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**Working Paper**

## Heterogeneity in effective VAT rates across native and migrant households in France, Germany and Spain

JRC Working Papers on Taxation and Structural Reforms, No. 09/2020

**Provided in Cooperation with:**

Joint Research Centre (JRC), European Commission

*Suggested Citation:* Christl, Michael; Papini, Andrea; Tumino, Alberto (2020) : Heterogeneity in effective VAT rates across native and migrant households in France, Germany and Spain, JRC Working Papers on Taxation and Structural Reforms, No. 09/2020, European Commission, Joint Research Centre (JRC), Seville

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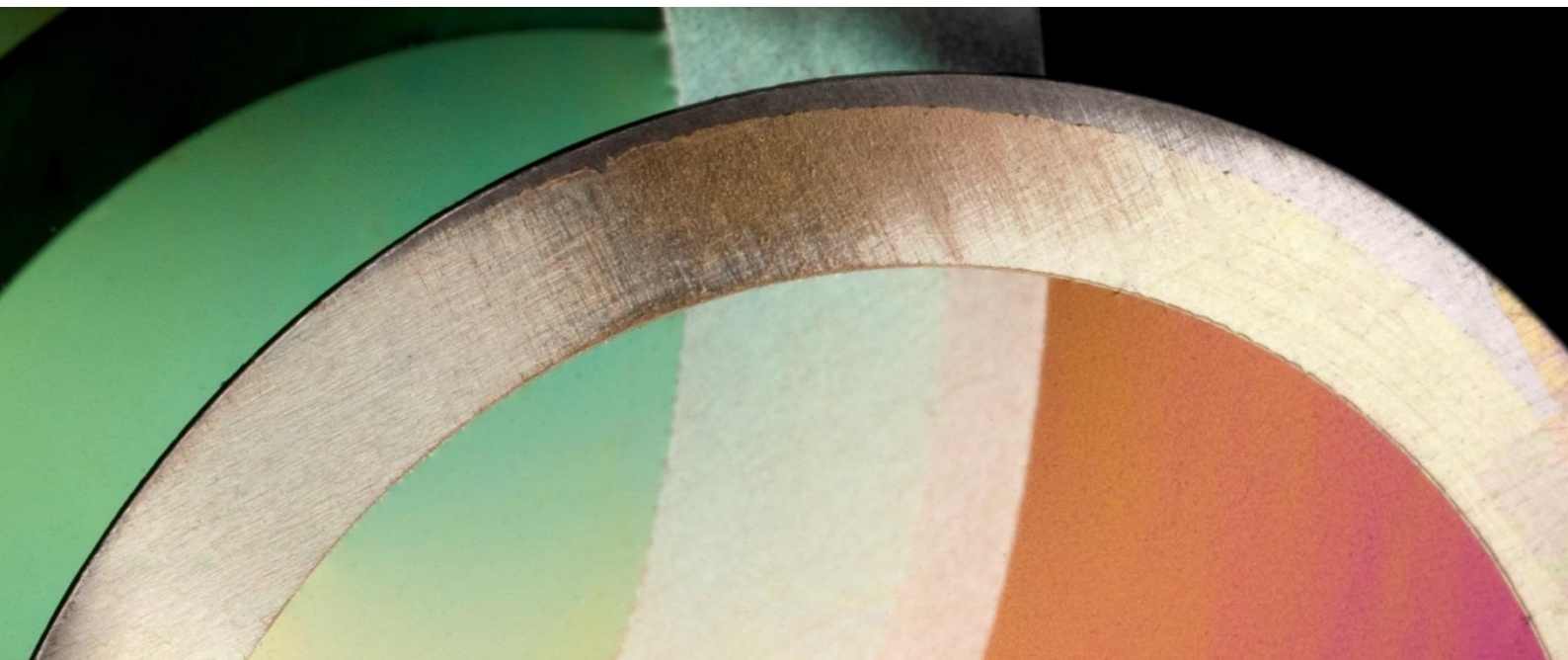
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## JRC TECHNICAL REPORT

# Heterogeneity in effective VAT rates across native and migrant households in France, Germany and Spain

*JRC Working Papers on  
Taxation and Structural  
Reforms No 09/2020*

Michael Christl, Andrea Papini & Alberto Tumino



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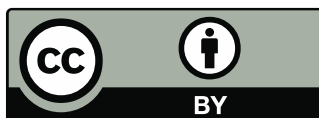
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How to cite this report: Christl M., Papini A. and Tumino A. (2020), Heterogeneity in effective VAT rates across native and migrant households in France, Germany and Spain, JRC Working Papers on Taxation and Structural Reforms No 09/2020, European Commission, Joint Research Centre, Seville. JRC122094

# Heterogeneity in effective VAT rates across native and migrant households in France, Germany and Spain

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## **Abstract**

This paper contributes to the literature on the distributional properties of VAT analysing who bears higher VAT payments between native and migrant household in France, Germany and Spain. The question is of interest both from a distributional and fiscal perspective, fitting the ongoing debate of the net fiscal impact of immigration. Using data from the 2010 EU HBS and a simple VAT calculator we show the existence of gaps in effective VAT rates between native and migrant households in France and in Spain, while no significant gap is observed in Germany. Our results also confirm the existing evidence on the regressivity of VAT with respect to income. These findings suggest that the fairness consequences of VAT reforms should be carefully assessed and advocate for the importance of considering indirect taxation when assessing the fiscal cost of migration.

# 1. Introduction

Value Added Taxes (VATs) are key elements in the tax revenue mix of most advanced economies, averaging 20% of OECD countries tax revenues (OECD, 2019). The question of who bear their cost is particularly relevant in the current economic climate. As a response to COVID-19 pandemic, some governments implemented significant fiscal stimulus packages aimed at cushioning the economic consequences of the pandemic and preparing the ground for the recovery. Among others, Germany released in June 2020, a €130 billion stimulus including a reduction in the standard and the reduced VAT rates until the end of 2020 (D'Acunto, Hoang, Weber 2020). Various other countries implemented VAT deferrals and similar measures<sup>1</sup>.

Following the pandemic, the general government budget deficit in the euro area is expected to reach 8.5% of GDP in 2020, compared with 0.6% in 2019 (ECB, 2020). The extent to which future consolidation effort will involve reforms of consumption taxes is still to be seen. Recent history taught us that reforms to VAT sustained the fiscal consolidation efforts of many advanced economies in the aftermath of the Great Recession. Following a decade of relative stability, the average standard VAT rate among OECD countries increased from 17.7% in January 2009 to 19.3% in January 2015, with increases taking place mostly in countries of the European Union (OECD, 2018). In addition, the recent policy agenda has seen tax shifts from labour to consumption as growth friendly policy measures that would improve competitiveness reducing distortions (e.g. European Commission 2018).

Although efficient from a revenue raising point of view, consumption taxes, and VAT among them, are likely to be regressive from a distributional perspective. Reduced rates applied to specific categories of goods are ineffective in counterbalancing these regressive elements,

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<sup>1</sup> A full list of measures taken by countries are summarized here: <https://globalvatonline.pwc.com/covid-19-summary>.

that would be better addressed by direct distributional instruments (de Mooij and Keen, 2012; European Commission, 2018). Regressive element can also be mitigated by longer term employment effects in case of tax shifts from labour to consumption (Pestel and Somers, 2013; Curci and Savenago 2019).

Our analysis makes use of a simple VAT simulator run on data from the 2010 EU Household Budget Survey (EU HBS) to study the distributional properties of the Value Added Tax in Germany, France and Spain, identifying how effective tax rates varies across income and differentiating between resident and migrant population.

From a fairness point of view, recent microsimulation studies confirm the regressive nature of VAT. Decoster et al. (2010) simulate a decrease in social insurance contributions accompanied by a VAT increase for four European countries (Belgium, Hungary, Ireland, and the United Kingdom). They find that indirect taxes are regressive with respect to disposable income, with lower income households suffering the most from the reform. The results are consistent with Thomas and Picos-Sánchez (2012). The authors use the OECD taxing wages simulation model, augmented by VAT simulator based on HBS data, to study the effect of a 5 percent reduction in social insurance contributions rates (SIC) compensated by a VAT increase in 13 European countries. The results point toward households with non-working members, for instance unemployed and pensioners, suffering the most from the reform as the SICs paid by these types of households was low in the baseline. Pestel and Sommel (2017) show that in Germany an increase in VAT counterbalanced by a reduction in personal income taxes would lead to worse distributional outcomes than if the same VAT increase would be counterbalanced by a reduction in social insurance contributions. The higher degree of progressivity of personal income tax compared to social insurance contributions explain the result. Bach et al. (2006) use a behavioural microsimulation model allowing for labour supply responses, find that a shift of the tax burden from labour to

consumption for Germany would have a slightly positive effect on labour supply but an overall modest increase in income inequality.

Despite some insights from the studies mentioned above, differences in indirect tax burden across socio-economic groups are less frequently analysed, at least in the European context. Understanding the distributional effects across different socio-economic groups is fundamental to understand the effects of VAT on horizontal equity. We hence add to this literature by studying the differences in effective VAT rates between resident and migrant population, further differentiating between EU and non-EU migrants.

