Firm-level effects of VAT reverse charge: an empirical analysis of European firms

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Abstract

This paper examines the response of firm outcomes to the optional domestic reverse charge mechanism (RCM) designed to prevent cross-border value-added tax (VAT) fraud in several European Member States. The RCM shifts the VAT liability from the supplier to the buyer and provides a natural experiment in removing fraudulent competition but also suspending the withholding feature of VAT creating risks of increased tax evasion at the retail stage. In this paper, I analyze the comprehensive effects on the business-to-business (B2B) as well as on the business-to-customer (B2C) stages. On average, I find evidence that RCM correlates with lower sales of B2B and B2C firms that decline stronger than costs. However, on the B2B level, this effect is found mainly among large firms. This hints to a positive association between compliance costs and firm size contrary to previous studies. The effects for small firms are weak, suggesting that they are unaffected by the RCM and the removal of fraud does not lead to a significant change in contrast to the prediction. Concerning retail firms, it seems that only medium-sized companies experience negative effects due to the RCM while very small and very large firms are unaffected. This cautiously speaks against an increase of tax evasion on the retail stage.

Keywords: Tax Fraud, Tax Evasion, Reverse Charge, VAT, Withholding

JEL Classification*:* D22, H26, H32

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1 Introduction

This paper examines the response of firm outcomes to the optional domestic reverse charge mechanism (RCM), a measure that has been introduced in the value-added tax (VAT) legislation of several European Member States.[1] The RCM intends to combat VAT fraud that is responsible for considerable revenue losses every year.[2] The empirical literature confirms a significant reduction of VAT fraud from the measure (Buettner and Tassi 2023, Stiller and Heinemann 2024; Bussy 2021; Krzikallová and Tošenovský 2020; Arltová et al. 2020; Čejková and Zídková 2019).

The conceptual design of VAT makes it desirable due to its self-enforcing mechanism consisting of three main features. Its invoice-credit system provides third-party reporting that increases detection risk, asymmetric incentives for sellers and buyers, and withholding of VAT on upstream stages (Ebrill et al. 2001, Slemrod and Velayudhan 2022, Wasseem 2022). The latter feature ensures that the seller obtains the tax whether the buyer is a legitimate trader or informal. Hence, VAT increases the cost for concealing transactions (Keen 2008). VAT is the highest revenue tax in the countries of the Organization for Economic Cooperation and Development (OECD) in 2021. The tax accounts for about 30% of all net tax revenue in these countries (OECD 2023). However, its design makes it also prone to fraud when a (fraudulent) seller collects and pockets the VAT on its output while the taxable buyer receives a tax refund (input tax deduction).

In the European Union (EU), organized VAT fraud is largely carried out as so-called 'Missing Trader Intra-Community' (MTIC) fraud. The missing trader (MT) imports goods from

[1] The measure is *optional* since Member States can decide to implement from a catalogue provided by the EU VAT Directive and *domestic* since only domestic transactions fall under the RCM. However, cross-border transaction within the EU fall also under a reverse charge mechanism but this is mandatory for all Member States.
[2] A current approximation of the VAT Gap for 2021 by Poniatowski et al. (2023) within the European Union is about 61 billion euros. That is, on average, about 9.3% of the VTTL (VAT Total Tax Liability), a theoretical VAT liability under assumed full compliance. However, the VAT Gap results not only from VAT fraud and evasion but also from avoidance, insolvencies, bankruptcies, and miscalculations.

a supplier in another EU Member State and sells them on the domestic market charging VAT. However, MT deliberately does not pay the VAT collected to the tax authorities and disappears.[3] If MT sells the imported goods to another trader that is involved in the fraud ('Broker')[4], which exports to a trader in another EU Member State, and MT re-imports to execute the fraud scheme repeatedly, the scheme is called 'Carousel Fraud'.[5] With every pocketed VAT by the seller and input tax deduction of the buyer, the fraudsters make profit, and the affected Member State suffers from a revenue loss if it cannot deny the deduction of the input VAT.[6]

Implementing the RCM shifts the VAT liability to the buyer. The right to deduct this VAT as input tax under the general requirements remains. In business-to-business (B2B) transactions, RCM effectively abolishes the withholding feature of VAT while the remaining properties stay intact. However, there is an assumed threat of increased sales towards the informal sector but also the risk of more tax evasion at the retail stage (Buettner and Tassi 2023, Tassi 2023). A common argument against a retail sales tax (RST) that is only collected on the last stage. However, against this is the attempt to combat fraud and eliminate distortions in markets affected by fraudsters. This paper challenges the assumption of competitive advantages of fraudsters and the associated negative impact of fraudsters on B2B firms. Furthermore, the impact at the B2B level must be considered when examining the response of the B2C sector to RCM. This paper attempts to fill this gap.

