germany (73.3%) or Portugal (62.7%). According to data from the Spanish Household Budget Survey, households' average cultural spending experienced a 21% fall between 2011 and 2015. Besides, the number of households without cultural spending increased from 2.9 million in 2011–3.7 million in 2015 (19.9% of total households).

<sup>3</sup> Cultural activities include cinema, live performances (theatre, concerts, ballet) and visits to cultural sites (museums, art galleries, historical monuments, and archaeological sites).

with the VAT rate increase of 2012 (from 8% to 21%), we find no evidence of prices responding more strongly to increases than to decreases in VAT. In terms of quantities, we find a symmetric response of the number of households consuming these cultural services, and an asymmetric response of the average cultural spending conditional on participation. In this later case, the 2012 VAT reform did not determine a statistically significant change in household consumption while the 2017 and 2018 VAT reforms increased the average household consumption in both performing arts and cinema conditional on participation.

Our paper makes two main contributions. First, it represents a contribution to the literature in public finance that estimates tax incidence. Studies quantifying the pass through of VAT rate cuts to consumer prices are scant and typically restricted to analysis of single countries (Chirakijja et al., 2009 and Crossley et al., 2014 in the UK, Carare & Danninger, 2008, in Germany, Gaarder, 2018 in Norway, Kosonen (2015) in Finland or Carbonnier (2007) and Trannoy (2011) in France). A notable exception is Benedek et al. (2020), that expands the analysis at the European level. Recent contributions of Benzarti and Carloni (2019) for France, Crossley et al. (2014) for the UK or Borrowiecki and Navarrete (2018) for 17 EU countries also add the consumer behavior to the analysis, as they incorporate the effect of VAT rates cuts on consumption. Nonetheless, the only international previous study focused on the cultural sector is the one by Borrowiecki and Navarrete (2018). For the Spanish case, three empirical studies analyze the impact of VAT reforms on the cultural sector. On the one hand, both Ateca-Amestoy et al. (2020) and García-Enríquez and Echevarría (2018) analyze the effect of the 2012 VAT rate raise in the prices and consumption of cultural goods and services. On the other hand, Prieto-Rodríguez et al. (2005) simulate the effects of three alternative VAT rates cuts on cultural goods consumption. Our paper is the first one to use the 2017 and 2018 VAT rate cuts in Spain as a quasi-natural experiment to analyze the causal impact of indirect taxation on consumer prices, participation and household spending in the cultural sector.

Second, this study contributes to a recent and growing strand of the literature focusing on the asymmetric responses of prices to VAT reforms. Benzarti et al. (2020) finds asymmetric response of prices to VAT changes in selected basic goods in the EU, Carbonnier (2008) finds that prices in some industries in France respond more to VAT increases, while in others they respond more to VAT decreases. Politi and Mattos (2011) evaluate VAT reforms in Brazil on selected food items and find asymmetric responses, whereas the results in Doyle and Samphantharak (2008) point to a symmetric response of prices to a 120-day temporary moratorium on a 5% gasoline tax in Indiana. To the best of our knowledge, our paper is the first attempt in the literature of tax incidence to use quasi-experimental methods to evaluate the asymmetric impact of VAT rates increases and decreases in both prices and quantities in the cultural sector.

The rest of the paper is organized as follows. Section 2 provides an overview of the governments' support for culture consumption and the use of VAT reforms. Section 3 discusses the likely effects of VAT reforms in terms of producer and consumer behavior. Section 4 describes the data. Section 5 presents the econometric identification strategy we use to analyze the extent to which the 2017 and 2018 VAT reductions were passed on consumer prices of performing arts, and whether this price drop led to an increase in the consumption of these cultural goods and services, and discusses the main results. Lastly, Section 6 highlights the main conclusions of the paper in terms of policy implications.

## **2. Why do governments support culture? The fiscal policy tools available in cultural policy**

Cultural consumption has several benefits on individuals' well-being. Cultural attendance improves individuals' physical and mental health (O'Niel, 2010) and it raises happiness (Frey, 2008; Ye et al., 2015). It also enhances cognitive skills and educational growth (Asadullah et al., 2020) which, in turn, leads to financial rewards in terms of higher future earnings (Reeves & de Vries, 2019). But the benefits of individual cultural participation are also present at the community level, as it contributes to the development of better societies with higher social cohesion and higher participation in civil life (Ateca-Amestoy et al., 2013; Campagna et al., 2020). Finally, the cultural sector also enhances local and regional development (Castellani, 2018), both in terms of boosting tourism and the revitalization of places (Bille & Schulze, 2006). The public sector recognizes the benefits of cultural goods and services and supports policies that facilitate their consumption.

Governments' support to the production, distribution and consumption of arts and culture can be achieved through two different channels. On the one hand, they resort to direct financing, generally in the form of grants and subsidies to organizations and sometimes through consumer vouchers. On the other hand, they support culture through tax policies in the form of indirect subsidies, of which two common examples are tax deductions for private supporters of arts and culture or the reduction of the VAT rates for cultural goods and services. In this paper, we will focus on the later.

There is no consensus on which fiscal policy tool is ideal, as it depends on which objectives the government wants to achieve. Furthermore, the economic effects of such policies are not equivalent. For instance, direct subsidies reflect the government's preference for which art should be supported, whereas consumer vouchers reflect more strongly the preferences of the population for cultural services (Frey, 2008). In the voucher system, a certain group of people receive an increase in their income for the consumption of cultural goods and services. By increasing their income, the voucher will stimulate consumption and enable the consumer to make more effective choices. The suppliers of cultural services would have a strong interest to offer cultural services the population appreciate, leading to an efficiency gain in the cultural sector. In addition, vouchers can serve as a welcome means to bring those people who never or rarely attend cultural events to start engaging in it. On the contrary, the beneficiaries of VAT rate reductions are not so clear, as their benefits could be restricted to the population who already consumes culture. As noted in Borowiecki and Navarrete (2018), and because of the indirect nature of the VAT, tax rate reductions cannot be specifically directed towards a desired good, provider or group of consumers. In this sense, reduced VAT rates have been criticized for being an ineffective means to support cultural consumption, mainly because it ignores the consumer's ability to pay. Furthermore, their distributional impact raises a lot of concern amongst policymakers given that, if culture is considered a luxury good and it correlates positively with income (see, e.g., García-Enríquez & Echevarría, 2018 or Prieto-Rodríguez et al., 2005), VAT reductions tend to benefit proportionally more the high-income people. Also note that reduced rates are considered equity enhancing because lowering the final price makes goods and services available for low-income households that would not otherwise have access to that market. This argument requires, however, a full pass-through of the tax cut to consumer prices. Otherwise, this tax reduction would be seen as a merely indirect cultural subsidy to producers, with no direct effect on the demand for culture.