Migrant households typically show different consumption and saving behaviour than natives because of heterogeneity in income, saving and consumption behaviours (see Carroll et al. , 1999; Piracha and Zhu, 2011; Dustman, 2017 among others). In presence of reduced VAT rates, as well as VAT exemptions, the differences in consumption pattern might lead to a different effective VAT burden between migrant and native households, implying concerns for horizontal equity across socio-economic groups.

The present research is also important in light of the literature on the net fiscal effect of immigration. In fact, existing studies usually assume that migrants and natives with similar incomes display the same consumption patterns and therefore pay the same indirect taxes (see Dustmann and Frattini (2014), Hansen et al. (2017) and Ruist (2020) for recent examples). Studying the differences in effective VAT rates among migrants and natives is thus very important when estimating the net fiscal effect of the migrant population in the host country.

Our analysis shows that gaps exist in the share of household income devoted to VAT payments between native and migrant households in Spain and, only for non-EU migrants, in France. No significant gap is observed in Germany. The country differences potentially stem from the specific consumption pattern and/or the different VAT systems in the countries

analyzed. Additionally, we find significant differences across regions, as well as across degrees of urbanization. Our results additionally support previous findings showing the regressivity of VAT with respect to income and allows making some considerations on the fiscal cost of migration.

The paper is structured as follows: Section 2 describes the data and the methods used in our analysis; Section 3 discusses the main results. Conclusion follows.

## 2. Data and Methods

Our paper makes use of data from the 2010 EU HBS<sup>2</sup>, a survey of private households carried out regularly under the responsibility of the National Statistical Institutes in each EU Member State. The data contain information on household expenditures on goods and services for final consumption with considerable detail, plus information on income and some demographic and socio-economic characteristics.

In the analysis we study how effective VAT rates<sup>3</sup>, i.e. the share of household income devoted to VAT payment, vary across three migration groups, namely native households, EU migrant households and non-EU migrant households. The migrant status is defined by citizenship. Please note migrants from outside the EU differ substantially in their origin in the three countries analysed.

The analysis focuses on three out of the four largest EU economies, i.e. France, Germany and Spain. Italy is not included in the analysis because household income data are not available in 2010 EU HBS. The 2010 data are the latest available at the time of writing.

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<sup>2</sup> More information about the HBS can be found on the website of EUROSTAT: <https://ec.europa.eu/eurostat/web/microdata/household-budget-survey>

<sup>3</sup> In the literature, this is also named as effective VAT burden, since we do not consider the tax base (taxable consumption) in the denominator, but the income.



Section 2.1 describes the simple VAT simulator used to compute the effective VAT tax burden faced by households in our sample. Section 2.2 provides descriptive evidence of the heterogeneity in effective VAT rates between migrant and native households. Section 2.3 introduce the econometric setting used to identify the main drivers of this heterogeneity.

### **2.1. Calculation of VAT tax rates**

The VAT is a consumption tax levied on the value added to goods and services along the whole supply chain. The tax is paid by the final consumer and it is defined as a percentage of the purchasing price, including other taxes or excises. We compute effective VAT rates as the ratio between household level VAT payments and household income. To do so, we set up a simple microsimulation model that simulates indirect taxes for France, Germany and Spain on the basis household expenditures from EU HBS and 2010 VAT rules. Our simulations of the VAT cover the standard rate, the reduced rates, the zero rate and the exempted goods, although it does not distinguish between a zero rate and VAT exemption. We assume full pass through of indirect taxes on to the consumer.<sup>4</sup> Information on relevant VAT rates to be applied to goods and services is based on the European Commission (2010) and the Worldwide VAT, GST and Sales Tax Guide (Ernst and Young, 2010)<sup>5</sup>. Both sources provide information about the value-added tax, goods and services tax and sales tax systems in the European countries.

The VAT structure in 2010 reported in Table 1 differs substantially between France, Germany and Spain. The standard rate, applied to most good and services, is of 19% in

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<sup>4</sup> Due to the assumption of full pass through which is common in the literature, we might overestimate the real VAT burden of households. Even if full pass through of VAT changes to consumer prices is almost always assumed in distributional analyses, recent empirical studies show that the degree of pass through depends on the different type of VAT reforms. For instance, Benedek et al. (2020), focusing on the changes in VAT rate in 17 European countries over the period 1999–2013 for a large number of commodities, find evidence of full pass through for changes in the standard VAT rates, but a generally lower degree of pass through for changes in reduced VAT rates.

<sup>5</sup> AT, GST and Sales Tax Guide 2010 Worldwide VAT, GST and Sales Tax Guide 2010 by Ernst and Young. Retrieved from: <http://www.ey.com>

Germany, 19.6% in France and 16% in Spain (raised to 18% during 2010). A 7% reduce VAT rate, applied to a selection of good and services, is present in Germany and Spain (raised to 8% during 2010 in Spain), while the reduced rate is of 5.5% in France. Super reduced rates are present in Spain and France, which are applied to special goods such as e.g. pharmaceuticals. Zero rate and exceptions are present in all the three countries, following the provision of the EU VAT Directive.

**Table 1: VAT rates across countries, 2010**

Country	VAT	VAT reduced	VAT super-reduced
France	19.6	5.5	2.1
Germany	19.0	7	-
Spain	16/18	7/8	4

*Note: In Spain, in July 2010 the rates where increased.*

The simple VAT calculator applies the relevant VAT rate to each detailed expenditure recorded in EU HBS, using the highest possible level of granularity. To consider the reform that modified the standard and the reduced VAT rates in Spain in mid-2010, for modelling purposes we use the average of the pre- and post-reform values of the relevant rates.

When one category of expenditures includes good and services that are taxed at different rates, we apply the rate that is ranked first in the list provided in European Commission (2010). This limitation might affect the precision of the simulations. Table A1 in the Appendix gives an overview about the specific products and the corresponding VAT rates used in our model.

We hence simulate household VAT liabilities as follows, accounting for the fact that observed expenditures in goods and services already includes VAT. Each commodity  $k$  has price net of VAT  $p_k$ , a VAT rate  $t_k$ . The consumer price  $cp_k$  can therefore be defined as:

$$cp_k = (1 + t_k) * p_k \quad (1)$$

Expenditures  $e_k$  are therefore defined as consumer price  $cp_k$  times the quantity of the commodity consumer price  $q_k$ :

$$e_k = cp_k * q_k = (1 + t_k) * p_k * q_k \quad (2)$$

Using (1) and (2), we calculate the VAT burden  $T_k$  for each commodity:

$$T_k = t_k * p_k * q_k = \frac{t_k}{1-t_k} * e_k \quad (3)$$

To calculate the total VAT burden  $T$  of a household, we sum up over all commodities. We compute the effective VAT tax rates  $eVAT$  dividing  $T$  by the total disposable household income  $Y$ .

$$eVAT = \frac{T}{Y} = \frac{\sum_{k=1}^n T_k}{Y} = \frac{\sum_{k=1}^n \frac{t_k}{1-t_k} * e_k}{Y} \quad (4)$$

As a way of validating the simulations of our simple model, we compare the total VAT payments predicted by our model with the European Commission (2018) estimates of VAT liabilities paid by households. Overall, we cover 87.7% of the VAT liabilities in France, 97% in Germany and 91% in Spain (see Table 2).

**Table 2: Macrovalidation of the VAT liabilities, 2010**

	France	Germany	Spain
model prediction (Mio EUR)	88,870	122,200	40,130
European Commission (2018) – year 2010 (Mio EUR)	101,311	125,930	44,103
in %	87.7%	97.0%	91.0%

## 2.2.Descriptive evidence on effective VAT rates

This sub-section provides descriptive evidence on how effective VAT rates vary across household migration statuses. We use the information on citizenship to divide households in three categories: native, EU migrant and non-EU migrant. We define as native those

households whose members are all citizen of the country analysed. EU migrant households are those in which at least one member is citizen of another EU country (but none of countries outside the EU). Non-EU migrant households are those including at least one citizen of a country outside the EU.

Table 3 highlights significant differences in the effective VAT rates faced by households with different migration backgrounds. In the three countries native households pay, on average, lower effective VAT rates than both EU and non-EU migrant households. T-tests confirm the statistical significance of the differences. In France, EU migrants pay on average the highest VAT rate (10.75%), followed by non-EU migrant households (10.21%) and native households (9.13%). In Germany and in Spain non-EU migrants face on average the highest effective VAT rates (11.07% and 11.53% respectively), followed by EU migrants (10.37% and 9.69%) and natives (9.88% and 8.68%).