An ambitious goal of the European Commission is to transform the VAT into a more digitized tax to benefit from technology advancements under the name "VAT in the Digital

[3] Up to this point, this fraud scheme is called 'Acquisition Fraud'.
[4] There can also be several 'Buffer'-firms between the missing trader and the broker (the exporting trader in the same EU Member State as MT), which can be aware or even unaware of the fraud to make it harder for tax administrations to uncover the scheme.
[5] The terms 'MTIC fraud', 'VAT fraud' and 'Carousel fraud' are used interchangeably throughout the paper since its specific meanings does not change the argumentation. The criminal organizations are also known for financing any kind of illegal activity using these schemes (Murray 2020).
[6] That is the case when the tax authority can prove that the broker (or a buffer) knew or could have known that they are involved in a VAT fraud chain (*Axel Kittel*-Test)

Age"[7]. However, countries still rely on the RCM if digital tools are not yet uniformly and comprehensively introduced within the EU. Therefore, the evaluation of currently available measures to fight tax fraud is still essential. Implementing the RCM is politically a tax revenue decision; however, it is important to understand the mechanism on the firm level for a broader understanding of such measures. Slemrod and Velayudhan (2022) point out the need to evaluate interventions aimed at reducing VAT evasion since policymakers face a tradeoff between additional administrative burden for firms and the social benefit from combatting evasion.

The RCM implicitly intends to solve the problem of competitive distortions while it poses additional compliance burden onto firms. The distortion of competition is caused by the low price offered by the fraudsters. However, if legitimate firms benefit from the lower price and the supply created by fraudsters, the removal of the fraudsters from the market through RCM can increase the input price for these firms creating pressure on operational efficiency. On the other hand, firms competing with the fraudsters should experience an increase in efficiency. However, that effect might be suppressed by an increase in compliance costs.

RCM is implemented B2B on certain goods and services except when a non-taxable person purchases. However, there are several expected effects of retail firms' output. If the effect on the B2B stage described above is significant, then retail firms face higher input prices they have to (partially) pass-through to their consumers. This would result in higher retail prices and lower output. However, if the removal of the withholding feature of VAT creates higher profitability of tax evasion, retail firms tend to underreport more of their sales. If profits from tax evasion are (partially) passed through to the consumer, prices decrease while output increases. The overall effect is therefore an empirical question.

To analyze B2B and B2C industries, I use a stacked difference-in-differences design. Financial accounting data is obtained from ORBIS covering European companies between 2000

[7] Comprehensive overview: URL: https://taxation-customs.ec.europa.eu/taxation-1/value-added-tax-vat/vat-digital-age_en.

and 2019. Identifying 43 usable RCM events across the EU, the results show that the RCM correlates with a decline in sales and operational efficiency of B2B and retail firms in treatment industries relative to the counterfactual. However, the heterogeneity analysis reveals that on the B2B level, small firms weakly respond to the RCM while the negative effects on outcomes are mainly found among the largest firms. This could be explained by the larger transaction volume compared to small and medium-sized firms (SMEs) and the accompanied higher costs. On the other hand, the smallest firms seem to be unaffected, so that the removal of fraudsters does not have a measurable effect while theory predicts stronger effects with decreasing firm size. Concerning retail firms, the heterogeneity analysis shows a different result compared to the B2B sample. It appears that only medium-sized retail firms experience lower sales, costs, and efficiency due to RCM, but such effects are non-existent among very large and very small firms.

Another important aspect of the reform is its risk of increased tax evasion at the retail stage. The results suggest that sales of electronic retailers significantly decreased after the RCM relative to the counterfactual. However, RCM is a pure B2B regulation. Due to the reform, retailers face a higher profitability of tax evasion when no input VAT is paid to the wholesaler. Tassi (2023) carries out concurrent work regarding the effect of the RCM on tax evasion at the retail stage and studies the effect of the RCM on retail firms in Germany using VAT taxpayer data. Affected German retailers reduce sales at the standard VAT rate indicating a decline in compliance. However, domestic sales overall are unaffected. Additionally, no price effect can be found similar to the analysis done in the underlying paper. My paper differs from Tassi (2023) in several ways. I use financial accounting data of European firms and include various time-varying firm-level control variables. Additionally, I cover all instances of the RCM within the EU, controlling for country-specific effects of the RCM.