On January 1, 1986, as a requirement for membership to the European Economic Community (EEC), Spain introduced the value-added tax (VAT).<sup>4</sup> Consumption taxes should be uniform to facilitate the functioning of the single market, ensure efficiency, and minimize indirect compliance costs. However, the EU directive that regulates the VAT, 2006/112/EC, allows the existence of reduced and super-reduced tax rates to improve income distribution and, sometimes, to facilitate access of all population segments to specific products. Spain has used this flexibility on VAT rates as a fiscal policy tool regarding cultural goods mainly in three occasions. First, in September 2012, the VAT rate on certain goods, including cultural goods, went up from the reduced-rate of 8% to the full-rate of 21%.<sup>5</sup> Second, in September 2017, the VAT rate on performing arts went down from the full-rate of 21% to a reduced-rate of 10%. Finally, in September 2018, the VAT rate on cinema went down from the full-rate of 21% to a reduced-rate of 8%.<sup>6,7</sup>

### 3. VAT reforms: who pays and who benefits?

#### 3.1. Producer behavior and tax-shifting: the pass-through of the VAT reduction to prices

A reduction on the VAT rate would lead to a reduction of the consumer price (*tax-shifting*) due to a reduction in the cost of the supplier. If the VAT reduction is not passed on to the final consumer prices, the benefit will appear in company profits, rather than in the consumer's disposable income. Producers do not always pass on the full VAT reduction to the consumer. The extent to which this VAT reduction is passed on to consumer prices depends on several other factors. On the one hand, when lowering the VAT rate is perceived to be temporary, the tax-shifting to consumers is lower (see, e.g., [Crossley et al., 2014](#)). On the other hand, the effect of reducing VAT rates on production and employment depends, to a large extent, on the level of competition in the sector. In sectors where competition is limited, the tax cut may be partly passed on to prices, that is, the price cut will be lower than the tax cut and, therefore, the impact on production and employment will be low. Finally, evidence also shows that labor intensive services (present in many cultural activities) tend to *undershift* VAT reductions, since increasing production in order to accommodate to a lower price is harder than to decrease production in response to a higher price [Carbonnier \(2007\)](#).

<sup>4</sup> This was applied throughout the country except for the Canary Islands, Ceuta and Melilla.

<sup>5</sup> In 2012 [see Royal Decree-Law 20/2012 in the Official State Bulletin (BOE, 2012) for more details] the general VAT tax rate was raised from 18% to 21%. The reduced tax rate, which is applied mainly to some types of food and beverages, hotels and restaurants, passenger transport and construction of new homes, among others, rose from 8% to 10%. The so-called super-reduced rate of 4%, which applies to essentials such as vegetables, milk, bread, fruit, pharmaceuticals and books, newspapers, was not changed. As a result of the reform, some cultural goods and services, including public shows, hairdressing services, funeral services, or recreational and sports services, among others, which were taxed at a rate of 8% before the reform, began to be taxed at the general rate of 21%.

<sup>6</sup> Law 3/2017 on General State Budgets of 2017 was published in the BOE on Wednesday, June 28, 2017. The VAT reduction on cinema tickets came into force on July 5, 2018, with the application of Law 6/2018 of General State Budgets of 2018, as published in the BOE on July 4, 2018.

<sup>7</sup> Prior to 2012, minor changes occurred: the tax rate on cultural goods was only slightly modified by one percentage point in 1995 and 2010 but implied no reclassification. In particular, in 1995 tax rates increased from 6% to 7% on tickets to theaters, circuses, amusement parks, concerts and libraries, and from 3% to 4% on the sale of books and newspapers. In 2010, the reduced tax-rate applied to all these items went up to 8%.



### 3.2. Consumer behavior: spending response to price changes

According to the literature, household expenditure on cultural goods and services depends on both individual characteristics and economic variables. On the one hand, individual characteristics such as gender (Kane, 2004; Muñiz et al., 2014), educational attainment (Seaman, 2006; Ateca-Amestoy and Prieto-Rodríguez, 2013; D'Angelo et al., 2010; Machado et al., 2017), labor market participation (Machado et al., 2017; Prieto-Rodríguez et al., 2005), income (Ateca-Amestoy and Prieto-Rodríguez, 2013, Sisto & Zanola, 2010; Falk & Katz-Gerro, 2016), household size and the number of children (Muñiz et al., 2014) are found to be key determinants of cultural consumption. In fact, Van der Ploeg (2006) suggests that indirect tax reductions do not necessarily lead to a more affordable access to cultural goods and services for all individuals because other factors (such as education, leisure opportunity cost, consumer's habits formation, or income level) are more relevant in explaining the consumption of cultural activities. On the other hand, economic variables such as the size of the town of residence (Escardibul & Villarroja, 2009; Prieto-Rodríguez et al., 2005) or the influence of business cycles (Katsuura, 2012) have been found detrimental.

There exists, however, limited research on government support for culture more generally and on indirect support through tax incentives more narrowly. Recent contributions in the field of Cultural Economics also highlight the need to deepen research on the effect of subsidies and tax concessions in the cultural sector (Borowiecki and Navarrete, 2018). For the Spanish case, only a handful of papers have measured consumers' responses to VAT cuts. Prieto-Rodríguez et al. (2005) estimate an Almost Ideal Demand Equations System (AIDS) and make use of microsimulation techniques to predict the effect of a tax cut on these cultural goods. They conclude that the reduction of the VAT rate is regressive because the potential welfare gains are positively related to the ability to pay, to the economic situation and to the household educational level. In the same vein, García-Enríquez and Echevarría (2018) estimate a two-stage Quadratic Almost Ideal Demand Equations System (QUAIDS) and conclude that the VAT rise on cultural services and telecommunications that occurred in 2012 was regressive. Even though high-income levels are associated with higher levels of cultural spending, the reform affected lower income families to a greater extent because spending on these services represents a higher percentage of their total spending. The only paper that evaluates the causal impact of the 2012 VAT rate rise by means of a quasi-experimental approach is Ateca-Amestoy et al. (2020). Their results determine that the reform did not increase the participation on this market (extensive margin) but increased the spending of households that consume cinema and performing arts (intensive margin).

## 4. Data

This research is based on data obtained mainly from three sources. First, in order to study these VAT reforms, we use data on the evolution of the monthly national and regional consumer price index (CPI), built by the Spanish Statistics Agency (*Instituto Nacional de Estadística*—INE). The CPI is a Laspeyres chain index calculated each month. It contains information on approximately 1,000 different goods (462 of traditional collection and 493 of scanner data), classified in 12 groups, 41 subgroups, 92 classes and 199 subclasses. The prices are checked all along the month with different collection methods (personal visits to outlets, email, telephone and internet and scanner

data) in a random sample of 177 Spanish cities. In particular, we use monthly price data of the subclass cinemas, theaters, and concerts<sup>8</sup> at the time of the two VAT reforms (i.e., between January 2017 and January 2019), and we compare its evolution with other price series (general CPI, CPI of cultural services and CPI of museums, libraries, and zoos).

Second, aggregate monthly information on energy prices come from the Industrial Price Index database (base year 2015), and labor costs for cinema and performing arts (average labor costs per worker) are drawn from the Labor Costs Survey.

Third, we rely on the monthly microdata on household spending on cultural goods and services from the Spanish Household Budget Survey (SHBS) for the 2016–2018 period.<sup>9</sup> This survey is published annually, and each wave consists of nearly 24,000 resident households randomly drawn from a sample of census sections selected according to demographic and geographic factors. The interviewed households provide detailed information regarding the nature and destination of their consumption expenses (according to ECOICOP), as well as household characteristics and living conditions such as total disposable income of the household, household head gender and age or household size. Table 1 reports descriptive statistics for the 2016 wave, the year before the VAT rate cut.

## 5. Empirical results

In this section we analyze the effect of reducing VAT for all live performances in June 2017, and for cinema in July 2018. First, we focus on the supplier behavior to quantify the pass-through of the VAT reduction to consumer prices. To that end, we first perform a preliminary analysis to provide visual evidence of the *tax-shifting* and we then turn to the econometric approach to measure it empirically. Second, we focus on the consumers' behavior to determine their response to price changes. In doing so, we implement a regression discontinuity design to identify the causal impact of VAT reductions on consumers' behavior.

