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UP AND DOWN THE VALUE-ADDED TAX

Susana Peralta
João Pereira dos Santos
Pedro Tavares de Sousa



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Authors

Susana Peralta

João Pereira dos Santos

Pedro Tavares de Sousa

Seminars Coordinators

ANA PAULA DOURADO | University of Lisbon

RITA DE LA FERIA | University of Leeds

Publisher

**CIDEEFF - Centre for Research in
European, Economic, Fiscal and Tax Law**

www.cideeff.pt | cideeff@fd.ulisboa.pt



FACULDADE DE DIREITO
UNIVERSIDADE DE LISBOA

Alameda da Universidade
1649-014 Lisboa



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OH! Multimedia

mail@oh-multimedia.com

Up and Down the Value-Added Tax¹

SUSANA PERALTA²
JOÃO PEREIRA DOS SANTOS³
PEDRO TAVARES DE SOUSA⁴

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2 Nova School of Business and Economics, Universidade Nova de Lisboa, Campus de Carcavelos, Rua da Holanda 1, 2775-405 Carcavelos, Portugal. E-mail: peralta@novasbe.pt

3 Nova School of Business and Economics, Universidade Nova de Lisboa, Campus de Carcavelos, Rua da Holanda 1, 2775-405 Carcavelos, Portugal. Email: joao.santos@novasbe.pt.

4 Nova School of Business and Economics, Universidade Nova de Lisboa, Campus de Carcavelos, Rua da Holanda 1, 2775-405 Carcavelos, Portugal. E-mail: pedro.mtsousa48@gmail.com

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Abstract

This paper assesses the incidence of a large and temporary increase in value-added tax for Portuguese restaurants and other catering services. In 2012 the tax increased from 13% to 23% and it was brought back down in July of 2016. Using data on all non-financial firms in Portugal between 2007 and 2018 we estimate effects upon consumers, capital owners, and workers. We show that firm-owners pass onto consumers around 40% of the VAT increase through prices while the pass-through after the repeal is zero. Resorting to a difference-in-differences strategy we find that the tax increase did not harm employees as severely as firm's margins, leading employers to later pocket most of the tax cut benefits.

Keywords

Value-Added Tax, VAT, Restaurants, Portugal, Fiscal Policy, Difference- in-Differences, Consumption Taxes



Introduction

The value-added tax (VAT) established itself across most developed countries as an important source of revenue for the State. Very often, governments make use of this consumption tax to adjust imbalances in national budgets. In 2011, Portugal's public accounts did not resist the financial and economic crises and, on April 7th, Portugal requested financial assistance from the European Union (EU) and the International Monetary Fund (IMF). On May, 17th, a three years Economic Adjustment Programme, negotiated between the Portuguese government, European Institutions and the IMF, was adopted by the Eurogroup. The Memorandum of Understanding had three main pillars: structural reforms, the banking sector, and fiscal consolidation. In the context of the third pillar, the Portuguese government made use of VAT to enhance public revenues in 2012. Purchases in Restaurants and other Catering Services, until then subject to the intermediate VAT rate (13%), became taxed at the standard rate (23%).

This unpopular decision amongst market agents was at the core of the following electoral campaign, with the socialist party committing for its repeal. Four and a half years later, by July 2016, the new socialist government repealed the VAT increase. *“The decrease in the VAT rate was based on the Government’s commitment to promote greater dynamism and boost employment in a sector of great relevance for the national economy and with a large capacity for job creation”*, the government argued¹. This repeal brought a tax break to a sector employing around 6% of the workforce whose VAT contributions surrounded 2% of total VAT revenues.

Later, in an assessment report compiled by the Portuguese Government and the National Association of Lodging and Catering Services² published on March 2019, the counter-reform was considered a success³. It is argued that in the 18 months after July 2016, employment in the sector increased 7.9% and social security contributions rose 12%, more than compensating the 370 million euros decrease in VAT revenues⁴. Ultimately, the report considered that aggregate benefits outweighed the reform's costs and labelled it as a crucial moment for the sector.

1 The socialist program aimed at pursuing *“Active employment policies for sectors of tradable goods and for industries with high potential for job creation”*.

2 AHRESP – Associação de Hotelaria, Restauração e Similares de Portugal.

3 The Focus Group was created by dispatch n.º 8591-C/2016 (2019)

4 Between 2015 and 2016 VAT revenues for catering services decreased from € 667M to € 297M.

This paper revisits these results by resorting to counterfactual techniques. We use a difference-in-differences analysis to assess the tax incidence of VAT changes upon three agents: consumers through market prices; employees through salaries wages and hours worked and firm-owners through business margins. Each assessment comprises an analysis of the 2012 increase and the 2016 repeal, searching for possible symmetries of the effects upon market agents. It is the purpose of our study to contribute to a growing literature on public finance documenting non- standard reactions towards consumption taxes. For that we rely on a high-quality firm dataset, IES⁵, containing information on all private enterprises in Portugal.

We find an asymmetric pass-through in prices. While in 2012 firm-owners passed onto consumers around 40% of the tax increase in 2016 the repeal did not caused a reduction in prices. Meanwhile employees, in 2012, faced a 4% and 5% reduction in hours worked and wages, respectively while firms accommodated the tax increase with a reduction of more than 20% of their gross value-added. In 2016, the counter-reform showed some symmetries for employment and value-added while it didn't benefit employees through wages. Herewith, the repeal favoured capital instead of labour as the former had been relatively more sacrificed by the initial reform.

5 Informação Empresarial Simplificada.



1. Institutional Background

The International Monetary Fund advises countries to undergo minimal exemptions and set a single VAT rate. Creating differentiated rates introduces distortions and disregards potential revenues. For instance, in 2016, Portugal lost more than half of its potential VAT revenue in exemptions, reduced tariffs or merely poor enforcement, resulting in a VAT ratio of 49%, OECD (2016).