This paper seeks to contribute to the existing literature in the following ways. Examining firm behavior in reaction to the RCM enlarges our knowledge about the effects of informal competition on formal firms (La Porta and Shleifer, 2014; Williams and Kosta, 2020; Beltrán,

2020; Goel et al, 2022). Especially, how informal competition in form of VAT fraudsters affect legitimate firms with respect to firm performance (Beltrán 2020, Williams and Kosta 2020, Williams and Bezederi, 2018, Ali and Najman 2017). The novelty of this study is the attempt to understand the effects of anti-fraud measures on the firm level and thus, extending the existing literature in that field. Existing literature centered the spotlight mostly on tax revenue effects of the RCM. Additionally, the paper embeds in the literature on tax remittance and how the properties of VAT protect tax revenue (Keen 2007, Slemrod 2008, Pomeranz 2015, Kopczuk et al 2016, Waseem 2022). Since the RCM partially transfers VAT into a RST (De La Feria 2019) it contributes to the discussion of both consumption tax systems.

The rest of this paper is structured as follows. In chapter 2, the legislative background regarding the RCM within the EU is presented. Chapter 3 describes the conceptual framework, and the hypotheses are developed in Chapter 4. Chapter 5 is dedicated to explanations on the methodology and statistical approach as well as the data used. In Chapter 6, the results are presented, and Chapter 7 displays the various robustness checks. Chapter 8 concludes the paper.

2 Policy Background

VAT fraud in its present form emerged from the establishment of the European Single Market. Especially, the existence of zero-rated exports and the abolishment of border controls enabled fraudsters to exploit breaks in the usual taxation chain that created a systematic fraud of falsely claimed VAT refunds. However, this vulnerability stands against the key feature of VAT where the tax is charged and credited on each stage in the production chain and therefore limits the loss for the government if one party in this chain fails to pay the VAT (Keen 2007).

The optional domestic RCM is an anti-fraud tool provided by the ‘Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax’ (VAT

Directive).[8] It enables European Member States to implement a change of tax liability from the supplier to the taxable buyer into their national VAT law. Therefore, the liability to pay the VAT and the person who is responsible for remitting it to the tax authorities is united. Whereas this mechanism was first invented to simplify tax collection regarding cross-border services (Article 194 of the VAT Directive), it is now widely used to fight VAT fraud. Article 199 to 199c of the VAT Directive gives Member States the opportunity to implement the RCM on certain fraud-prone supplies and services. Therefore, Member States can react according to their perception of fraud levels. The RCM intends to prevent fraudulent transactions by disabling fraudsters to take control over the VAT from a supply. The VAT payment obligation is shifted onto the buyer, which has an input credit in the same amount. Economically, RCM transfers the VAT into a RST with respect to the affected products.

However, we do not observe a general introduction of the mechanism for all possible instances provided by the VAT Directive across the EU Member States. Rather, the scope of application differs significantly between them. This is presumably because the introduction of the RCM leads to a change of systems for the affected products and services. Firms and tax administrations must apply two systems (VAT and an RST-like system) side by side. This leads to additional compliance costs (EY 2014) and costs for enforcing the measure. Therefore, the rational assumption is that EU Member States apply the RCM only if the benefit from fighting fraud is expected to exceed the cost and some countries might be more affected by fraud than others. However, since reliable estimations of fraud are difficult to obtain, some countries might be more cautious and may apply the RCM as a precautionary measure (EY 2014) while others hesitate to implement the measure although fraud levels would require it.

[8] "COUNCIL DIRECTIVE 2006/112/EC of 28 November 2006 on the common system of value added tax." *Official Journal* L 347/1.

3 Conceptual Framework

3.1 Trade Dynamics of VAT Fraud

The circumvention of regulations of any kind, taxes and labor protection laws enables informal firms to gain competitive advantages over formal firms (Hoopes et al. 2016, Karlinger 2014). In the case of VAT fraud, there is ample indication that fraudsters sell products below the market price to gain an advantage (European Court of Auditors 2019, Lamensch and Ceci 2018, van der Hel-van Dijk and Griffioen 2016, Frunza 2013, Frunza and Guegan 2011, Borselli 2011, Farrell 2004, German Federal Court of Auditors 2003).[9] Williams and Bezeredi (2018) find that the existence of VAT fraud is a serious obstacle for firms in terms of revenue growth in the Southeast European countries studied.