**Table 3: Main household characteristics**

		Native households	EU migrant households	Non-EU migrant households	P value t-test (vs native)	
		mean	mean	mean	EU migrant	Non-EU migrant
<b>France</b>	Effective VAT rate	9.13%	10.75%	10.21%	0.00	0.00
	Household income	44,460	39,013	47,530	0.05	0.00
	Household expenditure	33,685	32,113	38,431	0.21	0.00
	Expenditure rate	0.88	1.02	0.93	0.00	0.00
<b>Germany</b>	Effective VAT rate	9.88%	10.37%	11.07%	0.02	0.00
	Household income	42433	41608	31410	0.23	0.00
	Household expenditure	34314	33578	26460	0.18	0.00
	Expenditure rate	0.89	0.90	0.92	0.35	0.01
<b>Spain</b>	Effective VAT rate	8.68%	9.69%	11.53%	0.00	0.00
	Household income	33265	26346	22380	0.00	0.00
	Household expenditure	33787	26072	24587	0.00	0.00
	Expenditure rate	1.10	1.13	1.30	0.00	0.00

Source: Author's calculations

Various factors such as income, expenditures or consumption behaviour are likely to explain at least part of the observed heterogeneity in effective VAT rates observed across migration statuses. Table 3 hence also highlights the heterogeneity of household financial circumstances

across the three migration statuses. In France, native households are on average significantly richer than EU migrant households and the non-EU migrant households are significantly poorer. The differences could be justified, at least partly, by larger household size and higher share of working age population among migrants<sup>6</sup>.

In Germany, native and EU migrant households do not show statistically significant differences in their level of income, while native households are significantly richer than non-EU migrants are. In Spain, both EU and non-EU migrant households report a significantly lower income than native households.

Household's total expenditure follows a pattern similar to income. In Germany EU migrant households have similar expenditures as native households while non-EU migrant households have significantly less expenditures. In France, natives report the highest total expenditures, followed by non-EU migrants and EU migrants. In Spain, natives spend more than EU migrants and these more than non-EU migrants.

Holding income constant, some types of household could face different VAT payments if their expenditure (or saving) behaviour was different from those of the other groups. Table 3 reports the expenditure rate, defined as the ratio between total household income and total expenditures. The ratio is computed for every households separately and then averaged within migration groups. This explains why the expenditure rate differ from the ratio between the average household expenditures and average household income reported in Table 3. We find that in the three countries both EU and non-EU migrant households consume a higher share of their income than native households. Since the expenditure rate is equivalent to 1

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<sup>6</sup> A non-EU migrant household has an average size of 3.93 members, while a native household has on average 2.52 persons (see table A1 in appendix). Also in the SILC data, migrant households (Non-EU) tend to have a higher household income in France.

minus the savings rate, we can compare these figures with macro data from the OECD <sup>7</sup>. We find that the 2010 net household saving rate for Germany and France was about 10.3% and 10.5%, hence close to our finding. The comparison is less good in Spain (and in France for EU migrant households), where we find evidence of an expenditure rate above one, equivalent to a negative saving rate, while OECD data highlight a saving rate of about 5.1%. In this respect, it should be noted that mean expenditure rates can be influenced substantially by extreme values. Looking at the median, native households Spain end up with a savings rate of about 1%, the total population with a saving rate of 0%. Additionally, the result for Spain highlights the consequences of the strong economic downturn of the crisis, when a significant share of the population had to rely heavily on their savings due to substantial losses in income (Arce et al., 2013).

Additional characteristics, such as the household-type, the main activity status of the household, the education level of the household head but also regional distribution differ substantial across migration status. Detailed information on those differences by country can be found in Table A2 to Table A4 in the Appendix.

In addition to total expenditures, the type of good and services purchased is also likely to influence effective VAT rates since different VAT rates are applied to different good and services. Table 4 reports the share of household expenditure devoted to 12 main categories of goods and services recorded in the EU HBS, built aggregating the detailed expenditures.<sup>8</sup> The table allows appreciating the heterogeneity of the expenditure patterns of native and migrant households across countries.

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<sup>7</sup> The OECD defines net household savings as household net disposable income plus the adjustment for the change in pension entitlements less household final consumption expenditure. Data from: OECD, National Account at a glance, Household savings (indicator). doi: 10.1787/cfc6f499-en (Accessed on 13 August 2020)

<sup>8</sup> The 12 main categories are 1) Food and non-alcoholic beverages; 2) Alcoholic beverages, tobacco and narcotics; 3) Clothing and footwear; 4) Housing, water, electricity, gas and other fuels; 5) Furnishings, household equipment and routine maintenance of the house; 6) Health; 7) Transport; 8) Communication; 9) Recreation and culture; 10) Education; 11) Restaurants and Hotels; 12) Miscellaneous goods and services.

It should be noted that the largest expenditure share in the three countries correspond to housing. We see substantial differences in the share of expenditures by migration status spent for housing across the three countries. For example, non-EU migrant household spend more in housing than native households in Germany and Spain, while the opposite is true in France. Heterogeneity occurs also in the second and third largest categories of expenditure, namely food and transport. While non-EU migrant households spend 2.6 p.p. more than native households on food in Germany, the opposite is true in France, where native households spend more than 1 p.p. more than EU and non-EU migrants.

*Table 4: Household consumption behaviour across countries*

	France			Germany			Spain		
	Native	EU migrant	Non-EU migrant	native	EU migrant	Non-EU migrant	Native	EU migrant	Non-EU migrant
Household expenditure	33685	32113	38431	34314	33578	26460	33787	26072	24587
- food	16.5%	15.3%	15.3%	12.2%	12.4%	14.8%	14.7%	14.7%	15.3%
- alcohol	2.6%	2.6%	2.2%	1.6%	1.5%	1.6%	2.2%	3.9%	2.1%
- cloths	4.0%	3.3%	5.1%	4.6%	4.7%	5.1%	5.8%	5.3%	6.9%
- housing	25.6%	27.9%	24.1%	29.2%	30.1%	31.1%	28.1%	30.3%	29.4%
- housing equipment	4.9%	4.9%	4.8%	4.8%	4.7%	3.4%	4.9%	3.9%	4.0%
- health	1.5%	1.5%	1.6%	3.6%	2.5%	2.7%	3.1%	2.9%	1.9%
- transport	14.7%	14.2%	14.4%	14.6%	15.9%	14.3%	13.1%	12.5%	13.9%
- communication	2.8%	3.0%	2.9%	2.6%	2.9%	4.1%	3.0%	4.0%	4.1%
- culture	7.7%	6.6%	7.7%	10.1%	8.9%	8.6%	6.4%	5.8%	5.5%
- education	0.7%	1.0%	0.6%	1.1%	1.4%	1.5%	1.3%	0.9%	1.3%
- restaurants	5.7%	6.3%	7.0%	4.6%	4.5%	3.7%	9.6%	8.9%	9.0%
- others	13.3%	13.4%	14.4%	11.0%	10.4%	9.2%	7.7%	7.0%	6.5%

The descriptive evidence presented in this section shows that heterogeneity in effective VAT rates exists across migration statuses in the three countries. These also present important differences in terms of income, expenditures and other socio-demographic characteristics which could explain, at least in part, the heterogeneity of effective VAT rate. We hence employ a regression analysis to study the extent heterogeneity in effective VAT rates persists after controlling for the observed financial and socio-demographic characteristics of the households.

### 2.3. The econometric model

As already noted, the scope of this paper is to identify whether migrant and native households face different effective VAT rates. Although the descriptive evidence discussed in the previous section points in this direction, it is also possible that socio-economic variables different from migration statutes explain part of the observed heterogeneity. As already noted, differences in effective VAT rate can stem from differences in incomes, savings behaviour -more savings will lead to a lower consumption and therefore to a lower VAT tax burden - or from differences in the consumption behaviour - consuming different goods for which different VAT rates are applied. In addition, other socio-economic factors that could help to explain differences in the effective VAT burden across households through specific consumption behaviours.

To analyse this in more detail, we set up a simple regression analysis consisting in estimating a model of the type described in equation (5):

$$eVAT_i(y_i) = \alpha + \gamma_1 D_{EU} + \gamma_2 D_{Non-EU} + \delta X + \varepsilon_i \quad (5)$$

The dependent variable  $eVAT$  is the effective VAT rate faced by household  $i$ . Coefficients  $\gamma_1$  and  $\gamma_2$  estimates differences in mean effective VAT rates between migrant and native households. In successive model specifications, we add various controls ( $X$ ) to test the extent to which differences between migrant and native household persists.

In specification (2) we include total household income, as well as total consumption. Following Li and Ma (2017), who discuss several models to estimate effective tax functions, we include income with a 4<sup>th</sup> order simple polynomial that is estimated by OLS.



Specification (3) includes among the regressors a categorical variable which accounts for the expenditure preferences of the household as well as regional dummies and indicators of population density.

Expenditure types are identified as low (less than 70% of household income), low to middle (70-85%), middle (85-100%), middle-high (100-115%) and high (above 115%). Despite that we already control for income and expenditures, the variable is expected to add flexibility capturing to our specification capturing specific expenditure behaviours. Additionally to this specification, we also test the robustness of our results when introducing the expenditure rate directly in the model, adding an interaction term between income and expenditures and income and its polynomials and expenditures. Results in Table A5 to Table A7 in the Appendix show that the impact of changing to one of those models is minor, leaving the coefficients of interest unchanged and significant in most specifications.