The EU Commission is more flexible and recommends a standard tariff between 15% and 25%, with room for reduced tariffs. Many authors consider this flexibility crucial to address equity concerns. They argue that a universal rate makes VAT regressive since low income families spend a larger share of their income on VAT expenses, Bikas, E. & Andruskaite (2013). Today, many countries in the EU exempt basic goods by having implemented multi-rate VAT structures, Lejeune (2010).⁶

In practice, the value-added tax importance has increased amongst developed countries. While in 1990 it was present in 47 countries, 25 years later the number nearly tripled, with 140 countries having a value-added tax, Pomeranz (2015). Researchers have explored many reasons for the globalization of VAT (Keen and Lockwood (2010); Ebeke and Ehrhart (2011); Claus (2013); Lejeune (2010)), nonetheless, two main reasons stand out.

Firstly, the “revenue enhancing capacity” of the value-added tax, Ufier (2014), illustrated by the natural experiment analysed in this paper. Following the VAT increase, VAT revenue more than doubled in one year⁷. This “money machine”, Keen and Lockwood (2010), is crucial for any government to enhance tax revenues anytime they face budget constraints. Alternatively, whenever budget commitments become less of a problem, all the extra revenue gathered could be put at the disposal of lower income classes through enhanced social programs. Many governments have done it, illustrating VAT’s capacity to reduce the marginal cost of public funds, Keen and Lockwood (2010). Alternatively, the overall increasing trends in value-added tax tariffs is sometimes said to be the main driver for enhancing VAT revenues, Bikas and Ras˘kauskas (2011).

Secondly, its implementation mechanism prevents tax evasion. The VAT structure facilitates enforcement by generating third party information and paper trail. The right to deduct VAT on input creates a chain mechanism which is crucial for tax authorities to enforce compliance (Keen (2013); Slemrod (2007); Pomeranz (2015); Jenkins and Kuo (2000)).

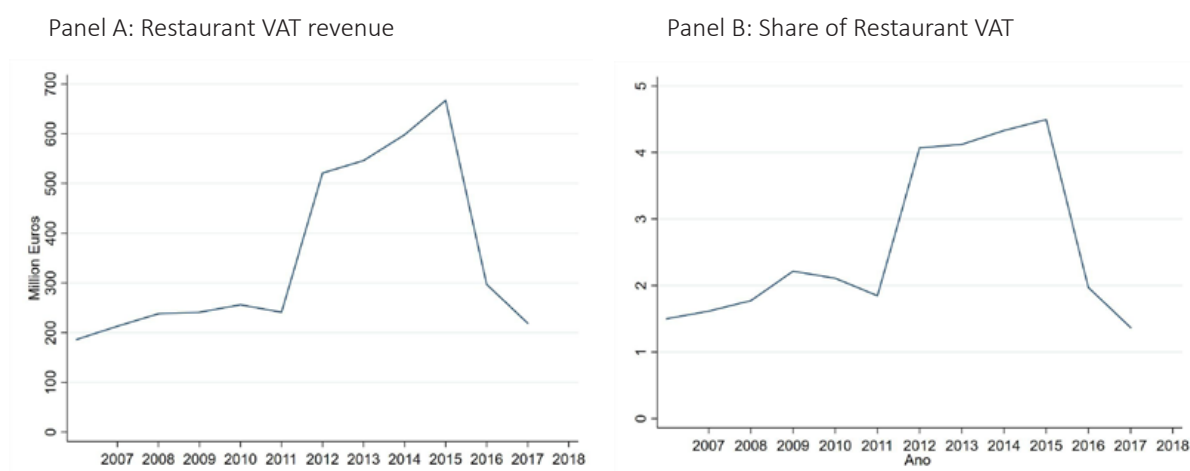
6 See Appendix A.6 on different VAT rates for catering services across the EU.

7 Revenue increased from 241 million euros in 2011 to 521 in 2012. Source: Portuguese Tax Authority.

1.1 The Portuguese VAT Reform

In July 2010, Portugal was facing a major economic and financial crisis and increased the standard VAT rate from 20% to 21%, the intermediate rate from 12% to 13%, and the reduced one from 5% to 6%. In January 2011 the standard was again increased to 23%. On April 6th 2011, Portugal sought financial assistance from the IMF, ECB and European Commission. The Memorandum of Understanding with the three international institutions was signed in May. One of its conditions was eliminating intermediate rates on catering services and therefore, in January 2012, the value-added tax for the catering services sector was increased to its standard level, 23%.

Figure 1: Restaurant VAT



The VAT increase from 13% to 23% was approved on the 29th of November 2011 and implemented as of the first of January, 2012. However, the discussions about this tax increase were very salient in the Portuguese debate since the beginning of the conversations with the international institutions about the bailout. As early as July 2011, the Associação de Hotelaria, Restauração e Similares de Portugal, the Portuguese restaurant and lodging association, handed in a written document committing to create 40 thousand jobs if the VAT increase would not carry through to the government⁸. Given these anticipatory discussions, in the difference-in-differences analysis and event studies below, the treatment period begins in 2011.

In September 2013 AHRESP published a report stating that the VAT increase for restaurants led to a loss of 34 million euros of revenue in 2012 and *“Therefore the government should repeal the increase, reducing VAT from 23% to 13% in order to promote employment.”*. Their view was that a tax windfall on firms of the sector would allow aggregate demand to increase due to lower prices and allow business owners to invest, increase employment and/or wages. A view shared by the Socialist Party, who, in July of 2016, repealed the VAT increase. This is the second moment of our experimental setting, the decrease of VAT for catering services from 23% to 13%.

⁸ https://www.jornaldenegocios.pt/empresas/turismo---lazer/detalhe/hotelaria_e_restauraccedilatildeo_prometem_40_mil_empregos_em_troca_de_reduccedilatildeo_de_iva.



2. Literature Review

Empirical research on the effects of VAT changes is not widely developed on outcomes beyond prices. Benzarti and Carloni (2019), evaluated a VAT decrease in France for sit-down restaurants from the standard rate (19.5%) to the reduced rate (5.5%). The authors explore effects of the policy over four groups: firm-owners, employees, consumers and suppliers of material goods. Their findings suggest that firm-owners pocketed more than half of the tax break. Consumers, employees and suppliers shared the remaining benefits.