The competitive advantage primarily stems from the ability to offer lower prices to their customers. Clearly, a low price enables fraudsters to get rid of the goods used in the carousel quicker when the goods are supposed to leave the carousel. However, keeping the goods within the fraudulent carousel, fraudsters can involve unaware firms in their fraudulent chain to conceal the fraud. A lower price helps to attract the demand for their goods.[10] There might be cases in which products within the carousel are overpriced to gain excess VAT refunds since higher prices lead to higher input VAT deduction by the buyer (Olexová et al. 2022). However, transactions in such a closed system should hardly affect legitimate market participants. At the end, the more frequent use of low prices is reflected in the European jurisdiction and found its

[9] The German Federal Court of Auditors (2000) reported that a 'well-known' European manufacturer of mobile phones requested the intervention of the tax administration because 80% of its cell phones were sold in Germany below the manufacturer's net selling price.

[10] See Fedeli and Forte (2011) for a theoretical model. A possible case, however, in which *fictitious* transactions may affect formal firms, could be the following scenario: The fraudsters include innocent companies, but disguise the non-existence of the goods by already presenting a third person as the buyer. The (non-existent) goods are pretended to be sent directly to this determined buyer without the honest company ever seeing the goods (such case was ruled at the European Court of Justice, see ECJ, Order of the Court of April 14, 2021 (C-108/20), *Finanzamt Wilmersdorf*). Thus, an innocent firm might profit from a lower price and a direct customer provided by the fraudsters. However, the VAT refund for this firm is dependent on whether the tax authority can prove that this (honest) seller knew or should have known from the tax evasion on a previous stage.

way into the so-called *Axel Kittel test* (Olexová et al. 2022).[11] If a buyer knew or could have known to be involved in VAT fraud, this taxable person can be made liable for the VAT of the fraudulent supplier. An unusually low price could indicate such involvement. Thus, firms are supposed to check whether the abnormal price does not already lead to the assumption of involvement in VAT fraud.

But how are low prices economically achievable for fraudsters? This is because the collected VAT is included into the profit while it is neutral for a compliant firm that pays the VAT to the tax authority (Sinn et al. 2004). A simple example illustrates this. MT can buy a good for 100 from a foreign exporter free of VAT and sell the good for 90 plus VAT of 18 to the domestic buyer. A compliant firm would suffer a loss of 10 while the fraudster pockets the VAT and therefore achieves a profit of 8. Under the condition that the market price p_M equals the input price, the lowest price (p_L) the fraudster can offer is

$$p_L = \frac{p_M}{(1 + \tau_{VAT})} \tag{1}$$

where τ_{VAT} is the VAT rate. For simplicity, p_M equals the input price of the fraudster so that p_L leads to no profit. In order to increase the profit and against the background that abnormal low prices indicate the involvement into a fraudulent network that leads to a refusal of input VAT deduction, the actual price p_A will be somewhat higher then p_L but below p_M, so that $p_L < p_A < p_M$.

Using a simple profit formula including S for sales and C for costs, the true profit Π of a legitimate firm i including VAT reads as

$$\Pi_i = S_i - C_i + [S_i\tau_{VAT} - S_i\tau_{VAT} + C_i\tau_{VAT} - C_i\tau_{VAT}] = S_i - C_i \tag{2}$$

[11] ECJ, Jugdement of the Court of July 6, 2006 (Joined Cases C-439/04 and C-440/04), *Axel Kittel and Recolta Recylcing*.

if firm i reports sales and costs and complies with the rules so that VAT is neutral.[12] On the other side, the fraudster f has the following profit function:

$$\Pi_f = S_f - C_f + S_f \tau_{VAT} \quad (3)$$

since received tax on the output $S_f \tau_{VAT}$ is pocketed, which reflects the competitive advantage of the fraudster. Note that any VAT on imports is neglected since it is levied using a deferred payment method and technically cancels out with a credit in the same amount for legitimate firms. Unlike tariffs, import VAT in the EU is not collected at the border but reported in the advanced VAT return and paid upon its filing.

If competitive distortions are severe enough to affect the market price, compliant firms must adapt to remain profitable. The compliant firm can respond to fraudulent competition by lowering its own price, to participate in the lower price offered (Aronowitz et al. 1996) or to leave the market completely. However, there are voices that assume that there are hardly any measurable effects on market conditions (e.g. Gebauer et al. 2007), which is in fact an empirical question and needs to be tested.