### 5.1. Supplier behavior: the effect of VAT reduction on consumer prices

- a) A preliminary analysis of the consumer price index of the subclass cinemas, theaters, and concert halls

Fig. 1 shows nationwide monthly data on four series of the Consumer Price Index (CPI) around the time of the 2017 and 2018 VAT reforms: general CPI; CPI for cultural services; CPI for cinemas, theaters, and concerts; and CPI for museums, libraries, and zoos.<sup>10</sup> The blue

<sup>8</sup> According to the Classification of Individual Consumption by Purpose (ECOICOP classification), which is the national adaptation of the international classification used by Eurostat for budget surveys. As of 2017, there is a change in the classification of products and services to calculate the CPI. The new ECOICOP classification, which replaces the old COICOP classification, allows the generation of price index values at the subclass level. The information is available at <https://www.ine.es/dynt3/inebase/es/index.htm?padre=3470&capsel=3466>. The ECOICOP 9421 code, that we will term as “cinema and performing arts”, includes mainly cinemas, theatres, operas, concerts, ballets, and other musical shows, as well as circuses, light and sound shows, bullfighting activities, and discotheques or public dances.

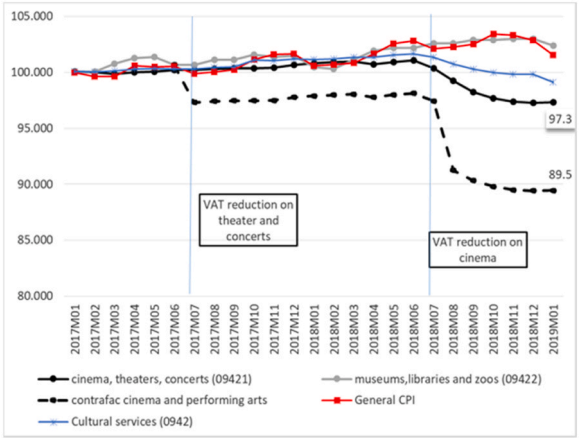
<sup>9</sup> The microdata are freely available on INE's website and are released on a yearly basis. We use a matching file provided by INE that includes the month when the data on the households surveyed in the SHBS were collected, thus providing a series of monthly spending on cultural goods and services between January 2016 and January 2019.

<sup>10</sup> Unfortunately, INE does not provide disaggregated series of CPIs for cinema, theater, and concert consumption and, therefore, these cultural services are analyzed together.



**Table 1**  
Descriptive statistics of the SHBS, 2016.

	Observations	Mean	Std. Dev.	Min.	Max.
Annual household expenditure (euros/year):					
Total expenditure	20,778	29,589.10	17,465.71	1374	299,481
Expenditure 09421	20,778	92.02	420.49	0	16,141
Spectators (participation: 1 =yes, 0 =no)	20,778	0.28	0.20	0	1
Expenditure 09421 if participation= 1	5,743	332.90	748.04	1	16,141
Household size	20,778	2.07	0.78	1	10
Household monthly income	20,778	2,019.90	1,320.48	0	14,001
Head household male	20,778	0.67	0.46	0	1
Head household age	20,778	55.90	15.07	18	85
High density municipality	20,778	0.49	0	0	1
Own elaboration using SHBS data.					



**Fig. 1.** Monthly evolution of the general CPI, CPI for cultural services, (observed and contrafactual) CPI for cinema/ theater and CPI for museums/ libraries. Source: own elaboration using data on CPI provided by INE.

vertical lines reflect the effective dates of the two VAT reforms: June 2017 for performing arts, and July 2018 for cinema. The four price index series evolved similarly until June 2018 but, as of this date, the general CPI and the CPI for museums, libraries and zoos rebounded slightly, whereas the cultural services CPI and, specially, the cinema, theater and concerts CPI fall. This result indicates that the VAT reduction on movie tickets that came into force in July 2018 could have reduced the price of this cultural service.

Fig. 1 also provides the evolution that national cinema prices would have had if producers had fully passed on the decrease in VAT to the prices of the shows (*contrafactual cinema and*

performing arts).<sup>11</sup> As it can be seen, the decrease in the prices of these services would have been much greater if the reductions in the VAT rate had been completely passed on to consumer prices. The difference of the counterfactual conditional series with the observed CPI demonstrates that between June 2017, before the VAT reduction, and December 2018, six months after the decrease in the VAT on cinema services, determines a variation of:

$$\begin{aligned}\Delta Realprice_{cinema/theater} &= CPI_{cinema/theater,dec18} \\ &\quad - CPI_{cinema/theater,jun17} \\ &= 97.3 - 100.2 = -2.9\end{aligned}$$

If the entire VAT reduction had been passed on to the prices, this variation would have been:

$$\begin{aligned}\Delta Realprice^*_{cinema/theater} &= CPI^*_{cinema/theater,dec18} \\ &\quad - CPI^*_{cinema/theater,jun17} \\ &= 89.5 - 100.02 = -10.7\end{aligned}$$

That is, the producers only passed on 27.2% of the VAT reduction to the price of the shows, calculated as follows:

$$\begin{aligned}Pricetransfer &= \frac{\Delta Realprice_{cinema/theater}}{\Delta Realprice^*_{cinema/theater}} = -2.9/-10.7 \\ &= 27.2\%\end{aligned}$$

a) *Tax-shifting: An econometric estimation of the percentage of price reduction passed through to consumers*

We follow [Carbonnier \(2007\)](#) to estimate the share of the price reduction that is passed on to consumers as a result of the VAT. The VAT is an ad valorem sales tax that is applied to the

<sup>11</sup> This series has been obtained by multiplying the tax base of these cultural products before the initial reform comes into force (in June 2017) by the CPI increase between June and July 2017. To consider that the cinema did not experience a tax change until July 2018, the percentage of expenditure on cinema consumption with respect to the total expenditure on cultural consumption is applied (68%, according to MCUD data):

$$\begin{aligned}Price^*_{jul17} &= \frac{Price_{jun17}}{1 + VAT\ rate} \times CPI_{jun17/jul17} \times \left( 1 + \underbrace{(0.21 \times 0.68)}_{VAT\ cinema\ (no\ change)} \right. \\ &\quad \left. + \underbrace{(0.1 \times (1 - 0.68))}_{VAT\ theater-music} \right)\end{aligned}$$

This formula makes it possible to generate the discontinuous series of [Fig. 1](#) for July 2017. Then, under the assumption that no significant changes had affected the price after the VAT reduction, the CPI of the original series from the INE until July 2018 is applied. The price of these cultural services would have been had the entrepreneurs passed on the entire VAT reduction to the prices of cinema tickets is:

$$Price^*_{jul18} = \frac{Price_{jun18}}{1 + VAT\ rate} \times CPI_{jun18/jul18} \times (1 + 0.1)$$

price before taxes. The price before tax is  $\frac{p}{1+\tau}$ , where  $p$  is the sale price, and  $\frac{\tau p}{1+\tau}$  is the tax amount. The consumer price variation, resulting from the tax variation, is  $\frac{dp}{d\tau}$ , and the amount of the price passed on to consumers is  $\frac{d\left(\frac{p}{1+\tau}\right)}{d\tau}$ , which is  $\frac{\frac{dp}{d\tau}(1+p)-p}{(1+\tau)^2}$ ; that is, the amount of the price passed on to consumers is:

$$s = \frac{(1+\tau)}{p} \frac{dp}{d\tau} \left( \frac{1+\tau}{1+\tau \left( \frac{(1+\tau)}{p} \frac{dp}{d\tau} \right)} \right) \quad (1)$$