Also looking at price effects Carbonnier (2007) investigated two large VAT windfalls in France. Firstly, for brand new cars in 1987, secondly, for housing repair services in 1999. The author finds that price effects depend on the sector according to the market's degree of competition. For cars the benefits passed onto consumers are higher than in house repair services since the latter operates almost in a perfectly competitive market preventing firm-owners to deliver larger pass-through to prices. In oligopolies, such as cars retail, Carbonnier argues that firms pass-through larger benefits to consumers because previously the firms had already been capturing a larger share of consumers' surplus.

Kosonen (2015) measured the effects of a 14 p.p. VAT decrease (from 22% to 8%) for hairdressing services in Finland in January of 2007. The author documents effects over prices and firms' turnover and estimates that prices were only cut in half of what a full pass-through would have implied. Kosonen also finds that firms tend to increase their margins and concludes that *"the deadweight loss to tax revenue makes the reform look inefficient policy"*. Benzarti et al. (2020), explored the same reform. Despite only investigating price effects, they extend their analysis beyond the moment of the repeal, January 2012. Their findings suggest that the direction of VAT reforms must be accounted in order to achieve redistribution as they induce asymmetric responses over prices. This points towards a gap on the standard tax incidence theory which treats VAT increases and decreases the same way. They document asymmetric pass-through on Finnish hairdressing services' prices and find that equilibrium prices after treatment are higher than before.



3. Data

The DiD framework uses annual administrative firm-level balance sheet data from IES - *Informação Empresarial Simplificada*, that covers the universe of Portuguese private firms. We restrict our sample to firms with at least one paid employee. We exclude firms with status “leaving the market” and those in the autonomous regions of Madeira and Azores, VAT rates are different in these regions. Firms with non-sequential observations are ignored, i.e., we include firms that die, but not those that come back after a period of inactivity.

We take advantage of the richness of our data to measure the impact of the tax reforms on several outcome variables. We focus on the impact on business owners through the gross value-added (GVA), i.e., the difference between a firm’s output and its intermediate consumption, and net income, i.e., the difference between revenue and costs. We also look at the labour input margin, through hours worked and salaries. In addition, we also analyse revenues and expenditures, which we further disentangle into costs of goods sold and material consumed (Costs Goods), supplies and external services (Ext Serv), wage expenditures (which include salaries, insurance, and social security payments), interest, and income tax payments. Regarding types of employment, we examine total, paid (full- and part-time), and non-paid employment (i.e., work performed by the businessowner and family). Finally, average wages and labor productivity (i.e., value added per paid worker) are also considered.

In Subsection 6.1 we use monthly non-seasonally adjusted prices on commodities from Eurostat’s Harmonised Indices of Consumer Prices (HCIP) to explore VAT pass-through on prices. Data is sorted by COICOP (Classification of Individual Consumption by Purpose), collected through surveys on each member state of the union. All series are harmonized, thus accounting for country specific sampling procedures.



4. Identification Strategy

We run difference-in-differences specifications, where the treated firms are the restaurants. More specifically, all catering services, namely restaurants, bars, cafeterias, and canteens, faced a 10 percentage points (p.p.) increase in the value-added tax in 2012. Hence, they constitute our treatment group⁹. As the comparison group, we use labour intensive sectors, namely, retail and wholesale, lodging, hairdressers and beauty saloons, and motor vehicle maintenance and repairs. Importantly, we exclude hotels that have a restaurant or cafe, and gas stations.¹⁰

The comparison group allows us to tackle two contemporaneous developments in the Portuguese economy. On the one hand, there was a tourism boom during the 2010s, which affected both the restaurant sector and the lodging industry, included in the comparison group¹¹. On the other hand, the government introduced an electronic invoicing system in 2013, that allows consumers who ask for the receipt to deduct part of the expenditures made in restaurants, beauty saloons and hairdressers, and car repairers, from their personal income tax bill. The fact that our comparison group includes these sectors allows us to mitigate confounding concerns due to this tax reform.

We implement a difference-in-differences (DiD) fixed effects (FE) regression for firm i in municipality m and year t , as follows:

$$\log Y_{it} = \alpha_i + \lambda_t + \beta_1 \text{VAT Upt} \times T_i + \beta_2 \text{VAT Down}_t \times T_i + \epsilon_{it} \quad (1)$$

Where Y_{it} is the outcome of interest, as detailed in section 4, for firm i in year t , T_i is the treatment indicator of firm i , VAT Upt is a dummy variable that takes value one 1 between 2011 and 2015, and 0 otherwise, and VAT Down_t is a dummy variable that takes value one 1 after 2016, and 0 otherwise. This specification includes firm and year fixed effects, but we also provide results for more demanding specifications with Nuts 3-year or municipality-year fixed effects. β_1 and β_2 are the coefficients of interest. Standard errors are clustered at the sector of activity- Nuts 3 level.

⁹ For simplification purposes, these will be referred as restaurants henceforth.

¹⁰ Notice that car retailers and wholesalers are not in the same EAC code as the remaining retailers and are thus not in the comparison group.

¹¹ We show that our results are robust to the exclusion of the most touristic municipalities.

This paper uses the DiD setting to explore treatment effects over capital through gross value-added (GVA) and net income, and labor, through employment and wages. We further explore revenues and expenses and different types of employment.

We test for the validity of our identification assumption with an “event study” to estimate average dynamic effects the tax shocks. More specifically, between 2007 and 2018, the following model is used:

$$\log Y_{it} = \alpha_i + \lambda_t + \sum_{\tau=2007}^{2009} \eta_{\tau} \times T_i \times Year_{\tau} + \sum_{\tau=2011}^{2018} \eta_{\tau} \times T_i \times Year_{\tau} + \epsilon_{it}, \quad (2)$$

Where the coefficients of interest are η_{τ} , that represent the leads and lags of the treatment effect, where the coefficient for the year just before the first treatment, 2010, is normalised to zero, i.e., $\eta_{2010} = 0$. The remaining variables and coefficients are defined as in (1).