Regional dummies might be relevant to capture specific local factors common to all those living in the region (e.g. housing prices). Additionally, a density variable allows us to distinguish between rural and urban areas. The information on degree of urbanisation is of special interest, since the literature shows that consumption is greatly affected by regional components (see, e.g. EUROSTAT (2010)).

In specification (4), we additionally control for the household type, the household size, the education of the household head and the general employment status of the household. All these factors are expected to influence various expenditure behaviours of the households.

### 3. Results

The descriptive evidence presented in section 2 highlights the existence of heterogeneity in effective tax rates paid by migrants and native households. This section presents the results of an econometric estimation.

#### 3.1. France

The results for France are listed **Error! Not a valid bookmark self-reference..** The finding from Model (1) confirm what seen in Section 2.2, with both EU and non-EU migrant households experiencing higher effective tax rates than native households. Model (2) adds controls for income and expenditures to Model (1). The coefficients on income and expenditure have the expected sign and are statistically significant. In this specification, Non-EU migrant household continue to face higher effective VAT rates than natives, while the coefficient on EU migrant households lowers substantially and loses statistical significance. The result holds in specification (3), where we include controls for expenditure behaviour, regional dummies and indicators for population density. We can also appreciate a strong regional dispersion of the effective VAT rate. While for example the effective VAT rate is about 0.3 p.p. higher in the Bassin Parisien than in the Ile de France region, in the Departments D'Outre-Mer show a 0.4 percentage point lower effective VAT rate. As expected, population density is also expected to influence consumption behaviours. We distinguish between region with high, middle and low population density and we find that the effective VAT rate is significantly lower in rural areas than in urban ones. Middle densely populated region have a 0.7 percentage points lower effective VAT rate than highly densely populated regions. For low densely populated areas it is even 0.11 percentage point.

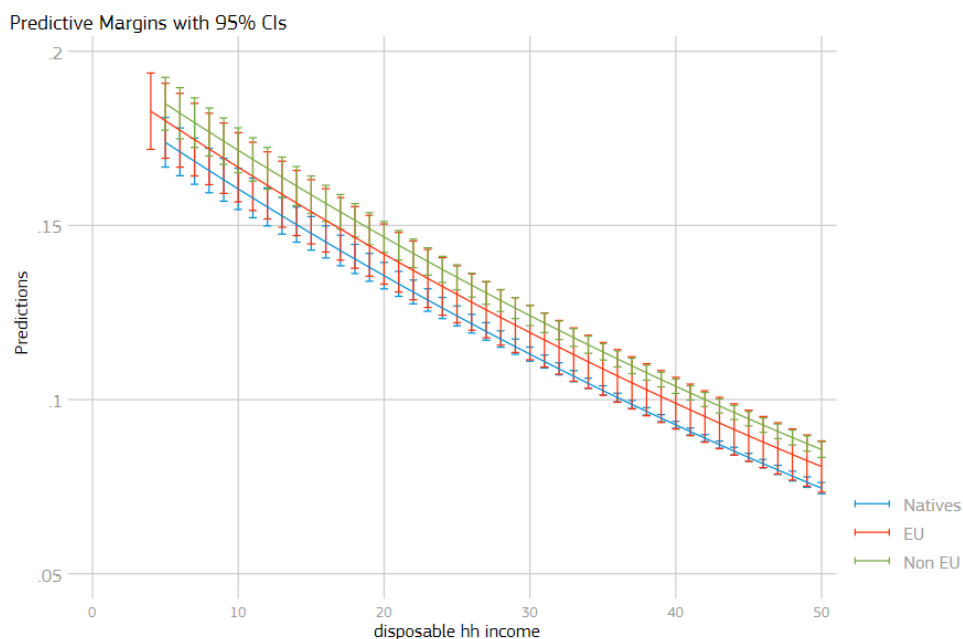
Adding more socio-demographic controls (specification 4) increases the coefficient on non-EU migrant, who face effective VAT rate about 1.1 p.p. higher than native household.

*Table 5: Regression results - France*

	(1) eVAT	(2) eVAT	(3) eVAT	(4) eVAT
<b>Migartion status (ref. native)</b>				
EU migrant	0.016 (2.65)**	0.006 (1.54)	0.003 (0.64)	0.006 (1.63)
Non-EU migrant	0.011 (10.10)**	0.006 (8.53)**	0.005 (7.90)**	0.011 (8.20)**
hh income		-0.005 (36.25)**	-0.003 (21.69)**	-0.003 (20.98)**
hh income^2		0.000 (17.55)**	0.000 (14.48)**	0.000 (14.01)**
hh income^3		-0.000 (11.15)**	-0.000 (10.17)**	-0.000 (9.94)**
hh income^4		0.000 (9.70)**	0.000 (9.06)**	0.000 (8.87)**
hh expenditures		0.003 (66.07)**	0.002 (20.35)**	0.002 (21.03)**
<b>Spending status (ref: high)</b>				
Low			-0.084 (33.83)**	-0.078 (31.91)**
low-middle			-0.078 (42.66)**	-0.073 (41.43)**
middle			-0.070 (43.61)**	-0.065 (43.47)**
Middle-high			-0.059 (38.45)**	-0.056 (39.07)**
<b>region (ref Ile de France)</b>				
Bassin Parisien			0.003 (2.95)**	0.005 (4.18)**
North – Pas de Calais			-0.001 (0.69)	0.000 (0.27)
East			0.008 (5.54)**	0.009 (5.98)**
West			0.004 (2.72)**	0.005 (3.21)**
South-east			0.001 (1.08)	0.002 (1.62)
Center - east			0.003 (2.58)**	0.004 (3.30)**
Mediterranee			0.002 (1.26)	0.004 (2.85)**
Departements D'Outre Mer			-0.004 (3.31)**	-0.003 (2.56)*
Rest			0.027 (8.75)**	0.028 (8.77)**
<b>population density (ref. high)</b>				
Middle			-0.007 (7.05)**	-0.005 (5.28)**
Low			-0.011 (13.06)**	-0.008 (11.28)**
Constant	0.091 (147.82)**	0.147 (56.31)**	0.193 (68.52)**	0.194 (68.39)**
Add. Controls	No	No	No	Yes
R-squared	0.01	0.51	0.60	0.62
R-squared adj.	0.01	0.51	0.60	0.62
RMSE	0.0717	0.0504	0.0456	0.0445
Observations	40,762	40,762	40,762	40,762

Predicting the outcomes of the model (specification (4)) on the different household types for France, Figure 1 highlights the statistically significant differences between the effective VAT rate faced by native and non-EU migrant households across the income distribution. EU migrant households also face higher VAT rate, but differences with native households are less clear cut. In line with the existing literature, the results confirm the regressivity of VAT with respect to income. The results also suggest that consumption behaviours specific to non-EU migrants in France lead to differences in the effective VAT rate faced, especially compared to native households. However, differences between EU-migrant households and natives are not significantly different from each other.

**Figure 1: Model prediction of the effective VAT rate by citizenship - France**



### 3.2. Germany

Table 6 reports the estimates of our model for Germany. The coefficients on being migrant, either EU or non-EU, lose size and statistical significance adding controls, and lose statistical significance in specification (4). As expected, household income and expenditure in Germany are important predictors of the effective VAT rate.

**Table 6: Regression results - Germany**

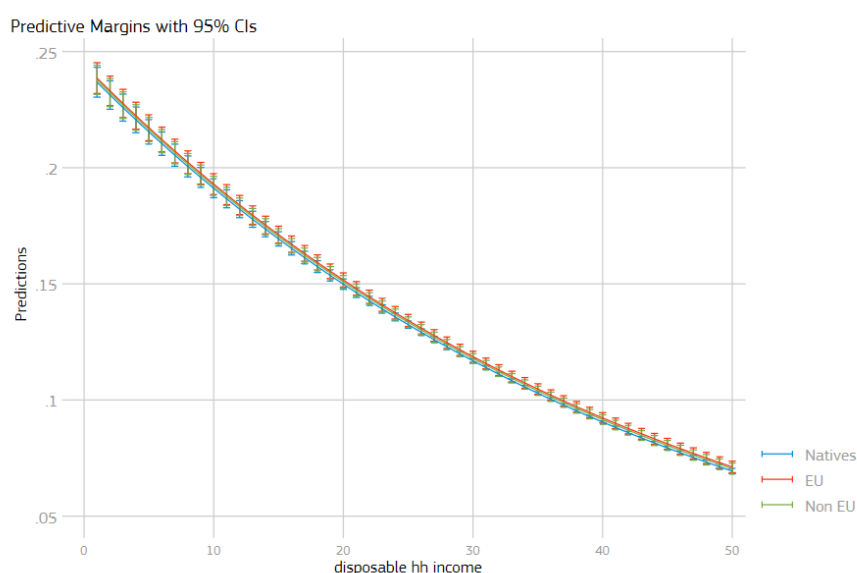
	(1) eVAT	(2) eVAT	(3) eVAT	(4) eVAT
<b>Migartion status (ref. native)</b>				
EU migrant	0.005 (2.49)*	0.003 (2.59)**	0.003 (2.37)*	0.002 (1.62)
Non-EU migrant	0.012 (6.89)**	0.002 (2.51)*	0.003 (3.62)**	0.001 (1.11)
hh income		-0.006 (44.37)**	-0.005 (35.18)**	-0.006 (32.61)**
hh income^2		0.000 (19.07)**	0.000 (17.72)**	0.000 (18.36)**
hh income^3		-0.000 (11.67)**	-0.000 (11.50)**	-0.000 (12.72)**
hh income^4		0.000 (8.27)**	0.000 (8.52)**	0.000 (9.70)**
hh expenditures		0.003 (83.19)**	0.002 (39.15)**	0.002 (39.32)**
<b>Spending status (ref: high)</b>				
Low			-0.049 (31.51)**	-0.049 (31.43)**
low-middle			-0.052 (50.54)**	-0.052 (50.70)**
middle			-0.047 (56.32)**	-0.047 (56.90)**
Middle-high			-0.039 (51.39)**	-0.039 (52.39)**
<b>region (ref DE0)</b>				
DE3			-0.000 (1.33)	-0.001 (1.39)
DE4			-0.001 (2.00)*	-0.001 (2.11)*
DE5			0.003 (8.46)**	0.002 (5.84)**
<b>population density (ref. high)</b>				
Middle			-0.003 (11.26)**	-0.003 (13.87)**
Low			-0.004 (8.95)**	-0.005 (11.93)**
Constant	0.099 (486.21)**	0.176 (93.44)**	0.202 (100.14)**	0.216 (87.44)**
Add. Controls	no	no	no	yes
R-squared	0.00	0.63	0.68	0.69
R-squared adj.	0.00	0.63	0.68	0.69
RMSE	0.0565	0.0343	0.0318	0.0315
Observations	122,373	122,373	122,373	122,373