The parameter “ $s$ ” is the output of the function  $f: x \rightarrow x \frac{1+\tau}{1+\tau x}$  when  $x = \frac{(1+\tau)}{p} \frac{dp}{d\tau}$  is the argument. This is a bijective function from  $\mathbb{R}^+ \rightarrow \mathbb{R}^+$ , strictly increasing with respect to  $x$ , with only two fixed points at 0 and 1. Therefore, if  $x = \frac{(1+\tau)}{p} \frac{dp}{d\tau}$  is lower than 100%, so is the percentage of tax variation that is passed on to the consumer. The effect of the characteristics of the market of cultural goods and services on the variable  $x = \frac{(1+\tau)}{p} \frac{dp}{d\tau}$  as a proxy for the percentage of price variation that is passed on to consumer prices is assessed below. In a situation of perfect competition, this variable is given by:

$$x = \frac{\epsilon_o}{\epsilon_d + \epsilon_o} \quad (2)$$

where  $\epsilon_o = \frac{p}{O} \frac{\partial O}{\partial p}$  is the supply elasticity, and  $\epsilon_d = -\frac{p}{D} \frac{\partial D}{\partial p}$  is the demand elasticity. Eq. (2) shows that in perfect competition, consumer participation increases with the supply elasticity, decreases with the demand elasticity, and is always lower than 100%. In situations of imperfect competition, the percentage of price reduction passed on to the consumer may be higher than 100%, that is, the change in consumer prices is greater than the tax variation. In most markets, the percentage of the change that is passed on to consumer prices is lower than 100%, that is, the tax changes modify the prices to a lesser extent than the tax change.

The parameter “ $s$ ” is estimated around July 2017 and 2018 for the market of cinema and performing arts. First, proxy  $x$  of parameter “ $s$ ” is estimated using the operator  $\Delta_t(X) = \frac{X_t - X_{t-1}}{X_{t-1}}$ . The following equation is estimated:

$$\Delta_t p_{cultu} = \sum_{i=1}^4 \alpha_i \Delta_{t+1-i}(1+\tau) + \beta \Delta_t p_{gen} + \sum_i \gamma_i \Delta_t X_{it} + u_t \quad (3)$$

where  $p_{cultu}$  is the CPI of cinemas and shows;  $p_{gen}$  is the general CPI; and  $X_{it}$  is a matrix of control variables that collects production costs (i.e., the energy price index and labor costs in cinema and performing arts). The price data used in this analysis are the monthly national prices of the three years around the reforms, and Eq. (3) is estimated assuming the existence of heteroskedasticity and autocorrelation. The sum of the estimates of  $\alpha_i$  is equal to proxy  $x$ . According to Eq. (1), this regression makes it possible to estimate the percentage of price reduction passed on to consumers, which is calculated as follows:

$$s = f\left(\sum_{i=1}^4 \alpha_i\right) = \left(\sum_{i=1}^4 \alpha_i\right) \left(\frac{1+\tau}{1+\tau \sum_{i=1}^4 \alpha_i}\right) \quad (4)$$

**Table 2**

GLS results for consumer shares.

	Estimated coefficient
Change in VAT rate during the first month ( $\alpha_1$ )	0.119 ***
Change in VAT rate during the second month ( $\alpha_2$ )	0.170 ***
Change in VAT rate during the third month ( $\alpha_3$ )	0.109 ***
Change in VAT rate during the fourth month ( $\alpha_4$ )	0.061 *
Passed on to consumers <sup>+</sup>	0.458
Number of observations	34
R <sup>2</sup>	0.580

Notes: Generalized Least Squares estimation results for Eq. (3). \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels; <sup>+</sup> is calculated as the sum of the coefficients up to the last significant decimal, according to Eq. (4), including other X regressors (energy price and cinema or theater labor costs). Monthly national data on CPI and production costs obtained from the Industrial Price Index dataset and the Labor Costs Survey (both available at the Spanish Statistics Agency's website).

The results in Table 2 indicate that 45.8% of the tax reduction was passed on to consumers. Since the tax rate decreased by 11% points (from 21% to 10%), the consumer price index decreased by 5% points. Furthermore, the significance level of these results is very high, suggesting that the calculations for determining this percentage are very precise. The price reduction had been passed on to consumers relatively fast, as the level of significance falls from the fourth month after introducing the reform.

This result points to a non-excessively high degree of competition in the market for cultural goods and services because the tax reduction passed on to consumers is 45.8%. Market power in this industry could explain that the benefit from the tax cut is not totally transformed over to the consumer but partially retained by the supplier. Anti-competitive practices among suppliers to set (almost) uniform-pricing in movie theaters could also explain this *undershifting*. This result is also in line with previous evidence arguing that labor intensive services (present in many cultural activities analyzed here) tend to *undershift* VAT reductions, since increasing production in order to accommodate to a lower price is harder than to decrease production in response to a higher price (Carbonnier, 2007).

## 5.2. Consumer behavior: the effect of VAT reduction on the number of spectators (extensive margin)

A review of the literature highlights that the econometric analysis of the causal impact of VAT reforms on the consumption of cinema and performing acts have mainly used two different approaches: estimating demand equations (Prieto-Rodríguez et al., 2015; García-Enríquez & Echevarría, 2018) and applying quasi-experimental methods (Ateca-Amestoy et al., 2020). The main limitation of estimating demand equations is the need for highly disaggregated information on prices and quantities, which is often unavailable.<sup>12</sup> Furthermore, in estimating demand equations for cultural activities, the effect of price variations is difficult to isolate because they are usually observed in conjunction with other supply factors, such as changes in

<sup>12</sup> For instance, there is no disaggregated price level information for the consumer category ECOICOP 09421 (Cinema and live shows), which makes it impossible to estimate the demand equation for each of the goods included in this heading.

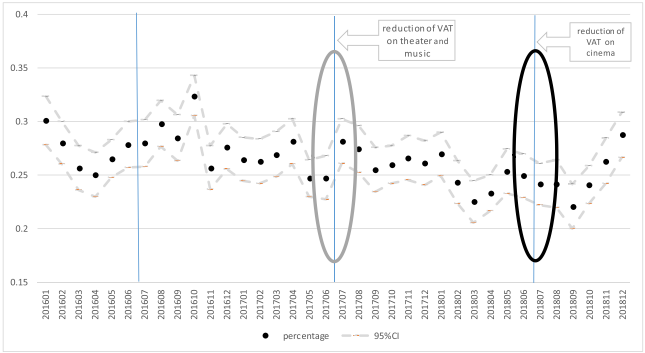
the location of performances, showtimes or work distribution, among others. The strong assumptions about individual behavior, functional form, and distributional aspects are another limitation of estimating demand equations. The estimation of the price elasticity of demand may reflect the price in the inelastic interval of the demand curves or may be conditioned by the use of aggregate data, which prevent differentiating the effects of prices of different goods and services. These limitations explain the wide range of variation in price elasticities estimated in the literature. Seaman (2006) reviews the estimated values in the literature for price elasticity and income elasticity and concludes that there is a similar number of estimates that place them both above and below unity. Along the same lines, Lévy-Garboua and Montmarquette (2011) argue that the luxury nature of cultural goods is not based on empirical estimates; rather, it is a theoretical conjecture. And Legoux et al. (2014) by means of a meta-analysis conclude that the price elasticity of the performing arts has increased in the last five decades.