5. Results

The following section presents our results for the policy changes, the VAT increase in 2012 and decrease in late 2015. We look at Eurostat's price series to measure pass-through onto consumers. We also address aggregate effects upon capital and labor, following the event-time study to explore dynamic effects and see whether the impacts were temporary or long-lasting. We complement this with a DiD approach.

5.1 Effects on Prices

The 23% VAT remained upon catering services from January 2012 until July 2016. In this subsection we explore the effects over consumers through prices. We leave the DiD setting to assess symmetries between both policies using monthly data on prices.

Consumer prices include both the VAT and the producer's price. The proportional change in final prices is given by the relative change of the difference in post and pre-reform prices and the pre-reform price. Thus, a 10 p.p. VAT increase translates into a 8.85% increase¹². The corresponding calculations for the repeal deliver a 8.13% decrease in prices. These percentages represent how much prices would have changed in case of full pass-through- dashed line in Panel B of Figure 2.

Essentially, five empirical patterns emerge from Figure 2. Firstly, Panel A displays a discontinuous hike in prices in 2012. A 3.5% increase in prices, two months into the VAT reform¹³. Secondly, this hike represents a pass-through around 40%, meaning that firms pass onto consumers almost half of the additional VAT burden through higher prices- Panel B. This goes against the argument of the existence of any adjustment friction either driven by menu costs or capacity constraints. Third, after the repeal the pass-through is almost non-existent as it is not observed any drop in prices¹⁴. Clearly, firms pocketed the tax windfall leaving consumers untouched.

12 $\frac{(1.23_{P_{after}} - 1.13_{P_{before}})}{1.13_{P_{before}}}$

13 2.8% in January, accumulating 4.86% throughout 2012

14 Right-hand graphic in Panel A and right-hand vertical line in Panel B of Figure 2

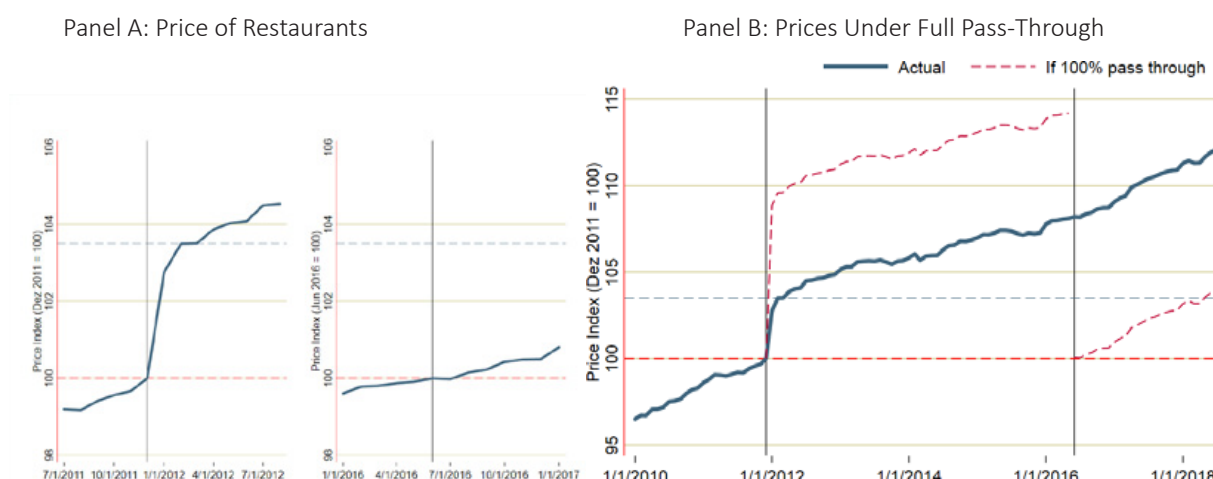
Fourth, prior to 2012, food items sold in retail stores faced a reduced VAT rate of 6%, this remained unchanged throughout our treatment period. Panel C depicts similar and fairly parallel time trends before 2012 for both groups, so food retail is also a natural control group in prices. Yet, after VAT of treated firms is brought back to its intermediate level (13%) there are no signs of convergence, revealing an asymmetric response to a temporary reform whose effects held on the medium run. Finally, Panel D shows log-differences between prices in both groups. Two months following the reform, restaurant prices had increased around 3% relative to retailers' food, hiking up to 4% by the end of 2012. An immediate, meaningful and persistent effect.

These empirical patterns are consistent with literature on asymmetries of price responses to tax changes. We find asymmetric price effects where a pass-through to consumers is only verified to make them bear the tax increase. The absence of a reduction in prices following the repeal is consistent with the argument against reduction of consumption taxes to boost aggregate demand through lower prices as, ultimately, producers pocket the tax windfall.

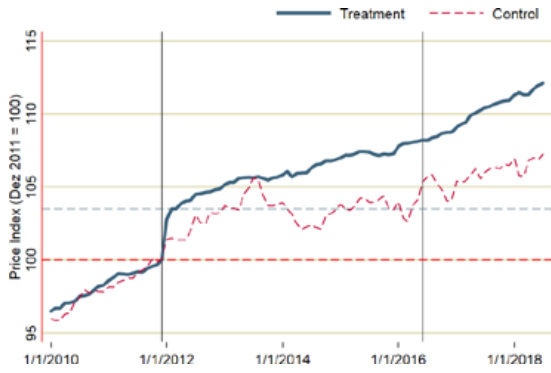
5.2 Distributional Effects

We now analyze the distributional effects on capital and labor. We start by presenting the event study results, computed as in eq. (2), in fig. 3. Our two main variables for capital are the gross value-added (GVA) in panel A and the value-added in panel B. With respect to labor, we examine the effect of these changes in VAT on hours worked in panel C and salaries in panel D. For the two capital-related outcomes, we observe a sharp deterioration of economic activity with the rise of VAT. This level shift remains from the 2012 until 2015. It is only with the VAT cut in 2016 that GVA and net income increase. For the two labor-related outcomes, the impact is not the same. First, decreases on hours worked and salaries, when the VAT increases, are less pronounced than for capital-related outcomes. However, when VAT comes back to 13%, point estimates are not statistically significant. This suggests that employers pocketed most of the tax cut benefits.