The coefficient on regional dummies indicates that the indirect tax burden differs significantly across regions. These differences are in the range of -0.1 to 0.2 percentage points. We also find that in areas with middle (low) density, people face a 0.3 (0.5)

percentage point lower effective VAT rate than people that live in regions with high population density.

Plotting the predicted effective VAT rate from specification (4) by migration status along the household income, Figure 2 highlights that the model does not predict significant differences for native households and migrant households (EU and Non-EU).

**Figure 2: Model prediction of the effective VAT rate by citizenship - Germany**



### 3.3. Spain

Table 7 reports the results of the regression analysis for Spain. The results confirm along all the model specification that both EU and non-EU migrants face a significantly higher effective VAT rate than natives. Depending on the specification, EU migrants face effective VAT rate between 0.7 and 1.1 p.p. higher than native. Non-EU migrant household face even larger differences, ranging between 2.8 in the simple model that does not control for anything (1) and 1.2 p.p. when using all controls in model (4).

**Table 7: Regression results - Spain**

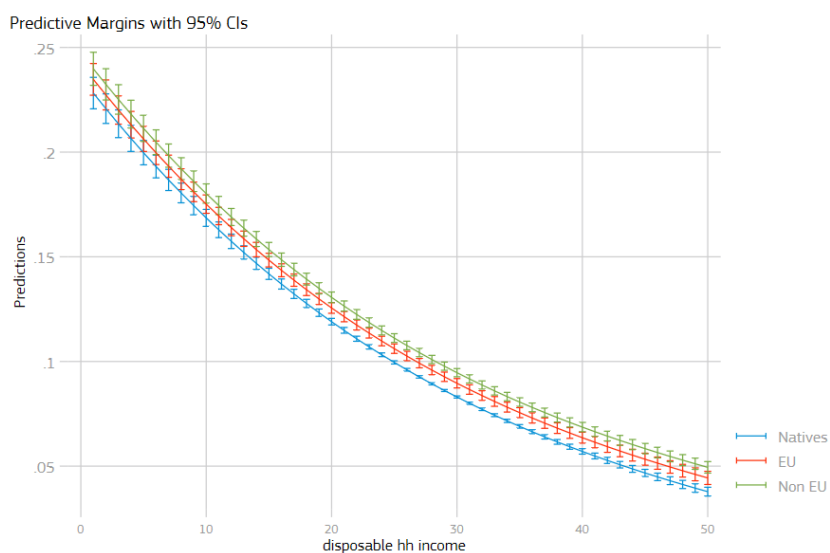
	(1) eVAT	(2) eVAT	(3) eVAT	(4) eVAT
<b>Migartion status (ref. native)</b>				
EU migrant	0.010 (5.11)**	0.011 (8.50)**	0.010 (8.48)**	0.007 (5.77)**
Non-EU migrant	0.028 (16.36)**	0.017 (16.05)**	0.018 (16.65)**	0.012 (11.24)**
hh income		-0.008 (36.34)**	-0.007 (28.11)**	-0.008 (30.68)**
hh income^2		0.000 (20.39)**	0.000 (19.15)**	0.000 (21.26)**
hh income^3		-0.000 (15.27)**	-0.000 (15.47)**	-0.000 (16.98)**
hh income^4		0.000 (12.11)**	0.000 (12.74)**	0.000 (13.96)**
hh expenditures		0.003 (94.20)**	0.003 (41.28)**	0.003 (42.53)**
<b>Spending status (ref: high)</b>				
Low			-0.024 (14.88)**	-0.018 (10.73)**
low-middle			-0.029 (24.74)**	-0.024 (20.12)**
middle			-0.029 (33.89)**	-0.025 (28.70)**
Middle-high			-0.026 (40.96)**	-0.023 (35.76)**
<b>region (ref. Northwest)</b>				
Northeast			-0.004 (8.05)**	-0.003 (7.69)**
Madrid			-0.003 (4.69)**	-0.003 (4.69)**
Center			0.002 (3.31)**	0.001 (1.58)
East			-0.003 (6.86)**	-0.004 (7.82)**
South			0.002 (3.86)**	0.001 (1.42)
Canarias			0.003 (2.72)**	0.000 (0.19)
<b>population density (ref. high)</b>				
Middle			-0.000 (0.28)	-0.000 (0.93)
Low			0.002 (3.78)**	0.002 (3.76)**
Constant	0.087 (321.26)**	0.147 (56.63)**	0.152 (62.46)**	0.141 (55.42)**
Add. Controls	no	no	no	yes
R-squared	0.02	0.61	0.64	0.66
R-squared adj.	0.02	0.61	0.64	0.66
RMSE	0.0569	0.0359	0.0344	0.0334
Observations	62,245	62,245	62,245	62,245

Similar to France and Germany, the results highlight the importance of controlling for the household financial and socio-demographic circumstances as well as for regional dummies.

When looking at the population density, we find that the effective tax rate in rural areas was significantly higher (0.2 p. p.) compared to urban areas in Spain<sup>9</sup>.

Figure 3 plots the predicted the effective VAT rate from specification (4) by migration status. As expected, the chart highlights the regressivity of the VAT, and additionally the significant differences across the income distribution in Spain. While for very low incomes, the model predictions seem to indicate less significant differences in the predicted effective VAT rate, at least for natives and EU migrants. The differences between migrant and native household become larger further up in the income distribution, highlighting that in Spain, different consumption behaviour of native and migrant households leads to a higher effective VAT rate for both EU and Non-EU migrants.

**Figure 3: Model prediction of the effective VAT rate by citizenship - Spain**



<sup>9</sup> When interpreting these results, one has to keep in mind that the crisis year of 2010 potential influenced regions across Spain differently. The impact on both, income and savings across regions could be very different and could have changed substantially after the crisis.



## 4. Conclusions

VAT represent an important item in the tax mix of the great majority of advanced economies. After the Great Recession, various EU member states resorted to VAT reform for budgetary consolidations. In addition, recent years have seen a growing interest in policy aims at switching taxation from labour to less distortionary bases, among which consumption.

The recent COVID-19 pandemic has required important policy interventions from various countries, some of them consisting also in temporary delays of VAT payments or temporary reductions in its rates. It is still early to say whether future policy interventions will also involve VAT reforms to partially consolidate public finances after the crisis. Nevertheless, it is still clear that VAT reforms represent an important tool at disposal of policy makers for either budgetary or efficiency purposes.

Who bears the cost of VAT is hence a question of great importance. Various studies have shown the regressive nature of VAT, whose systems of reduced rates fails in counterbalancing. In this paper, we focused on who bears higher VAT payments between native and migrant household in three European countries. The question is of interest from both a distributional and a budgetary perspective, fitting in the ongoing debate of the fiscal cost of migration.

We used data from the 2010 HBS and a simple VAT calculator to compute effective VAT rates for samples of native, EU migrant and non-EU migrant households in France, Germany and Spain. Built as the ratio of VAT payments over household income, effective VAT rates capture the share of household income spent in VAT well. Following descriptive evidence showing the existence of gaps in effective VAT rates by household migration status, we perform a simple regression analysis aimed at testing the robustness of this finding to the

inclusion of factors likely associated to household financial and socio-economic circumstances.