On the other hand, quasi-experimental methods require fewer assumptions, with no need for estimating the price elasticity of demand. Under this approach different methodologies have been used: natural experiments (Brodaty, 2016), difference-in-differences and matching methods (Ateca-Amestoy et al., 2020), or randomized controlled trials (Thomas, 2016), among others. To isolate the effect of tax variation on the consumption of goods and services, these methods exploit the source of exogenous variation because the dramatic change in VAT rate affects all potential consumers and all art forms equally.

In this section we employ a regression discontinuity design and household monthly microdata from the SBHS to study whether the 2017 and 2018 VAT reforms led to changes in cinema and performing arts consumption. The effect of the tax reform is analyzed first on the extensive margin (logarithm of the number of spectators) and then on the intensive margin (average spending on cultural goods per spectator).

As noted before, in 2012, the VAT rate on cultural goods went up from the reduced-rate of 8% to the full-rate of 21%. A few years later, the government decided to intervene to stimulate the demand for cultural goods and services, reducing the VAT dramatically from the full-rate of 21 to a reduced-rate of 10% for all live performances in June 2017, and from the full-rate of 21 to a reduced-rate of 8% for cinema in July 2018. Our regression discontinuity design allows us to evaluate whether significant changes in the level of cultural consumption occurred in the months immediately after the 2017 and 2018 tax reforms in comparison with the months before the legislative changes. Around those times, the selection biases are expected to be negligible and, therefore, an estimate of the impact with good statistical properties is obtained. The effects of the VAT reform can be estimated by regression discontinuity with cumulative cut-off points, where households receive different treatments or different doses of the same treatment for different ranges of the execution variable. Individuals receive treatment 1 if  $X_i < C_1$ , treatment 2 if  $C_1 < X_i < C_2$ , and so on until the last treatment in  $X_i > C_J$ . Households that consumed cinema and performing arts in July 2017 had a reduction in VAT on shows (but not cinema), whereas households that consumed cultural goods and services in July 2018 benefitted from an additional decrease in VAT on cinema, that is, an increase in the treatment dose.

We first present regression discontinuity graphical evidence to intuitively illustrate the discontinuous change in our outcome variable across the policy thresholds. We use microdata on monthly household spending on cultural goods and services to construct a dichotomous



**Fig. 2.** Monthly evolution of the proportion of households with spending on cultural services, with average (points) and at 95% confidence interval (dashed gray lines) Own elaboration using SHBS survey data.

variable  $I(Spending_{ht} \geq 0)$  that indicates whether household “ $h$ ” at time “ $t$ ” has spent money on these cultural services. Fig. 2 depicts the percentage of households that spent some money on cultural services ( $Phspencult_t$ ). During the months of the 2016–2018 period ( $t = 1.36$ ), approximately 22% and 30% of the households consumed cultural goods related to cinema and performing arts, respectively.

There is a break in July 2017, as the percentage of households consuming culture after this date is clearly higher than in the months prior to the VAT reduction. There are not significant differences observed between the percentage of households consuming culture before and after the 2018 VAT decrease. However, this visual approximation is not sufficient to determine whether the change in tax rates entailed a change in households’ consumption behavior.

Next, we present the methodology that allows us to calculate two impacts for the two periods when the change in VAT rate occurred:

a) The effect of the July 2017 reduction of the VAT rate on consumption:

$$\begin{aligned} Impact_{July17} = & \underbrace{\lim_{+July\ 17} Phspencult_t}_{\% \text{ households that consume culture after the VAT cut (July 17)}} \\ & - \underbrace{\lim_{-July\ 17} Phspencult_t}_{\% \text{ households that consume culture before the VAT cut (July 17)}} \end{aligned} \quad (5)$$

that is, the study observations are those enclosed in the grey circle of Fig. 2, and

b) The effect of the July 2018 reduction of the VAT rate on consumption:



$$\begin{aligned}
 \text{Impact}_{\text{July}18} = & \underbrace{\lim_{+ \text{July } 18} \text{Phspencult}_t}_{\% \text{ households that consume culture after the VAT cut (July 18)}} \\
 & - \underbrace{\lim_{- \text{July } 18} \text{Phspencult}_t}_{\% \text{ households that consume culture before the VAT cut (July 18)}}
 \end{aligned} \quad (6)$$

that evaluates the impact that a reduction in VAT on cinema had on the number of households that consumed this type of cultural services in 2018 (black circle in Fig. 2).

To assess the impact of these two tax reforms on cultural participation we use the non-parametric approximation developed by [Calonico et al. \(2014, 2015\)](#) with two types of treatment associated with the regulatory changes of July 2017 and July 2018. These treatment values are defined as  $d_j$ ; thus, the treatment variable is given by  $D_i \in \{d_1, d_2, \dots, d_J\}$ , and under standard regularity conditions, the impact around each cut-off point “ $j$ ” is  $\alpha_j$ <sup>13</sup>:

$$\begin{aligned}
 \alpha_j = E(Y_i(d_j) - Y_i(d_{j-1}) | X_i = c_j) = & \lim_{x \downarrow c_j} E(Y_i | X_i = x) \\
 & - \lim_{x \uparrow c_j} E(Y_i | X_i = x)
 \end{aligned} \quad (7)$$

where  $X_i$  is the month when families buy cultural goods and services ( $i = 1, \dots, 36$ );  $Y_i$  is the outcome variable that measures the impact, which is 1 if the family has spent money on cultural goods and 0 otherwise; and the cut-off time points where the impact of the reform is evaluated are  $c_1 = 19$ , for July 2017 and  $c_2 = 31$  for July 2018.<sup>14</sup> [Table 3](#) outlines the values of the non-parametric estimator of the impact of the VAT rate change on the two dates analyzed in this study.<sup>15</sup> The results show that the 2017 VAT rate reduction increased the number of households that consumed shows by 5.3% points with respect to a hypothetical situation in which the tax rates had not been lowered. That is, the 11% points decrease in VAT rate translated into a decrease in prices, which increased the number of households that consumed cultural goods and services by 5.3% points. However, the findings regarding the 2018 reform are not significant and, therefore, the VAT reduction on cinema failed to increase the number of spectators. As noted in [Ateca-Amestoy et al. \(2020\)](#), the increasing availability of affordable close substitutes

<sup>13</sup> Unlike the case with multiple non-cumulative cut-off points, the population is not partitioned, so that each observation can be used to estimate two different treatment effects (but contiguous in the dimension of the score, in our case the month of consumption). For example, units receiving treatment doses  $d_j$  are used as “treated” (that is, above the  $c_j$  limit) when estimating the impact at the first cut-off, which we called  $\alpha_j$ , but they can also be used as “controls” when estimating the impact at the next cut-off point,  $\alpha_{j+1}$  (that is, below the  $c_{j+1}$  limit). It is possible that this affects the independence of the specific estimators used at the different cut-off points, although this dependency problem disappears asymptotically while the bandwidths used around each cut-off point decrease with the size of the sample. Meanwhile, the bandwidths can be chosen so that they do not overlap and thus, guarantee that the observations are used only once.