3.2 RCM and VAT Properties

The Self-Enforcement of VAT

Economically, RCM replaces VAT with a RST since the remittance of VAT falls onto the purchaser and cancels out with the tax credit. Absent any other distortions and perfect enforcement, RST with no taxation on the B2B-stages is economically equivalent to a VAT (Crawford et al. 2010). However, a major structural difference between both systems is that VAT is levied on each stage of the production. Within a RST system, the full tax amount is lost when the seller on the retail stage fails to remit the tax. Therefore, the RCM could augment the "last-mile problem" of VAT, i.e. that sellers at the retail stage are not incentivized to hand out

[12] Another assumption is that firm i only makes sales that entitle it to deduct input tax. As VAT is neutral, the VAT payments cancel out.

a receipt. The unregistered buyer can hardly be monitored and sellers face opportunities to underreport sales.

An important aspect of the VAT in favor of a RST is its self-enforcing mechanism (Kopczuk and Slemrod 2006) that also found validation in empirical studies (Pomeranz 2015, Waseem 2017). However, important to note and to avoid misleading wording, the self-enforcing mechanism can only work when there is a sufficient deterrence effect of governmental enforcement (Pomeranz 2015).

First, this mechanism consists of the auditable paper trail in which administrative enforcement is enabled by cross-checking reported information of the seller and purchaser. This increases the cost of underreporting of sales or over-reporting of costs (Slemrod and Velayudhan 2022). RCM does not interfere with the third-party information feature since seller and purchaser must declare the RCM transactions in their advance VAT return.

Second, VAT provides asymmetric incentives for seller and buyer (Slemrod and Velayudhan 2022). The seller has an incentive to underreport sales to evade income taxes, but the buyer wants to report the transaction to obtain a tax-deductible cost and may even want to over-report inputs. These opposing incentives are designed to enforce VAT by nature. However, misreporting seems to be the real-life case at least in weak enforcement environments (Almunia et al. 2022). The RCM does not change the asymmetric incentives.

Ultimately, the invoice-credit system of the VAT (Ebrill et al. 2001) provides that compliant suppliers receive the tax regardless of whether the purchaser is legit or conceals the transactions from the tax authorities (Keen 2008). Thus, the paid VAT is either a non-refundable part of the costs and acts as an input tax if the purchaser is informal and withholding tax if registered (Keen 2008, Slemrod and Velayudhan 2022, Wasseem 2022). The VAT, therefore, behaves like a tariff that is levied regardless of the formality of the buyer (Keen 2007). Regarding the RCM, however, the mechanism retains the first two self-enforcing properties of VAT, but the feature of tax withholding is eliminated. This could lead to higher tax evasion at

the final stage (Keen 2007) and purchases of the informal sector become less costly (Buettner and Tassi 2023).

The Principle of Neutrality

Another aspect of VAT is its principle of neutrality. In general, VAT should not affect business organization or other business decisions since final consumption is the subject of taxation. However, it is widely known that pre-financing of VAT by the seller violates this principle when the purchaser pays the gross amount after the deadline for payment of VAT to the tax authorities. The RCM establishes this neutrality by shifting the liability for VAT to the buyer (Englisch 2015, Famulska and Rogowska-Rajda 2018). The same effect occurs for firm purchases when a firm pays the VAT to the seller but can deduct the input tax only in the next VAT statement (EY 2014). However, the opposite is true when a seller receives the VAT inclusive price before remitting the tax to the authorities based on the upcoming VAT statement. In this case, the RCM would have a negative effect on cashflows (EY 2014). Pessina (2020) finds that the shift of the VAT liability to the buyer decreases firm sales due to the negative liquidity impact when the seller does not receive VAT anymore. Especially small firms are affected since they have limited access to external financing. As a result, firms exit the market that becomes more concentrated.

Studies by PwC (2007) and EY (2014) show that the RCM increase compliance cost. Besides one-time cost to set up book-keeping systems, consulting tax advisors and changing invoice procedures, ongoing costs result from complying with two different types of VAT collection in which transaction-based consulting can be necessary. RCM is specific on the underlying goods and services falling under its scope. These studies also point out that smaller firms must deal with relatively higher compliance cost.

4 Hypothesis Development

4.1 Effects of RCM in B2B Markets

Trade Dynamics

To the extent firms compete with fraudsters, RCM should enable formal firms to take back market shares previously controlled by the fraudulent competition. However, it seems reasonable that the market price increases such that effects on sales depend on the elasticity. If this leads to reductions in sales, operational efficiency declines when costs are sticky. On the other hand, real-life cases show that firms can benefit from trading with fraudsters because they have lower input prices and more trading opportunities. Aronowitz et al. (1996) call them symbiotic relationships that are more pronounced among small firms. The removal of the fraudsters affects sales and efficiency negatively for these firms when input prices (transaction volume) increase (decreases).