Figure 2: Effect of VAT reforms on Prices



Panel C: Prices of Restaurants and Retail



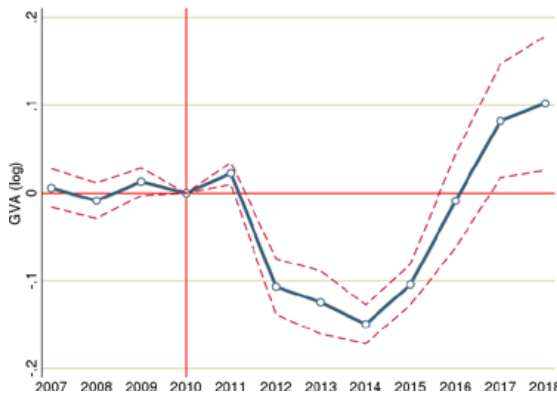
Panel D: Log-Difference in Prices



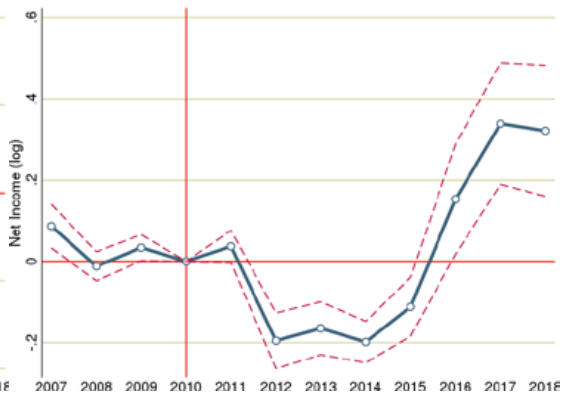
Notes: Panel A shows actual prices for restaurants; Panel B depicts counterfactual prices in case of full pass-through with a 8.85% hike in prices in January 2012 and -8,13% in July 2016; Panel C shows prices of food retailers as a counterfactual of restaurants, using monthly Eurostat data; Panel D was computed based on author's computations of log-differences between prices in restaurants and food retailers. For graphical clarity composite prices are normalized to 100 in the period immediately before the primary VAT reform, December 2011. Periods preceding VAT reforms are represented by vertical lines.

Figure 3: Event Studies

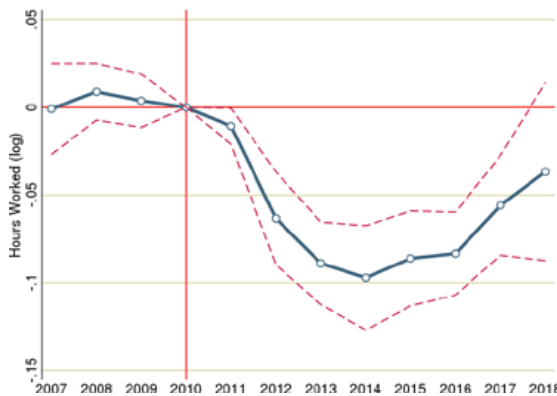
Panel A: Gross Value Added



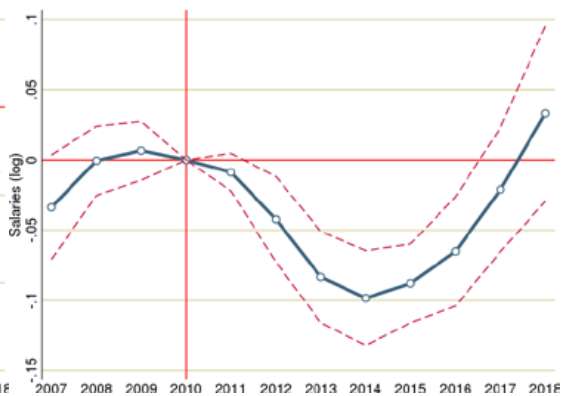
Panel B: Net Income



Panel C: Hours Worked



Panel D: Salaries



Notes: Panel A xxx.

We confirm previous results with difference-in-differences specifications in table 1 for capital and table 3 for labor. Moreover, baseline results seem to be quite robust when we substitute

year fixed effects by a more demanding vector of fixed effects: year-nuts 2 fixed effects in columns (2) and (5) or by year-municipality fixed effects in columns (3) and (6). We find that GVA falls, on average, more than 20% when VAT goes up, and, when VAT goes down, the effect is not statistically significant. The effects are different for net income as it falls by around 13% when VAT increases, and by more than 23% when the rate goes back to the initial level.

Table 1: DiD Capital

	Gross Value Added			Net Income		
	(1)	(2)	(3)	(4)	(5)	(6)
$VAT Up \times T_i$	-0.236*** (0.010)	-0.218*** (0.020)	-0.213*** (0.019)	-0.131*** (0.017)	-0.118*** (0.018)	-0.116*** (0.019)
$VAT Down \times T_i$	0.012 (0.064)	0.029 (0.067)	0.039 (0.063)	0.234*** (0.066)	0.238*** (0.065)	0.239*** (0.063)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Year*Nuts2 FE	No	Yes	No	No	Yes	No
Year*Municipality FE	No	No	Yes	No	No	Yes
N	859,718	859,718	851,263	616,620	616,620	611,321
R-squared	0.809	0.810	0.812	0.775	0.775	0.778

Notes: Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. For results relying on a balanced sample see table 12.

We further decompose the impact on capital-related outcomes in table 2, separating revenues from expenses. We do not find a significant impact on total revenue when VAT increases. However, we observe a large increase when VAT fell of around 14%. As expected, the impacts for turnover are rather similar. Regarding expenses, total expenses seem to increase when the VAT rate goes up, but the effect is not statistically significant, and increase by almost 10% when VAT rate goes down. This increase is partly explained by increases in the costs of goods sold and material consumed by 16%, in supplies and external services by 9%, and in interest payments by 14%. Interestingly, our results highlight substantial decreases in income tax payments when VAT increased, and a large recovery in income tax payments when VAT rate fell.