Our results confirm the existence of a gap in effective VAT rates between native and non-EU migrant households in France and in Spain. In Spain, a statistically significant gap is also observed between native and EU migrant households. We found no significant gap in Germany. Additionally, our analysis highlights substantial differences in the effective tax rates across regions but also across different degrees of urbanization, confirming the correlation of that these dimensions with final consumptions (EUROSTAT, 2010). Our findings also support the existing evidence of regressivity of VAT with respect to income.

Although being of purely descriptive nature, the finding suggests that revenue rising VAT reforms might have important distributional drawbacks that should be evaluated to enhance the fairness of the tax systems. Moreover, the findings advocate for the importance of considering indirect taxation as well as direct taxation and benefit expenditures for the assessment of the fiscal cost of migration.

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## 6. Appendix

*Table A1: VAT rates according to the EC (2010)*

Category	DE	ES	FR
<b>Foodstuffs</b>	7 (19)	4 (7)	5.5 (19.6)
<b>Water supplies</b>	7	7	5.5
<b>Pharmaceutical products</b>	19	4 (16)	2.1 (5.5, 19.6)
<b>Transport of passengers</b>	7 (19)	7	5.5
<b>Books, Newspapers, Periodicals</b>			
<i>Books</i>	7	4 (16)	5.5 (19.6)
<i>Newspaper</i>	7	4 (16)	2.1 (19.6)
<i>Periodicals</i>	7	4 (16)	2.1 (19.6)
<b>Admission to cultural services</b>	[ex] (7)	[ex] (7)	5.5 (19.6)
<b>Renovation of private dwellings</b>	19	7	5.500
<b>Hotel accommodation</b>	7	7	5.5
<b>Restaurants</b>	19	7	5.5
<b>Social services</b>	7	7	19.6
<b>Medical and dental care</b>	7 [ex]	7	[ex]
<b>Beverages</b>			
<i>Spirits</i>	19	16	19.6
<i>Wine</i>	19	16	19.6
<i>Beer</i>	19	16	19.6
<i>Mineral water</i>	19	7	5.5
<i>Lemonade</i>	19	7	5.5
<i>Fruit juices</i>	19	7	5.5
<b>Clothing</b>			
<i>Adults</i>	19	16	19.6
<i>Children</i>	19	16	19.6
<b>Footwear</b>			
<i>Adults</i>	19	16	19.6
<i>Children</i>	19	16	19.6
<b>Tobacco</b>	19	16	19.6
<b>Hifi-Video</b>	19	16	19.6
<b>CD/ CD-ROM</b>	19	16	19.6
<b>Household electrical appliances</b>	19	16	19.6
<b>Furs</b>	19	16	19.6
<b>Jewels</b>	19	16	19.6

Source: European Commission (2010)

Category	DE	ES	FR
<b>Energy Products</b>			
<i>Natural gas</i>	19	16	19,6 (5,5)
<i>Electricity</i>	19	16	19,6 (5,5)
<i>Firewood</i>	7	16	5.5
<i>Timber for industrial use</i>	7 (19)	16	19.6
<b>Telecommunication services</b>			
<i>Phone/ fax/ telex/etc.</i>	19	16	19.6
<i>Pay TV/ cable TV</i>	19	16	5.5
<i>TV licence</i>	[ex]	16	2.1
<b>Petroleum products</b>			
<i>Petrol (unleaded)</i>	19	16	19.6
<i>Diesel fuel</i>	19	16	19.6
<i>LPG</i>	19	16	19.6
<i>Heating oil</i>	19	16	19.6
<i>Lubricants</i>	19	16	19.6
<b>Motor vehicles</b>	19	16	19.6
<b>Passenger transport</b>			
<i>Air</i>	19	7	5.5
<i>Sea</i>	19 (7 )	7	5.5
<i>Inland waterway</i>	19 (7 )	7	5.5
<i>Rail</i>	19 (7 )	7	5.5
<i>Road</i>	19 (7 )	7	5.5
<b>Bars and cafés</b>			
<i>Bars and cafés</i>	19	7	5.5
<i>Night clubs</i>	19	7	5.5
<i>Alcoholic beverages</i>	19	7	19.6
<b>Immovable property</b>			
<i>Social Housing</i>	19	4 (7)	5,5 (19,6)
<i>Renovation and repairing</i>	19	7	5,5 (19,6)
<i>Building land</i>	[ex]	16	19.6
<i>Supplies of new buildings</i>	[ex]	7 (16)	19.6
<i>Construction work on new buildings</i>	19	4 (7)	19.6
<b>Services supplied by lawyers</b>	19	16	19,6 (5,5)

**Table A2: Summary statistics for Germany**

	natives		EU migrants		Non-EU migrants		t-test (p-values)	
	mean	SD	mean	SD	mean	SD	EU	Non-EU
effective VAT	0.0988	(0.06)	0.1037	(0.06)	0.1107	(0.05)	0.0173	0.0000
hh income	42433	(27121)	41608	(28651)	31410	(21167)	0.2292	0.0000
Savings	8119	(18412)	8030	(18543)	4950	(13300)	0.8781	0.0000
hh expenditures	34314	(21551)	33578	(20827)	26460	(17109)	0.1786	0.0000
Expenditure rate	0.8897	(0.41)	0.9005	(0)	0.9201	(0.36)	0.3478	0.0095
<b>Expenditure type</b>								
Food	4178	(2177)	4178	(2239)	3910	(1831)	0.1878	0.0000
Alcohol	548	(749)	520	(755)	423	(676)	0.1860	0.0000
Cloths	1584	(1653)	1564	(1678)	1352	(1254)	0.1263	0.0000
Housing	10032	(5085)	10096	(5049)	8233	(3721)	0.6015	0.0000
housing equipment	1650	(4090)	1573	(3468)	891	(1672)	0.2474	0.0000
Health	1244	(3292)	851	(1752)	707	(1723)	0.0001	0.0000
Transport	5027	(10832)	5341	(10644)	3783	(10045)	0.2497	0.0235
communication	886	(580)	980	(622)	1072	(660)	0.0000	0.0000
culture	3476	(4320)	2995	(3749)	2265	(3052)	0.0001	0.0000
education	368	(1187)	463	(1298)	408	(880)	0.0001	0.0507
restaurants	1562	(2121)	1527	(2471)	979	(1798)	0.5374	0.0000
others	3760	(4199)	3491	(3935)	2436	(2900)	0.0995	0.0000
size	2.65	(1.27)	2.71	(1.25)	2.86	(1.20)	0.4303	0.0027
<b>Education</b>								
primary or less	0.1716	(0.38)	0.1002	(0.30)	0.1480	(0.36)	0.0000	0.0000
lower secondary	0.0915	(0.29)	0.1260	(0.33)	0.1851	(0.39)	0.0060	0.0126
upper secondary	0.3870	(0.49)	0.2998	(0.46)	0.2505	(0.43)	0.0111	0.0000
post-secondary	0.0694	(0.25)	0.0818	(0.27)	0.0451	(0.21)	0.0000	0.0000
tertiary (1st stage)	0.2691	(0.44)	0.3716	(0.48)	0.3509	(0.48)	0.7861	0.0000
tertiary (2nd stage)	0.0114	(0.11)	0.0205	(0.14)	0.0205	(0.14)	0.3206	0.8445
<b>Region</b>								
NUTS_1	0.5020	(0.50)	0.6337	(0.48)	0.5679	(0.50)	0.1814	0.0104
NUTS_2	0.1334	(0.34)	0.1526	(0.36)	0.1623	(0.37)	0.0227	0.0038
NUTS_3	0.1625	(0.37)	0.1327	(0.34)	0.2032	(0.40)	0.0106	0.0000
NUTS_4	0.2021	(0.40)	0.0810	(0.27)	0.0666	(0.25)	0.0001	0.7409
<b>Population density</b>								
high density	0.5118	(0.50)	0.6592	(0.47)	0.7163	(0.45)	0.0006	0.0000
middle density	0.3732	(0.48)	0.2836	(0.45)	0.2522	(0.43)	0.0000	0.0000
low density	0.1150	(0.32)	0.0572	(0.23)	0.0315	(0.17)	0.0000	0.0000
<b>Household type</b>								
one adult	0.1950	(0.40)	0.1774	(0.38)	0.1026	(0.30)	0.0190	0.0011
two adults	0.3045	(0.46)	0.2949	(0.46)	0.3383	(0.47)	0.0000	0.0000
>2 adults	0.0641	(0.24)	0.0564	(0.23)	0.0408	(0.20)	0.0000	0.0000
one adult with children	0.0561	(0.23)	0.0403	(0.20)	0.0264	(0.16)	0.0000	0.0000
2 adults with children	0.3423	(0.47)	0.4103	(0.49)	0.4645	(0.50)	0.0000	0.0000
>2 adults with children	0.0380	(0.19)	0.0208	(0.14)	0.0274	(0.16)	0.0000	0.0000
<b>Activity status</b>								
working	0.4300	(0.50)	0.4931	(0.50)	0.3361	(0.47)	0.0000	0.0012
unemployed	0.0558	(0.23)	0.0907	(0.29)	0.1505	(0.36)	0.0001	0.0000
retired	0.2223	(0.42)	0.1329	(0.34)	0.0617	(0.24)	0.0000	0.0000
student	0.0673	(0.25)	0.0583	(0.23)	0.0834	(0.28)	0.0021	0.0033
family work (unpaid)	0.0715	(0.26)	0.1527	(0.36)	0.2839	(0.45)	0.0000	0.0001
disabled	0.1531	(0.36)	0.0723	(0.26)	0.0844	(0.28)	0.0008	0.0002