Compliance Costs

Another aspect of the RCM is the costs it creates for firms. EY (2014) estimates ongoing RCM compliance costs of 0.43% of turnover while non-RCM compliance costs account for 0.30% of turnover. The difference of 0.13% is the compliance costs increase (43% increase). Buettner and Tassi (2023) argue that RCM may decrease compliance costs since no VAT payments and reimbursements are made anymore that lead to liquidity advantages, which clearly depends on the volume of sales made that fall under the mechanism. Pessina (2020), however, states that RCM (the shift of VAT liability to the buyer) creates a decline in liquid funds when firms do not receive output VAT to finance themselves in the short run.

It is an empirical question which effects prevail. However, assuming a price increase correlated with a decline in sales and efficiency, flanked by increased compliance costs, I predict:

Hypothesis H1a: *All else equal, RCM decreases sales and operational efficiency.*

Firm Size

Findings by Aronowitz et al. (1996) suggest that small firms are more likely to be affected by fraudsters. This would result in small firms experiencing negative effects when fraudsters enter the market. However, small firms are also more likely to be involved in fraudulent chains to stay competitive (Aronowitz et al. 1996). Over time, small firms might adapt and (unknowingly) collude with fraudsters, benefiting from trade and possibly lower prices. A larger firm can be more resistant to fraudulent competition simply due to economies of scale and market power. Additionally, smaller firms face relatively higher compliance cost compared to large firms when the RCM applies (EY 2014, PwC 2007). This would lead to lower efficiency and ultimately lower output. Hence, I predict:

> **Hypothesis H2:** *All else equal, small firms decrease sales and operational efficiency stronger than large firms.*

Import Ratio as Exposure Proxy

Ideally, one can measure the exposure of a firm to VAT fraud to test the impact of the reform for those that are indirectly addressed by it. However, amongst all firms within an industry, it seems unlikely to gain such insights. As a possible approximation to isolate firms exposed to fraudulent practices, I assume the import ratio of a firm. As discussed, cross-border VAT fraud is based on a transaction from one Member State to another, in which the fraudster imports a good and sells it on the domestic market without paying the collected VAT to the tax authority. A legitimate firm importing goods should therefore face similar domestic customers as the fraudster. On the other side, if a legitimate firm mainly buys its inputs from the domestic market, it can choose the supplier based on the price and might (unknowingly) choose the fraudster as trading partner. Recall that fraudsters can offer goods at prices under their competition. Hence, importing firms as direct competitors should benefit from the suppression of fraudsters while domestic-oriented firms likely benefited from lower input prices or were even unaffected before the RCM. Thus, I hypothesize:

Hypothesis H3: *All else equal, the higher the import intensity of a firm, the more it increases its sales and operational efficiency after the RCM.*

4.2 Effects of RCM in Retail Markets

If prices increase on the B2B stage after RCM, the B2C stage faces higher input costs. If higher prices cannot be fully passed-on by retailers when selling to the end consumer, they will forgo profit margins. However, a price increase would lower firms' sales and the operational efficiency decreases. One would therefore expect a negative effect of the RCM on retailers. An additional explanation of decreasing sales might be that RCM removes the withholding feature of VAT. The invoice credit mechanism no longer protects inputs on upstream stages (Keen and Smith 2006, De La Feria 2019). Under the standard VAT system, a retailer must pay VAT to the wholesaler so that the maximum amount of tax evasion is the tax on the difference between retail price (output) and wholesale price (input): $S_i\tau_{VAT} - C_i\tau_{VAT}$. When the RCM applies, the input price for the retailer becomes free of VAT and underreported sales leads to uncollected VAT in the full amount $S_i\tau_{VAT}$, since $C_i\tau_{VAT} = 0$. This could lead to increased tax evasion by underreporting sales of retail firms. However, to prevent triggering scrutiny by the tax authorities, firms may counter with lower reporting of costs which is less costly when no VAT is levied due to the RCM. Hence, I expect the sales-to-costs ratio to stay constant if at all to decrease slightly when sales underreporting exceeds cost underreporting.

Hypothesis H4: *All else equal, RCM decrease reported sales, costs, and operational efficiency of retail firms.*

Smaller firms are more likely to engage in tax evasion (Kleven et al. 2016, Alm et al. 2019). Hence, holding everything else constant, smaller firms should report less sales relative to larger firms due to the missing withholding feature and increased profit from tax evasion. Accordingly, tax evaders will counter lower sales reporting with lower cost reporting. However,

compliance costs caused by RCM hit small firms harder. Hence, I expect stronger effects among small firms.