Regarding wage expenditures (which include salaries, insurance, and social security payments), they seem to be mainly reduced, when the VAT goes up, by, on average, 4%. When VAT goes down, wage expenditures remain constant. This is precisely what we will analyse in the labor-related results.

Table 2: DiD Revenues and Expenses

	Revenues		Expenses					
	Total	Turnover	Total	CMVMC	FSE	Wage Expend	Interest	Income Tax
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VAT Up $\times T_i$	-0.015	-0.021	0.028	0.058*	0.050**	-0.036**	-0.013	-0.562***
	(0.021)	(0.026)	(0.018)	(0.029)	(0.024)	(0.014)	(0.030)	(0.002)
VAT Down $\times T_i$	0.135**	0.125**	0.094**	0.161***	0.088**	-0.002	-0.137**	0.469**
	(0.054)	(0.060)	(0.036)	(0.054)	(0.035)	(0.026)	(0.052)	(0.217)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	983,462	983,599	983,571	983,599	983,599	983,598	983,599	979,032
R-squared	0.783	0.758	0.901	0.825	0.835	0.866	0.737	0.692

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01. For results relying on a balanced sample see table 13.

Table 3: DiD Labor

	Hours Worked			Salaries		
	(1)	(2)	(3)	(4)	(5)	(6)
VAT Up $\times T_i$	-0.043***	-0.033**	-0.028**	-0.053**	-0.038*	-0.031
	(0.012)	(0.013)	(0.013)	(0.019)	(0.019)	(0.020)
VAT Down $\times T_i$	-0.033	-0.020	-0.012	-0.006	0.014	0.024
	(0.020)	(0.024)	(0.022)	(0.030)	(0.032)	(0.031)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Year*Nuts2 FE	No	Yes	No	No	Yes	No
Year*Municipality FE	No	No	Yes	No	No	Yes
N	983,599	983,599	971,724	791,881	791,881	782,790
R-squared	0.788	0.788	0.791	0.846	0.846	0.848

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01. For results relying on a balanced sample see table 14.

So far we know that both hours worked and the wage bill decrease when VAT increases to the standard rate. However, we do not know if these effects translate on a reduction of the workforce or on a wage reduction, keeping employment numbers constant. We analyze the impact of the VAT shocks on employment, average wages, and labor productivity in table 4. Zooming in on employment numbers, we find that total employment in column (1) falls, on

average, by 2%. This is driven by paid employment in column (2). On the contrary, non-paid work provided by the business owner and family, if anything, increases to compensate this loss in the workforce, as shown in column (3). The decrease in paid employment is explained by the decrease in full-time workers, as paid employment increase when VAT rate goes up. The effect is not symmetric when VAT the rate went back to 13%. Employment do not seem to react, with the exception of paid part-time employment that increases by 5%. Regarding the average wage and labor productivity, both are not affected by the VAT shocks.

Table 4: DiD Employment, Wages, and Labor Productivity

	Employment					Av Wage	Labor Prod
	Total	Paid	Non Paid	Paid Full	Paid Part		
	(1)	(2)	(3)	(4)	(5)		
VAT Up $\times T_i$	-0.020**	-0.021**	0.002***	-0.028***	0.022***	-15.015	-23.159
	(0.008)	(0.008)	(0.000)	(0.008)	(0.001)	(10.112)	(19.589)
VAT Down $\times T_i$	-0.002	-0.002	0.002***	-0.015	0.048***	2.542	9.939
	(0.015)	(0.015)	(0.001)	(0.016)	(0.004)	(5.057)	(8.077)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	983,599	983,599	983,583	981,231	641,969	983,599	983,599
R-squared	0.897	0.897	0.508	0.890	0.755	0.098	0.089

Notes: Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.



6. Robustness Checks

For robustness, we exclude all firms in the top ten most touristic municipalities to account for a possible confounder related with the touristic boom in Portugal. The results for capital, presented in table 5, highlight slightly more than negative impacts of the VAT shocks than baseline.

Table 5: DiD Capital: Excluding Touristic Municipalities

	Gross Value Added			Net Income		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>VAT Up</i>	-0.260*** (0.011)	-0.247*** (0.022)	-0.239*** (0.022)	-0.164*** (0.029)	-0.153*** (0.030)	-0.146*** (0.029)
<i>VAT Down</i>	-0.006 (0.066)	0.009 (0.070)	0.023 (0.066)	0.187*** (0.066)	0.197*** (0.066)	0.208*** (0.064)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Year*Nuts2 FE	No	Yes	No	No	Yes	No
Year*Municipality FE	No	No	Yes	No	No	Yes
N	656,285	656,285	641,740	480,356	480,356	470,315
R-squared	0.806	0.807	0.808	0.773	0.774	0.777

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Labor-related outcomes are analyzed in table 7 and are very similar to baseline results.

Table 6: DiD Revenues and Expenses: Excluding Touristic Municipalities

	Revenues		Expenses					
	Total	Turnover	Total	CMVMC	FSE	Wage Expend	Interest	Income Tax
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>VAT Up</i>	-0.037* (0.018)	-0.042** (0.019)	0.010 (0.016)	0.040* (0.023)	0.027 (0.019)	-0.050*** (0.010)	-0.066** (0.027)	-0.542*** (0.029)
<i>VAT Down</i>	0.108** (0.045)	0.097* (0.056)	0.075** (0.033)	0.144*** (0.051)	0.054** (0.021)	-0.025 (0.020)	-0.189*** (0.050)	0.497** (0.216)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	744,791	744,901	744,888	744,901	744,901	744,901	744,901	741,667
R-squared	0.784	0.758	0.899	0.818	0.829	0.862	0.738	0.695

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 7: DiD Labor: Excluding Touristic Municipalities