*Table A3: Summary statistics for France*

	natives		EU migrant		Non-EU migrant		t-test (p-values)	
	mean	SD	mean	SD	mean	SD	EU	Non-EU
Effective VAT	0.0913	(0.07)	0.1075	(0.11)	0.1021	(0.07)	0.0000	0.0000
Hh income	44460	(35936)	39013	(27699)	47530	(33519)	0.0567	0.0000
savings	10775	(29224)	6900	(25856)	9099	(26028)	0.0010	0.0000
hh expenditures	33685	(20140)	32113	(21688)	38431	(21427)	0.2174	0.0000
Expenditure rate	0.8846	(0.57)	1.0196	(1)	0.9306	(0.54)	0.0002	0.0000
<b>Expenditure type</b>								
food	5544	(4738)	4901	(3812)	5886	(4957)	0.0700	0.6204
alcohol	867	(1682)	828	(1701)	861	(1630)	0.1307	0.0000
cloths	1340	(1829)	1062	(1606)	1945	(2127)	0.0146	0.0000
housing	8616	(4393)	8963	(4582)	9274	(5243)	0.0000	0.0000
housing equipment	1664	(3051)	1568	(3346)	1833	(3032)	0.6681	0.0017
health	510	(981)	484	(855)	600	(1096)	0.1242	0.0001
transport	4954	(7667)	4566	(7786)	5529	(7920)	0.5512	0.0000
communication	958	(651)	975	(654)	1104	(741)	0.7343	0.0113
culture	2598	(3832)	2108	(2739)	2946	(3881)	0.3946	0.0000
education	233	(1203)	332	(1880)	242	(1163)	0.3787	0.5643
restaurants	1904	(3147)	2014	(3410)	2673	(3142)	0.0337	0.0000
others	4497	(4139)	4313	(5870)	5537	(5723)	0.3496	0.0895
size	2.52	(1.30)	2.52	(1.27)	3.93	(1.22)	0.0474	0.0000
<b>Education</b>								
primary or less	0.0953	(0.29)	0.0603	(0.24)	0.0017	(0.04)	0.0000	0.0000
lower secondary	0.1298	(0.34)	0.0419	(0.20)	0.0077	(0.09)	0.2574	0.0000
upper secondary	0.2017	(0.40)	0.0938	(0.29)	0.0098	(0.10)	0.1429	0.0000
post-secondary	0.1565	(0.36)	0.0911	(0.29)	0.0114	(0.11)	0.0102	0.0000
tertiary (1st stage)	0.0795	(0.27)	0.0295	(0.17)	0.0049	(0.07)	0.1808	0.0000
tertiary (2nd stage)	0.1068	(0.31)	0.1258	(0.33)	0.0140	(0.12)	0.0048	0.0000
not spec	0.2304	(0.42)	0.5577	(0.50)	0.9505	(0.22)	0.0648	0.0000
<b>Region</b>								
Ile de France	0.1664	(0.37)	0.3333	(0.47)	0.2023	(0.40)	0.0002	0.0000
BASSIN PARISIEN	0.1738	(0.38)	0.0925	(0.29)	0.1573	(0.36)	0.0000	0.0000
North - PAS-DE-CALAIS	0.0611	(0.24)	0.0214	(0.15)	0.0606	(0.24)	0.0000	0.0000
East	0.0858	(0.28)	0.1162	(0.32)	0.0822	(0.27)	0.6683	0.0000
West	0.1318	(0.34)	0.0608	(0.24)	0.1232	(0.33)	0.0004	0.0000
South-east	0.1083	(0.31)	0.1115	(0.32)	0.0986	(0.30)	0.0927	0.0000
Center-east	0.1202	(0.33)	0.1265	(0.33)	0.1084	(0.31)	0.0021	0.0000
MÉDITERRANÉE	0.1248	(0.33)	0.1350	(0.34)	0.1272	(0.33)	0.6550	0.0000
DÉPARTEMENTS								
D'OUTRE-MER	0.0265	(0.16)	0.0028	(0.05)	0.0337	(0.18)	0.6430	0.0000
<b>Population density</b>								
high density	0.4538	(0.50)	0.5219	(0.50)	0.4705	(0.50)	0.1927	0.0000
middle density	0.1989	(0.40)	0.2339	(0.42)	0.1878	(0.39)	0.0521	0.0000
low density	0.3473	(0.48)	0.2442	(0.43)	0.3417	(0.47)	0.0000	0.0000
<b>Household type</b>								
one adult	0.2172	(0.41)	0.1750	(0.38)	0.0161	(0.13)	0.0336	0.0000
two adults	0.3639	(0.48)	0.4149	(0.49)	0.0287	(0.17)	0.8234	0.0000
>2 adults	0.0510	(0.22)	0.0513	(0.22)	0.0070	(0.08)	0.8250	0.0000
one adult with children	0.0485	(0.21)	0.0404	(0.20)	0.1391	(0.35)	0.0000	0.0000
2 adults with children	0.2897	(0.45)	0.2844	(0.45)	0.7753	(0.42)	0.0000	0.0000
>2 adults with children	0.0296	(0.17)	0.0340	(0.18)	0.0339	(0.18)	0.9192	0.0000
<b>Activity status</b>								
working	0.4459	(0.50)	0.4745	(0.50)	0.2947	(0.46)	0.0652	0.0000
unemployed	0.0601	(0.24)	0.0664	(0.25)	0.0465	(0.21)	0.0000	0.0000
retired	0.3033	(0.46)	0.3203	(0.47)	0.0160	(0.13)	0.0000	0.0000
student	0.1293	(0.34)	0.0416	(0.20)	0.0153	(0.12)	0.0051	0.0000
family work (unpaid)	0.0377	(0.19)	0.0686	(0.25)	0.0450	(0.21)	0.0392	0.0000
disabled	0.0236	(0.15)	0.0288	(0.17)	0.0076	(0.09)	0.0020	0.0000
military or community service	0.0001	(0.01)	0.0000	(0.00)	0.5749	(0.49)	0.0000	0.0000