Hypothesis H5: *All else equal, small retail firms report relatively lower sales and costs compared to large retail firms after the RCM.*

5 Empirical Strategy and Data

5.1 Empirical Model

I use stacked regressions to capture the effects of the RCM to prevent drawbacks in classical two-way fixed effects models with staggered treatment timing (see e.g. De Chaisemartin and D'Haultfoeuille 2020, Baker et al. 2022). Each event (e) spans 8 years in total with four years prior and after an RCM event so that $t \in [-4, 3]$. First, I use an event study design to capture the dynamics and to formally test the parallel trends assumption pre-reform:

$$Y_{ceijt} = \sum_{k \neq -1;\, k=-4}^{3} \delta_k \, RCM_{cejt}^{k} + X_{ceit}\beta_x + FE_{eit} + \varepsilon_{ceijt} \tag{4}$$

where $RCM_{cejt}^{k} = \mathbb{1}[t = Year\ of\ Event_{cej} + k]$. RCM turns to unity when a year is k periods away from the actual year of an event in treatment country c and industry j with the year prior to the introduction ($k = -1$) set to zero as baseline for each event e. In addition, the following static version (stacked difference-in-differences) accompanies the dynamic model to capture the average effect:

$$Y_{ceijt} = \delta \, RCM_{cejt} \; + \; X_{eict}\theta + \gamma_{ei} + FE_{eit} + \varepsilon_{ceijt} \tag{5}$$

The subscript e in Eq. (4) and (5) denotes that each variable is event specific. When referring to the variables in the following notations, the subscript is left out for simplicity. Y_{cijt} represents the dependent variables for firm i in country c and industry j at time t: $SALES_{cijt}$ as

the natural logarithm of sales, $COSTS_{cijt}$ as natural logarithm of the difference between EBIT and sales[13], and SCR_{cijt} as natural logarithm of the sales-to-costs ratio.

To identify the effect of the reverse charge mechanism, I construct RCM_{cjt} as an interaction between an event-specific $TREATMENT_{cj}$ and $POST_t$ variable. Since the inclusion of fixed effects omits these main effects, I omitted them from the equation. The interaction is a binary variable with unit value when the RCM applies at time t in industry j in country c and zero otherwise. When the RCM is implemented within the last six months of a year, the dummy obtains unity only from the next year to account for possible time lags and adjustment processes.

However, for reasons of identification, not every RCM event is appropriate, especially when the number of firms covered by the mechanism within an industry is low. Therefore, the primary focus lies on B2B industries with assumably comprehensive RCM coverage. These industries fall into the group *direct* in Table 1 and form the treatment group. B2B industries with RCM on an assumable lower number of transactions as well as industries that are supposed to be allocated at downstream or upstream stages (e.g. the retail stage) are excluded and indicated as *indirect* in Table 1. The effect of RCM on these industries is less clear and therefore excluded from the analysis. Important to note is that for design reasons, an observation serves as control only when it is never treated (clean control) until the end of 2019 (end of sample period). However, a never treated observation is only assigned to the control group, when it is in a similar industry relative to the RCM observations.[14] Similarity is proxied based on industry codes (NACE Rev. 2) so that neighbouring industries in the same or in another EU country are assigned. Table 2 provides an overview of treatment and assigned control industries and firms.[15]

[13] Hundsdoerfer and Jacob (2020) discuss the use of EBIT-Sales

[14] Using all never treated country-industries available would result in an unfeasible computational demand using stacked regressions and might be undermined by noncomparability of firms between industries.

[15] Control firms need to have similar NACE Rev. 2 codes relative to an event-specific treatment industry. In cases the RCM applies on all industries within a two-digit industry, control units are obtained using the neighbour industries also based on the two-digit codes. Example 1 (2): RCM is introduced in Germany (France) on the industries with the NACE Rev. 2 codes 8121, 8122 and 8129 (61). There are no further industries sharing the first three (two) digits "812" with these treatment industries. Hence, non-RCM industries with industry codes beginning with "80" and "82" ("60" and "62") serve as the control group.

Due to the stacked design, a control firm can occur multiple times when it is assigned by the selection process for several "stacks".