<sup>14</sup> Another possibility is to calculate an estimator of  $\alpha_j$  using the classical approximation by [Hahn et al. \(2001\)](#) and [Porter \(2003\)](#) and a nonparametric approach of local polynomials based on kernels on both sides of threshold  $c_j$ . These nonparametric regression estimators are particularly suitable for inference in the regression discontinuity design for their good properties at the limit of the regression support (see [Fan & Gijbels, 1996](#)). These results are very similar to those presented in [Table 7](#), and available upon request from the authors.

<sup>15</sup> For space reasons, we only present the results of the variable that captures the significance of the reforms. The complete set of results is available upon request from the authors.

**Table 3**

Estimation of the impact of VAT rate reduction on cultural consumption. Non-parametric RD results.

	Estimate	p-value
$Impact_{jul17}$	0.053	0.001
$Impact_{jul18}$	-0.020	0.383
$Impact_{july16}$	-0.03	0.15

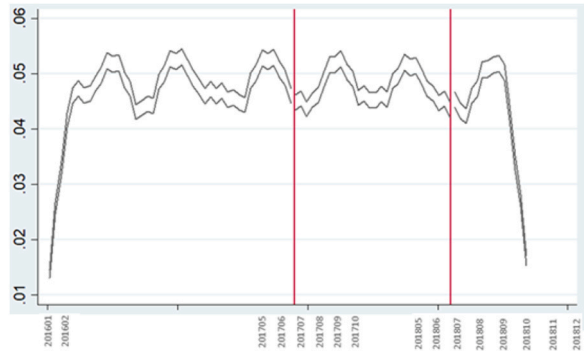
for cinema, such as TV watching, online consumption of audiovisual content (Netflix, HBO, etc) or illegal downloads could help explain this last result.

The validity of estimating the impact of a public intervention using the regression discontinuity evaluation method depends on fulfilling a set of assumptions. Thus, the results are subjected to a robustness check analysis by testing for falsification, absence of manipulation, and balanced sampling. The falsification (or placebo) test analyzes whether the discontinuity exploited to assess the causal impacts of a VAT rate reduction was caused by the regulatory changes of July 2017 and 2018. To test this hypothesis, a false cut-off point, for example, July 2016, is used. As outlined in Table 3, no significant changes occurred in July 2016.

The test of absence of manipulation determines whether households can accurately manipulate the value of the score they receive. When individuals can decide their position around the threshold—July 2017 and July 2018—the estimates calculated using the regression discontinuity technique do not have the desirable properties. If households cannot precisely manipulate the consumption of cultural goods and services, a similar number of observations should be identified before and after the reform date. Conversely, if household units had the power to affect their score and they knew that the treatment was beneficial, we should expect more people just above (where treatment is received) than below the cut-off. In other words, some people decide to postpone (or bring forward) the consumption of cultural services to gain benefits from it. The implications of this type of manipulation are observed in the proportion of individuals around July 2017 and July 2018, which is discontinuous (Lee, 2008; McCrary, 2008). However, given the design of this policy and the data collection process of the SBHS, this type of behavior is highly unlikely to have occurred. We test the null hypothesis that the density of the variable is continuous at the cut-off points.<sup>16</sup> Fig. 3 presents the estimation, using non-parametric methods, of the density function (95% confidence intervals) of the households surveyed in each of the months in which the SBHS is carried out, and confirms its continuity around the cut-off points. We formally examine the degree of manipulation by applying the McCrary test (McCrary, 2008). The resulting p-values are higher than 10%; thus, the assumption of continuity of the density function is accepted.

Lastly, the balancing test analyzes whether there are significant differences in other individual characteristics around July 2017 and July 2018. If so, the inherent identification problem would preclude us from assessing whether differences in the percentage of households that consumed culture resulted from the tax reform or from differences in characteristics between the two groups. This test compares differences between the means around the study cut-off points. Table 4 outlines the p-values from the tests for the explanatory variables used in the

<sup>16</sup> See Horowitz (2001) for more details.



**Fig. 3.** Non-parametric estimator of the density function. Notes: 95% confidence intervals. Red vertical lines denote the two VAT rate cuts (19 associated with July 2017 and 31 associated with July 2018).

**Table 4**  
p-values of the test for differences between means around the cut-off points.

Variable	July 2017	July 2018	Variable	July 2017	July 2018
Household head gender *	0.24	0.42	Castile La Mancha	0.26	0.22
High density Municipality <sup>+</sup>	0.38	0.45	Catalonia	0.59	0.90
Household size	0.60	0.11	Valencian Community	0.19	0.16
Household head age	0.27	0.76	Extremadura	0.36	0.25
Log of annual household income	0.23	0.11	Galicia	0.16	0.35
Andalusia	0.69	0.86	Madrid	0.64	0.87
Aragón	0.11	0.37	Murcia	0.94	0.91
Asturias	0.27	0.83	Navarra	0.40	0.88
Balearic Islands	0.98	0.21	Basque Country	0.80	0.55
Cantabria	0.76	0.58	La Rioja	0.61	0.39
Castile and León	0.73	0.35			

Notes: \* Dummy variable equal to 1 if the household head is male, 0 otherwise; <sup>+</sup> Dummy variable equal to 1 if the home is in a municipality with more than 20,000 inhabitants, 0 otherwise; <sup>~</sup> Household size is measured using the OECD method.

analysis. All p-values are higher than 10%; that is, no significant differences in these variables are found around the cut-off points of July 2017 and July 2018.

The results from the non-parametric approximation presented above could be biased if the consumption of cultural goods and services showed high seasonality. Alternatively, the parametric approach, by imposing an explicit functional form, makes it possible to remove the effects of seasonality or cycle and of other variables concerning the impact of the tax reform. As a further robustness check, we evaluate the impact of the 2017 and 2018 tax reforms using the regression discontinuity method with a parametric approach (Lee & Lemieux, 2010). The following equation is estimated:

$$I(Spending_{ht} > 0) = \beta_0 + \beta_1 D_{1t} + \beta_2 D_{2t} + m(t) + \gamma X_{it} + \mu_{month} + \delta_{region} + U_{ht} \tag{8}$$

The dependent variable of the model is a dichotomous variable that takes value 1 if the family has consumed cultural services in that month and 0 otherwise;  $\beta_0$  is a constant; and  $D_{1t}$  and  $D_{2t}$  capture the impact of the tax reform on the consumption of cultural goods and services:

$$D_{1t} = \begin{cases} 1 & \text{if } t \geq \text{Jul } 2017 \\ 0 & \text{otherwise} \end{cases} D_{2t} \\ = \begin{cases} 1 & \text{if } t \geq \text{Jul } 2018 \\ 0 & \text{otherwise} \end{cases} \quad (9)$$

$m(t)$  is a monthly function of time, which captures the non-linearity of the time effects:

$$m(t) = \beta_3 t + \beta_4 t^2 + \dots + \beta_5 t^5 + \beta_6 t^6 \quad (10)$$

Any other type of specification that better adjusts to the underlying behavior of the data can

thus be defined. The variable  $t$  is a counter that is given by:  $t = \begin{cases} 1 & \text{if } t = \text{Jan}2016 \\ 2 & \text{if } t = \text{Feb}2016 \\ \dots & \dots \\ 19 & \text{if } t = \text{Jul}2017 \\ \dots & \dots \end{cases}$ .

The term  $\mu_{\text{month}}$  reflects the seasonality of the series; the term  $\delta_{\text{region}}$  captures the heterogeneity of the region (Autonomous Community); the vector of variables  $X_{it}$  contains the household characteristics, such as household head age and sex, whether the municipality of the household has high population density, and household income and size.  $\beta_1$  and  $\beta_2$  identify the causal impact of the VAT reduction in July 2017 and July 2018 on household spending, respectively, and  $U_{it}$  is a zero mean random disturbance.