*Table A4: Summary statistics for Spain*

	natives		EU migrant		Non-EU migrant		t-test (p-values)	
	mean	SD	mean	SD	mean	SD	EU	Non-EU
Effective VAT	0.0868	(0.06)	0.0969	(0.06)	0.1153	(0.07)	0.0000	0.0000
Hh income	33265	(18846)	26346	(16753)	22380	(16604)	0.0000	0.0000
savings	-522	(14752)	274	(14110)	-2207	(11301)	0.4931	0.0000
hh expenditures	33787	(19128)	26072	(14456)	24587	(15570)	0.0000	0.0000
Expenditure rate	1.1012	(0.52)	1.1322	(1)	1.2989	(0.69)	0.0004	0.0000
<b>Expenditure type</b>								
food	4965	(3015)	3836	(1961)	3761	(2339)	0.0000	0.0000
alcohol	738	(973)	1006	(1141)	512	(719)	0.0000	0.0000
cloths	1975	(2844)	1371	(1877)	1692	(2234)	0.0000	0.0000
housing	9501	(5291)	7888	(4260)	7232	(3699)	0.0000	0.0000
housing equipment	1650	(2727)	1021	(1485)	995	(3486)	0.0000	0.0000
health	1055	(2800)	752	(3463)	472	(1824)	0.0003	0.0000
transport	4440	(6544)	3265	(3938)	3424	(3943)	0.0000	0.0000
communication	1028	(740)	1042	(871)	1009	(941)	0.4250	0.0623
culture	2147	(3121)	1510	(2112)	1360	(1943)	0.0000	0.0000
education	437	(1348)	242	(952)	317	(1209)	0.0000	0.0000
restaurants	3250	(3997)	2312	(2947)	2209	(3259)	0.0000	0.0000
others	2600	(3090)	1828	(2419)	1603	(1978)	0.0000	0.0000
size	3.20	(1.23)	2.96	(1.22)	3.81	(1.54)	0.3568	0.0000
<b>Education</b>								
less than primary	0.0158	(0.12)	0.0023	(0.05)	0.0205	(0.14)	0.0000	0.0000
primary	0.1917	(0.39)	0.0891	(0.29)	0.1287	(0.33)	0.4293	0.4203
secondary	0.2656	(0.44)	0.2513	(0.43)	0.2732	(0.45)	0.0000	0.0000
post-secondary	0.1532	(0.36)	0.2943	(0.46)	0.2237	(0.42)	0.0004	0.0000
tertiary	0.2149	(0.41)	0.2307	(0.42)	0.1626	(0.37)	0.0000	0.0000
not spec.	0.1588	(0.37)	0.1322	(0.34)	0.1913	(0.39)	0.0000	0.6770
<b>Region</b>								
Northwest	0.1035	(0.30)	0.0348	(0.18)	0.0334	(0.18)	0.5520	0.0071
Northeast	0.0985	(0.30)	0.0681	(0.25)	0.0693	(0.25)	0.9493	0.0000
Madrid	0.1305	(0.34)	0.1669	(0.37)	0.2008	(0.40)	0.0691	0.0000
Center	0.1290	(0.34)	0.0877	(0.28)	0.0601	(0.24)	0.0001	0.0000
East	0.2754	(0.45)	0.3792	(0.49)	0.4148	(0.49)	0.0391	0.0025
South	0.2192	(0.41)	0.1983	(0.40)	0.1674	(0.37)	0.4740	0.0161
Canarias	0.0438	(0.20)	0.0651	(0.25)	0.0540	(0.23)	0.0179	0.0000
<b>Population density</b>								
high density	0.5091	(0.50)	0.4725	(0.50)	0.6182	(0.49)	0.1702	0.8212
middle density	0.2289	(0.42)	0.2495	(0.43)	0.2080	(0.41)	0.0000	0.0013
low density	0.2620	(0.44)	0.2780	(0.45)	0.1738	(0.38)	0.0000	0.0000
<b>Household type</b>								
one adult	0.0723	(0.26)	0.0835	(0.28)	0.0422	(0.20)	0.0000	0.0000
two adults	0.2162	(0.41)	0.2824	(0.45)	0.1603	(0.37)	0.0001	0.0670
>2 adults	0.2075	(0.41)	0.1475	(0.35)	0.1545	(0.36)	0.0031	0.0507
one adult with children	0.0211	(0.14)	0.0098	(0.10)	0.0276	(0.16)	0.0588	0.0000
2 adults with children	0.3690	(0.48)	0.3817	(0.49)	0.3735	(0.48)	0.0483	0.0171
>2 adults with children	0.1126	(0.32)	0.0951	(0.29)	0.2385	(0.43)	0.0176	0.0000
other	0.0013	(0.04)	0.0000	(0.00)	0.0033	(0.06)	0.3396	0.0161
<b>Activity status</b>								
working	0.3911	(0.49)	0.4525	(0.50)	0.4589	(0.50)	0.0920	0.0000
unemployed	0.1036	(0.30)	0.1476	(0.35)	0.1883	(0.39)	0.0018	0.0000
retired	0.1536	(0.36)	0.1362	(0.34)	0.0153	(0.12)	0.0000	0.0000
student	0.0616	(0.24)	0.0409	(0.20)	0.0481	(0.21)	0.9066	0.2808
family work (unpaid)	0.1095	(0.31)	0.0749	(0.26)	0.0835	(0.28)	0.0000	0.0000
disabled	0.1584	(0.37)	0.1322	(0.34)	0.1907	(0.39)	0.8570	0.0000
military or community service	0.0222	(0.15)	0.0156	(0.12)	0.0152	(0.12)	0.0542	0.0000



*Table A5: Additional Regressions, France*

	(1) eVAT	(2) eVAT	(3) eVAT	(4) eVAT
<b>Migartion status (ref. native)</b>				
EU migrant	0.006 (1.63)	0.001 (0.42)	0.008 (2.11)*	0.006 (1.83)
Non-EU migrant	0.011 (8.20)**	0.005 (7.40)**	0.013 (9.21)**	0.012 (9.13)**
hh income	-0.003 (20.98)**	-0.001 (6.69)**	-0.005 (42.11)**	-0.005 (20.82)**
hh income^2	0.000 (14.01)**	0.000 (7.52)**	0.000 (20.80)**	0.000 (11.43)**
hh income^3	-0.000 (9.94)**	-0.000 (7.06)**	-0.000 (19.38)**	-0.000 (3.70)**
hh income^4	0.000 (8.87)**	0.000 (6.78)**	0.000 (18.69)**	-0.000 (4.32)**
hh expenditures	0.002 (21.03)**	0.000 (5.35)**	0.004 (36.47)**	0.006 (37.05)**
<b>Spending status (ref: high)</b>				
Low	-0.078 (31.91)**			
low-middle	-0.073 (41.43)**			
middle	-0.065 (43.47)**			
Middle-high	-0.056 (39.07)**			
Expenditure rate		0.109 (33.90)**		
<b>interactions</b>				
hh income * expenditures			-0.000 (11.26)**	-0.000 (13.36)**
hh income^2 * expenditures				0.000 (7.75)**
hh income^3 * expenditures				-0.000 (7.72)**
hh income^4 * expenditures				0.000 (8.30)**
Constant	0.194 (68.39)**	0.008 (2.24)*	0.137 (57.21)**	0.114 (25.01)**
Add. Controls	yes	yes	yes	yes
R-squared	0.62	0.89	0.61	0.63
R-squared adj.	0.62	0.89	0.61	0.63
RMSE	0.0445	0.0244	0.0451	0.0437
Observations	40,762	40,762	40,762	40,762

\*  $p < 0.05$ ; \*\*  $p < 0.01$

**Table A6: Additional Regressions, Germany**

	(1) eVAT	(2) eVAT	(3) eVAT	(4) eVAT
<b>Migartion status (ref. native)</b>				
EU migrant	0.002 (1.62)	0.003 (4.52)**	0.002 (2.01)*	0.002 (3.03)**
Non-EU migrant	0.001 (1.11)	0.005 (7.37)**	0.002 (2.28)*	0.003 (4.82)**
hh income	-0.006 (32.61)**	-0.002 (25.45)**	-0.009 (52.06)**	-0.011 (61.62)**
hh income^2	0.000 (18.36)**	0.000 (12.34)**	0.000 (31.34)**	0.000 (43.51)**
hh income^3	-0.000 (12.72)**	-0.000 (5.29)**	-0.000 (21.64)**	-0.000 (32.85)**
hh income^4	0.000 (9.70)**	0.000 (2.28)*	0.000 (16.66)**	0.000 (26.19)**
hh expenditures	0.002 (39.32)**	0.001 (18.58)**	0.005 (77.82)**	0.010 (63.51)**
<b>Spending status (ref: high)</b>				
Low	-0.049 (31.43)**			
low-middle	-0.052 (50.70)**			
middle	-0.047 (56.90)**			
Middle-high	-0.039 (52.39)**			
Expenditure rate		0.107 (65.72)**		
<b>interactions</b>				
hh income * expenditures			-0.000 (33.77)**	-0.000 (34.27)**
hh income^2 * expenditures				0.000 (20.32)**
hh income^3 * expenditures				-0.000 (8.84)**
hh income^4 * expenditures				-0.000 (1.33)
Constant	0.216 (87.44)**	0.037 (19.25)**	0.187 (88.54)**	0.151 (71.39)**
Add. Controls	yes	yes	yes	yes
R-squared	0.69	0.87	0.76	0.83
R-squared adj.	0.69	0.87	0.76	0.83
RMSE	0.0315	0.0203	0.0279	0.0231
Observations	122,373	122,373	122,373	122,373

\*  $p < 0.05$ ; \*\*  $p < 0.01$

*Table A7: Additional Regressions, Spain*

	(1) eVAT	(2) eVAT	(3) eVAT	(4) eVAT
<b>Migartion status (ref. native)</b>				
EU migrant	0.007 (5.77)**	0.009 (14.32)**	0.008 (8.01)**	0.010 (11.27)**
Non-EU migrant	0.012 (11.24)**	0.012 (25.60)**	0.014 (14.89)**	0.014 (19.37)**
hh income	-0.008 (30.68)**	0.001 (10.83)**	-0.009 (23.18)**	-0.012 (44.28)**
hh income^2	0.000 (21.26)**	-0.000 (9.60)**	0.000 (11.33)**	0.000 (29.42)**
hh income^3	-0.000 (16.98)**	0.000 (7.93)**	-0.000 (6.29)**	-0.000 (19.60)**
hh income^4	0.000 (13.96)**	-0.000 (6.80)**	0.000 (4.34)**	0.000 (13.80)**
hh expenditures	0.003 (42.53)**	0.000 (2.44)*	0.005 (44.33)**	0.010 (56.44)**
<b>Spending status (ref: high)</b>				
Low	-0.018 (10.73)**			
low-middle	-0.024 (20.12)**			
middle	-0.025 (28.70)**			
Middle-high	-0.023 (35.76)**			
Expenditure rate		0.100 (100.31)**		
<b>interactions</b>				
hh income * expenditures			-0.000 (15.32)**	-0.000 (27.35)**
hh income^2 * expenditures				0.000 (13.80)**
hh income^3 * expenditures				-0.000 (3.41)**
hh income^4 * expenditures				-0.000 (4.13)**
Constant	0.141 (55.42)**	-0.038 (21.75)**	0.119 (34.89)**	0.096 (40.46)**
Add. Controls	yes	yes	yes	yes
R-squared	0.66	0.89	0.73	0.82
R-squared adj.	0.66	0.89	0.73	0.82
RMSE	0.0334	0.0188	0.0299	0.0246
Observations	62,245	62,245	62,245	62,245

\*  $p < 0.05$ ; \*\*  $p < 0.01$

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