	Hours Worked			Salaries		
	(1)	(2)	(3)	(4)	(5)	(6)
VAT Up	-0.050*** (0.011)	-0.043*** (0.014)	-0.040*** (0.014)	-0.071*** (0.015)	-0.061*** (0.018)	-0.058*** (0.019)
VAT Down	-0.047** (0.017)	-0.037 (0.022)	-0.028 (0.021)	-0.036** (0.014)	-0.022 (0.024)	-0.014 (0.023)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Year*Nuts2 FE	No	Yes	No	No	Yes	No
Year*Municipality FE	No	No	Yes	No	No	Yes
N	744,901	744,901	725,421	596,875	596,875	581,606
R-squared	0.782	0.783	0.785	0.840	0.840	0.842

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 8: DiD Employment, Wages, and Labor Productivity: Excluding Touristic Municipalities

	Employment					Av Wage Labor Prod	
	Total	Paid	Non Paid	Paid Full	Paid Part		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VAT Up	-0.025*** (0.009)	-0.026*** (0.008)	0.002*** (0.000)	-0.033*** (0.009)	0.022*** (0.004)	-249.694*** (23.129)	-0.221*** (0.010)
VAT Down	-0.016 (0.012)	-0.017 (0.012)	0.003** (0.001)	-0.029** (0.012)	0.045*** (0.008)	-278.476*** (90.946)	0.027 (0.055)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	744,901	744,901	744,891	743,181	483,724	482,104	654,841
R-squared	0.894	0.894	0.507	0.888	0.721	0.825	0.655

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01.



7. Conclusion

This paper uses a large VAT reform in Portugal to shed light upon the effects of a temporary VAT increase. In January 2012, VAT for restaurants and catering services increased from 13% to 23% and so, through a Difference-in-Differences methodology, we build a counterfactual for the evolution of this treatment group. We explore treatment effects over 4 agents: consumers, workers, firm-owners and suppliers. We complemented our analysis with dynamic effects, distributional effects between labour and capital and studying possible symmetries following the counter-policy which occurred in July, 2016.

We find asymmetric price responses to symmetric VAT changes. Firstly, firm-owners passed onto consumers 40% of the total burden of the 2012 VAT increase whereas in 2016 there was no evidence of a reduction in prices. In 2012, workers faced wages reductions around 4% whereas employment effects were limited. These employees in 2016 collected very little benefits. Firm-owners were highly affected by the VAT increase - GVA decreased more than 20% - due to a relatively higher erosion of capital (gross operating surplus) compared to labour (employment expenses). Suppliers, despite the high inflation verified in catering services in 2012, managed to increase their goods value relatively to restaurant's sales, yet they were unable to expropriate benefits from the tax windfall upon their clients in 2016. Overall the tax incidence has proven to be asymmetric between both policies.

Contrary to the tax increase, the repeal occurred halfway through the year and using annual IES data may induce some bias in our DiD estimates. Also, the repeal was not perfectly symmetrical to the increase as VAT for alcoholic beverages remained taxed at 23%. Nonetheless, it is not possible to isolate this effect due to data limitation.

Benzarti and Carloni (2019) concluded *"the concept of tax incidence is (...) agnostic about the direction of the tax change"* their work, as ours, poses this questions as we also find that the throughout our VAT roller-coaster, different agents bear different costs, collecting different benefits, giving support to different economic theories.



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9. Appendix A - Data

Table 9: Sector's Composition according to CAE-Rev.3

Group	CAE	Description
Catering S.	56101	Restaurantes tipo tradicional
Catering S.	56102	Restaurantes com lugar ao balcão
Catering S.	56103	Restaurantes sem serviço de mesa
Catering S.	56104	Restaurantes típicos
Catering S.	56105	Restaurantes com espaço de dança
Catering S.	56106	Confeção de refeições prontas a levar para casa
Catering S.	56210	Fornecimento de refeições para eventos
Catering S.	56290	Outras atividades de serviço de refeições
Catering S.	56301	Cafés
Catering S.	56302	Bares
Catering S.	56303	Pastelarias e casas de chá
Catering S.	56304	Outros estabelecimentos de bebidas sem espetáculos
Catering S.	56305	Estabelecimentos de bebidas com espaço de dança
Food Retail	47112	Comércio a retalho em est. n/ esp. c/ predominância de produtos alimentares
Food Retail	47210	Comércio a retalho de frutas e produtos hortícolas
Food Retail	47220	Comércio a retalho de carne e produtos à base de carne
Food Retail	47230	Comércio a retalho de peixe, crustáceo e molusco
Food Retail	47240	Comércio a retalho de pão, produtos de pastelaria e confeitaria
Food Retail	47250	Comércio a retalho de bebidas
Food Retail	47291	Comércio a retalho de leite e derivados
Food Retail	47292	Comércio a retalho de produtos alimentares naturais e dietéticos
Food Retail	47293	Outro comércio a retalho de produtos alimentares
Hotels	55111	Hotéis com restaurante
Hotels	55112	Pensões com restaurante
Hotels	55113	Estalagens com restaurante
Hotels	55114	Pousadas com restaurante
Hotels	55115	Motéis com restaurante
Hotels	55116	Hotéis-Apartamentos com restaurante

Hotels	55117	Aldeamentos turísticos com restaurante
Hotels	55118	Apartamentos turísticos com restaurante
Hotels	55119	Outros estabelecimentos hoteleiros com restaurante
Hotels	55121	Hotéis sem restaurante
Hotels	55122	Pensões sem restaurante
Hotels	55123	Apartamentos sem restaurante
Hotels	55124	Apartamentos turísticos sem restaurante
Hotels	55201	Outros estabelecimentos hoteleiros
Hotels	55202	Alojamento mobilado para turistas
Hotels	55203	Turismo no espaço rural
Hotels	55204	Outros locais de alojamento de curta duração
Hotels	55300	Parques de campismo e caravanismo
Hotels	55900	Outros locais de alojamento
Hairdressers	96021	Salões de Cabeleireiro
Hairdressers	96022	Institutos de Beleza

9.1 PORDATA and Tourism by Municipality

We use the number of sleepovers, in hotels or any other accommodation service, of tourists per year to determine the most touristic municipalities in Continental Portugal. We order municipalities by their annual average number of sleepovers in the period 2012/2017. Top 10% is given by:

Table 10: Top 10% most touristic municipalities in Continental Portugal

Municipality	2012	2013	2014	2015	2016	2017	Average
Lisboa	6 789 166	7 237 915	9 008 523	9 999 851	11 066 130	12 553 476	9 442 510
Albufeira	6 412 895	6 377 959	7 177 322	7 306 242	8 124 832	8 395 439	7 299 115
Porto	1 815 157	2 012 153	2 548 591	2 879 833	3 300 011	3 782 858	2 723 101
Loulé	1 932 791	2 087 392	2 271 927	2 305 686	2 531 404	2 683 095	2 302 049
Portimão	1 791 267	1 789 486	2 015 985	2 142 850	2 296 096	2 511 614	2 091 216
Lagoa	1 031 493	1 179 867	1 335 126	1 436 622	1 595 813	1 649 321	1 371 374
Cascais	1 202 055	1 206 730	1 310 461	1 347 352	1 426 743	1 589 183	1 347 087
V.R.S. António	914 862	972 734	1 037 603	1 080 857	1 171 598	1 219 374	1 066 171
Lagos	768 822	788 062	857 061	990 996	1 110 716	1 223 138	956 466
Ourense	572 861	551 042	647 091	727 904	773 154	1 298 259	761 719
Tavira	586 598	559 778	697 992	650 713	647 295	732 342	645 786
V.N. Gaia	357 098	435 438	490 789	564 340	592 587	663 957	517 368
Coimbra	381 854	364 099	480 103	526 235	572 651	637 973	493 819
Évora	309 544	310 364	375 983	458 925	516 066	585 931	426 136

Source: PORDATA, Inquérito à Permanência de Hóspedes na Hotelaria e outros Alojamentos

9.2 Value-Added Tax Across the EU

Table 11: VAT Across Member of European Union for Catering Services

Member States	VAT on Restaurants	Tariff	Notes
Austria	10%	Reduced	
Belgium	12%	Intermediate	21% for drinks
Bulgaria	20%	Standard	
Croatia	25%	Standard	
Cyprus	9%	Reduced	
Czech Rep.	15%	Intermediate	21% for alcoholic beverages
Denmark	25%	Standard	
Estonia	20%	Standard	
Finland	14%	Intermediate	Excludes alcoholic bev.
France	10%	Intermediate	5%- school canteens; 20%- alcoholic beverages
Germany	19%	Standard	
Greece	24%	Standard	
Hungary	5%	Reduced	
Ireland	14%	Intermediate	Hospital/school canteens exempt; 23%- drinks
Italy	10%	Intermediate	
Latvia	21%	Standard	
Lithuania	21%	Standard	
Luxembourg	3%	Reduced	17% for alcoholic beverages
Malta	18%	Standard	
Netherlands	9%	Reduced	21% for alcoholic beverages
Poland	8%	Intermediate	23% for drinks
Portugal	13%	Intermediate	23% for alcoholic beverages
Romania	5%	Reduced	19%- alcoholic bev. other than draft beer
Slovakia	20%	Standard	
Slovenia	9,5%	Reduced	For preparation of meals
Spain	10%	Reduced	
Sweden	12%	Intermediate	
U. Kingdom	20%	Standard	
Avg. Tariff	14%		

Source: "VAT Rates applied in the Member States of the EU, Situation at 1st July 2019".



10. Appendix B - Balanced results

Table 12: DiD Capital: Balanced panel

	Gross Value Added			Net Income		
	(1)	(2)	(3)	(4)	(5)	(6)
VAT Up $\times T_i$	-0.249*** (0.012)	-0.232*** (0.023)	-0.225*** (0.020)	-0.148*** (0.017)	-0.135*** (0.017)	-0.134*** (0.018)
VAT Down $\times T_i$	0.011 (0.056)	0.029 (0.062)	0.041 (0.057)	0.257*** (0.069)	0.257*** (0.067)	0.260*** (0.065)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Year*Nuts2 FE	No	Yes	No	No	Yes	No
Year*Municipality FE	No	No	Yes	No	No	Yes
N	438,792	438,792	431,119	343,716	343,716	337,421
R-squared	0.850	0.851	0.853	0.782	0.783	0.787

Notes: Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: DiD Revenues and Expenses: Balanced panel

	Revenues		Expenses					
	Total	Turnover	Total	CMVMC	FSE	Wage Expend	Interest	Income Tax
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VAT Up $\times T_i$	-0.042** (0.016)	-0.043** (0.019)	0.019 (0.018)	0.034 (0.023)	0.040* (0.021)	-0.043** (0.012)	0.041 (0.026)	-0.800*** (0.031)
VAT Down $\times T_i$	0.109*** (0.038)	0.116** (0.043)	0.104*** (0.031)	0.151*** (0.039)	0.108*** (0.033)	0.003 (0.019)	0.016 (0.066)	0.382* (0.013)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	462,815	462,840	462,832	462,840	462,840	462,840	462,840	460,836
R-squared	0.890	0.855	0.941	0.863	0.907	0.919	0.724	0.665

Notes: Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14: DiD Labor: Balanced sample

	Hours Worked			Salaries		
	(1)	(2)	(3)	(4)	(5)	(6)
VAT Up \times T _i	-0.046*** (0.013)	-0.037** (0.013)	-0.032** (0.014)	-0.055*** (0.018)	-0.040** (0.018)	-0.031 (0.020)
VAT Down \times T _i	-0.034* (0.017)	-0.022 (0.020)	-0.013 (0.018)	0.004 (0.025)	0.025 (0.029)	0.039 (0.029)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Year*Nuts2 FE	No	Yes	No	No	Yes	No
Year*Municipality FE	No	No	Yes	No	No	Yes
N	462,840	462,840	454,692	399,940	399,940	392,690
R-squared	0.843	0.844	0.846	0.889	0.889	0.891

Notes: Significance Levels: * p < 0.10, ** p < 0.05, *** p < 0.01.



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