**Table 5**  
Parametric approach: marginal effects of the logit estimation.

Variable	dy/dx	Std. Err.	Variable	dy/dx	Std. Err.	Variable	dy/dx	Std. Err.
$D_{1t}$	0.04	0.02	Andalusia	-0.03	0.01	February	0.01	0.01
$D_{2t}$	0.00	0.02	Aragón	-0.03	0.01	March	0.01	0.01
$t$	-0.06	0.02	Asturias	-0.14	0.01	April	0.01	0.01
$T^2$	0.02	0.00	Baleares	0.15	0.01	May	0.01	0.01
$t^3$	0.00	0.00	Cantabria	-0.08	0.01	June	0.02	0.01
$t^4$	0.00	0.00	Castilla León	-0.05	0.01	July	0.02	0.01
$t^5$	0.00	0.00	Castilla la Mancha	0.03	0.01	August	0.03	0.01
$t^6$	0.00	0.00	Catalonia	0.00	0.01	September	0.00	0.01
Household head gender*	-0.03	0.00	Valencia	-0.08	0.01	October	0.02	0.01
High density municipality <sup>+</sup>	0.03	0.00	Extremadura	-0.01	0.01	November	0.00	0.01
Household size <sup>~</sup>	0.13	0.00	Galicia	-0.09	0.01	December	0.01	0.01
Household head age	0.00	0.00	Madrid	0.15	0.01			
Log. annual household income	0.06	0.00	Murcia	-0.03	0.01			
			Navarra	-0.01	0.01			

Notes: \* Dummy variable equal to 1 if the household head is male, 0 otherwise; + Dummy variable equal to 1 if the home is in a municipality with more than 50,000 inhabitants, 0 otherwise; ~ Household size is measured using the OECD method; Dichotomous variable for regions that takes value 1 if the household resides in that region, 0 otherwise; Dichotomous variable for months that takes value 1 for that month, 0 otherwise.

**Table 6**  
Causal impact of VAT rates discounts on cultural goods and services.

	Estimation	p-value
$Impactspen_{jul17}$	0.501	0.002
$Impactspen_{jul18}$	0.362	0.013

The results are presented in Table 5. Only  $\beta_1$  significantly differs from zero; that is, the results confirm that the 2017 tax cut increased the number of households that consumed cultural services. However, in 2018, no relevant effect is observed. These results are robust to the impact estimates calculated using non-parametric methods.

### 5.3. Consumer behavior: the effect of VAT reduction on household spending (intensive margin)

We first estimate the impact of VAT rate cuts on household cultural spending using the non-parametric techniques developed by Calonico et al., (2014, 2015). It is necessary to test whether the difference in average household spending on culture around the cut-off points is significant. The effect on household spending on culture due to the reduction in VAT rates in July 2017 is expressed as:

$$\begin{aligned}
 & Impactspen_{July\ 17} \\
 &= \underbrace{\lim_{+July\ 17} logspencul_t}_{\text{average household spending on culture after the VAT cut (July 17)}} \\
 &- \underbrace{\lim_{-July\ 17} log\ spencul_t}_{\text{average household spending on culturae before the VAT cut (July 17)}}
 \end{aligned} \tag{11}$$

and similarly, for July 2018:

$$\begin{aligned}
 & Impactspen_{July\ 18} = \underbrace{\lim_{+July\ 18} logspencul_t}_{\text{average household spending on culture after the VAT cut (July 18)}} \\
 &- \underbrace{\lim_{-July\ 18} logspencul_t}_{\text{average household spending on culture before the VAT cut (July18)}}
 \end{aligned} \tag{12}$$

The results indicate that the VAT cuts of July 2017 and July 2018 increased the average household spending on cultural goods and services by 50.1 and 36.2 logarithmic points, respectively, in comparison with a hypothetical situation in which tax rates had not been lowered (Table 6). The tests of falsification, absence of manipulation, and balanced sampling ensure the robustness of the impact estimation method.<sup>17</sup>

<sup>17</sup> For reasons of space, we do not present these results; however, they are available upon request from the authors. The test of falsification does not allow us to reject the null hypothesis of absence of impact in July 2016 (p-value 0.83). The test of absence of manipulation around threshold values shows no significant differences in the number of beneficiaries

**Table 7**

Causal impact of 2012 VAT reform on cultural goods and services.

	Estimation	p-value
Extensive margin: $Impact_{sept12}$	-0035	0,04
Intensive margin: $Impact_{sept12}$	-0039	0,74

#### 5.4. Testing for asymmetric responses to VAT increases and decreases: the case of the 2012 reform

We first compare our results on the pass through of the VAT rate cut in 2017 and 2018 with the results obtained in previous empirical studies analyzing the effect of the 2012 VAT rate increase on aggregate cultural consumption in Spain. On the one hand, [García-Enríquez and Echevarría \(2018\)](#) estimate that the percentage of the 2012 VAT reform on cinema and performing arts that was passed on to consumer prices was 31.4%. On the other hand, [Ateca-Amestoy et al. \(2020\)](#) determine that, as a result of the 13% of tax rate increase in 2012, the CPI for the aggregate of cultural goods and services in Spain rose an unprecedented 6.93%, leading to a pass through of 53,3%. It is important to note that CPI for cultural services includes items whose VAT rate only increased 2 or 3% points because of the 2012 tax reform and others that are VAT exempt. It could be the case that the price index for cinema and performing arts increased even more than the CPI for cultural services and, consequently, the pass through on prices could have been higher. These results denote that there seems to be no significant difference in pass-through between reforms that rise the VAT rate from the ones that reduce it.<sup>18</sup>

Next, we analyze if tax rate increases and decreases on cinema and performing arts produce symmetrical effects on household participation and consumption. To that aim, we implement the regression discontinuity approach to the 2012 VAT reform and compare the results to those obtained for the 2017 and 2018 reforms ([Tables 5 and 6](#)). Results in [Table 7](#) state that the effect of the 2012 VAT rise, from 8% to 21%, was statistically significant in the extensive margin, causing a 3.5% points reduction on the number of households consuming cinema and performing arts. However, the effect was not statistically significant in the intensive margin and, therefore, it did not affect the average consumption of cinema and performing arts conditional on participation.

(footnote continued)

around the cut-off points. The test of balanced sampling shows no significant differences in variables around the cut-off points of July 2017 and 2018. Lastly, the tests of balanced sampling with respect to the other variables do not reject the null hypothesis of the absence of significant differences around the cut-off points given by the two dates analyzed. Note that these results are robust to the use of parametric methods and are also available upon request from the authors.

<sup>18</sup> In addition, the pass-through parameter is close to the average values obtained for the set of all sectors in the economy, i.e., not only cultural goods and services. [Bank of Spain \(2012\)](#) reports that the estimated pass-through rate for the Spanish VAT reform in 2012 would be around one-third of the total impact potential. And [Benedek et al. \(2020\)](#), estimates that, for the 17 Eurozone countries and the period 1999–2013, the pass-through parameter ranges between 29% and 40% depending on the econometric specification. One aspect in which our results differ from the ones in [Benedek et al. \(2020\)](#) is that they conclude that pass through to consumer prices is essentially zero for reclassifications between VAT rate categories. However, our results are in line with those obtained by other studies that analyze reclassification of different class of goods and services from full to reduce VAT rates in France and Finland, for which pass through estimation was between 40% and 70% ([Kosonen, 2015](#); [Trannoy, 2011](#)).



The reclassification of performing arts in 2017 from the full-rate of 21% back to the reduced-rate of 10% seems to have had a symmetric effect on participation when compared to the 2012 VAT reform. The 2017 VAT reform determined a 5.3% points increase in the number of households consuming these cultural services (extensive margin), whereas the 2012 increase in VAT for cinema and performing arts (from 8% to 21%) decreased participation by 3.5% points. However, the findings regarding the 2018 VAT cut on cinema (from 21% to 8%) show no statistically significant effect in participation, that is, the number of moviegoers did not increase.

On the other hand, the effect of these tax reforms was not symmetric in the intensive margin. In comparison with a hypothetical situation in which tax rates had not been lowered the reform of 2012 did not change average household consumption on cinema and performing arts conditional on participation. In other words, consumption patterns of those households already consuming culture did not respond to price changes caused by the tax raise. On the contrary, the reform of 2017 increased the average consumption of performing arts by 50.1 logarithmic points and the reform of 2018 also increased the average household spending on cinema by 35.2 logarithmic points. That is, although the tax cuts on cinema and performing arts were only partially passed on to ticket prices, those households that already consumed culture increased their consumption of these cultural services.

## **6. Conclusions and policy implications**

Cultural consumption is associated with positive externalities and, as such, represents a crucial element in the social and economic development of societies. In the presence of positive externalities, the market, however, fails to provide the optimum quantity of culture and requires for public intervention. Sponsoring culture is, therefore, a long-term profit-generating investment that governments can achieve by means of Pigouvian subsidies or tax schemes. VAT rate discounts are one of available and yet understudied tools to tackle with this market failure and improve allocative efficiency.

This paper evaluates the effectiveness of the three VAT reforms implemented between 2012 and 2018 (one tax raise reform and two tax cut reforms) in the cultural sector in Spain. Using aggregate monthly consumer price index data, we first provide visual evidence and empirical estimates of the tax shifting and the distribution of the VAT burden between consumers and producers. Our findings indicate that the VAT cuts that occurred in 2017 and 2018 lowered the price of cultural goods and services affected by the tax reform. Nevertheless, film and entertainment producers and distributors only passed 45% of the VAT cut to consumer prices.

We then use microdata on households' monthly consumption of culture and a regression discontinuity design to assess the causal effects of these VAT reforms on performing arts and cinema consumption (both in the extensive and the intensive margin). Interestingly, the results indicate that the effect of the 2017 VAT reduction on performing arts slightly increased the number of households consuming these cultural services in comparison with the number of households that would have consumed cultural goods and services if the VAT rate had not been reduced, whereas the 2018 VAT cut on cinema had no significant effect in the number of moviegoers (extensive margin). The price drop did not attract new spectators to cinema, with the existence of affordable substitutes being the main reason. The cinema industry has faced recent waves of technological change that provide a wide range of cheaper alternatives to cinema consumption, such as online platforms with streaming content (Netflix, HBO, etc) along with affordable home equipment and ownership of computers (Borowieki and Prieto-Rodríguez, 2014). In the intensive margin, the cultural spending per household conditional on

participation (i.e., spending by households already consuming culture) increased after the two VAT rate reductions.

Finally, we test for asymmetries in pass-through between VAT rate decreases (in 2017 and 2018) and the VAT rate increase in 2012 and we find no evidence of prices responding more strongly to increases than to decreases in VAT. Both VAT rate increases and decreases lead to a less than full pass-through of the tax cut to consumer prices. We also provide evidence of an asymmetric response of the average cultural spending conditional on participation. Households' spending on cinema and performing arts increased as a result of the 2017 and 2018 tax cuts but it did not react to the 2012 tax raise. This last result supports the idea that price does not seem to be a very relevant factor influencing consumer expenditure patterns on cultural services. Culture consumption is found to be heavily dependent on previously acquired habits (Lévy-Garboua and Montmarquette, 2011; Machado et al., 2017) and on social relations, as social networks influence the formation of individual preferences (Lazzaro & Frateschi, 2017). In the same vein, Van der Ploeg (2006) suggests that VAT reforms do not necessarily lead to a more affordable access to cultural goods and services for all individuals because other factors (such as education, leisure opportunity cost or income level) are more relevant in explaining the consumption of cultural activities. Fernández-Blanco et al. (2009) estimate a latent model to research cinema participation distinguishing between enthusiast, moviegoers and non-attendants, finding that ticket prices only influence among those people that report lower valuation for current releases due to the higher response of this group to real income changes. In sum, aspects such as age, occupation, educational level, movie quality, ethnic origin or consumption habits are perhaps more relevant in determining the spending patterns of households' cultural consumption than ticket prices.

Overall, these results call into question the effectiveness of VAT reforms as fiscal stimulus tools. On the one hand, our results indicate that VAT rate discounts on cultural goods and services represent a significant social cost in terms of a public revenue loss which, in turn, is partly transferred to private producers' benefits at the expense of consumers, given the less than full pass-through to consumer prices. On the other hand, in the case of cinema, the policy intervention also fails to achieve its goal of stimulating the demand for cultural goods and services, as it does not increase the number of moviegoers.

The purpose of the VAT is to collect taxes on consumption fairly based on neutrality. The principle of justice collides with the effective and efficient use of tax incentives for the arts and culture. Our findings indicate that if the objective pursued by the tax reform is to guarantee access to culture for a greater number of potential consumers, perhaps the use of specific subsidies for consumption would be more efficient. If, as noted in Machado et al. (2017), the low levels of cultural consumption are more related to the lack of habit than with the lack of monetary resources, more clear and targeted public interventions should be more effective in attracting never-goers to cinema and performing arts.

In addition, reduced VAT rate is a tax incentive of indefinite duration, that is, the cost of the subsidy is not known in advance. In turn, the use of reduced VAT rates generates indirect compliance costs. Artistic or cultural activities cannot be defined globally because the arts sector is very innovative and narrowing the definition of artistic activity to a list of causes quickly renders it outdated, sometimes giving rise to numerous disputes as to whether specific goods and services should be considered cultural for VAT purposes.

Unlike personal income tax, VAT cannot be differentiated based on the taxable person and her characteristics. Every buyer of a cultural good or service taxed at a reduced rate receives an indirect subsidy. Thus, as noted in Prieto-Rodríguez et al. (2005), VAT rate discounts can be

regressive since the potential welfare gains are positively related to the ability to pay, to the economic situation and/or to the household educational level. In the case of Spain, there exists a notable use of super-reduced and reduced rates in VAT (Bach et al., 2021), with a considerable cost in terms of revenues (López-Laborda et al., 2021). In addition, half of the tax benefits of reduced VAT rates are concentrated in the wealthiest 40% of households. Accordingly, alternative policy instruments, such as targeted direct subsidies (e.g. consumer vouchers) for stimulating access to culture for specific population groups such as students, pensioners or the unemployed according to their characteristics (e.g. income) should be investigated, as they use may mitigate loss of collection revenues and increase efficiency. In this regard, the Spanish government announced at the end of 2021 that around half a million citizens turning 18 in 2022 would be eligible for a 400 euros voucher to spend on cultural services. Comparing the causal impact of this policy intervention with that of VAT rate cuts would help us to better understand the weaknesses and strengths of each fiscal tool to achieve the desired goal regarding the demand for culture and, therefore, this analysis should be addressed in future research.

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