Using data on all EU Member States increases the generalizability of the results. However, this strategy comes with the challenge that it can introduce heterogeneity due to different market and economic conditions and different political regimes. However, European firms have similar access to markets due to the European single market with free movement of goods and the abolishment of border controls and tariffs. Additionally, VAT regulations are proposed and enforced by the European Commission and adopted in directives and regulations by the Council of the European Union. Member States must adopt these regulations within their national VAT law. Hence, the rules are EU wide harmonized and provide homogenous VAT law across European Member States. Although no harmonization in terms of income taxes or accounting standards exist within the EU (except for large companies such as IFRS), I expect also comparability to a certain degree in these areas. In the robustness tests, I employ entropy balancing to increase the comparability based on observable firm characteristics.

Concerning the control variables, X_{ict} is a vector of time-varying firm and country level variables. On the firm-level, $Size_{it}$ as natural logarithm of total assets, ROA_{it} as pre-tax income scaled by total assets, PPE_{it} as fixed assets scaled by total assets, and $Debt_{it}$ as long-term debt scaled by total assets are included. Regarding the country level, a variable controlling for other potential fraud-reducing reforms, i.e. digital reporting requirements (DRR_{ct})[16], the standard VAT rate (VAT_{ct}), GDP growth (ΔGDP_{ct}), inflation ($Inflation_{ct}$), the level of unemployment ($Unemployment_{ct}$), and household consumption in percent of GDP ($Consumption_{ct}$) serve as controls. Detailed variable descriptions are in Table 3. Standard errors are clustered at the

[16] Other EU-wide anti-fraud tools such as VIES are not included assuming that they provide equal combatting power to every EU Member State. However, another anti-fraud tool is the split payment mechanism (where the buyer pays the VAT on a special blocked account). The measure applies in Italy since 2017 on a limited number of transactions with the government or listed companies, in Romania between 2018 and 2020 on transactions when a firm is in insolvency or has VAT debts and in Poland from November 2019. Since the implementation in Poland is at the end of the year 2019, no observations are dropped.

event-country-industry level. The model includes event-specific fixed effects (FE) with Event×Firm FE and Event×Time FE. To provide a clear overview of the hypotheses and the expected effects on the various outcome variables, Table 4 below serves as a summary.

[Table 3 about here]

[Table 4 about here]

5.2 Data

I use financial accounting data from 2000 to 2019 of European companies collected from BvD Orbis via WRDS. I start the sample period in 2000 to potentially cover most RCM introductions. The sample period ends in 2019 due to the pandemic. I identify 61 potential RCM implementations in the EU that can be associated with specific industries and for which data from four years before and after the RCM are available within the sample period. Therefore, events that occur within the first three or the last three years of the time window are trimmed to ensure compositional balance in the stacked regression design (Wing et al. 2024). After the sample selection process outlined below, 43 events are left in the sample.[17]

I start the data generating process by restricting firms to have total assets (Orbis: TOAS) and sales (Orbis: TURN) greater zero and EBIT (Orbis: OPPL) to be non-missing. For firms in Cyprus, Great Britain, and Ireland, I replace sales (Orbis: TURN) with operating revenue (Orbis: OPRE) if sales are missing before dropping observations with missing sales or sales < 0. In these countries, sales are reported as operating revenue. For an observation to stay in the sample, I require all dependent and independent variables to be non-missing.

Furthermore, I restrict the sample to active firms and exclude banking and insurance companies (first two-digit NACE Rev. 2 codes 64, 65 and 66 and firms indicated as bank or

[17] The event SK/01.2014 is dropped since Slovakia introduced DRR at the same time as RCM so that the effect of RCM and DRR cannot be distinguished. All other events are omitted due to lack of sufficient number of treatment firms (<10): AT/01.2005, PT/10.2006, GR/01.2007, NL/01.2007, GB/06.2007, AT/07.2007, LT/01.2008, SK/04.2009, CZ/04.2011, IE/05.2011, AT/01.2012, DK/07.2012, RO/09.2013, CY/10.2013, DK/07.2014, GB/07.2014, CZ/02.2016.

insurance company). By restricting the sample to active firms, I expect that missing trader firms are excluded since they exist only for a short period of time mainly for fraud and should be dissolved after the RCM. To ensure a clear comparison, I keep only firm-years with accounting closing dates between end of October and end of February and assign them to the same year.

Furthermore, I drop observations with missing industry codes. To ensure a correct assignment of industries, I drop firms that have more than one primary industry code assigned within the Orbis database. In some instances, the country variable (Orbis: CTRYISO) does not match with the first two digits of the BvD ID and firms are dropped if they do not match. Furthermore, I keep only one unconsolidated observation by firm. Several firms have multiple observations per year. However, manually checking a few of these instances reveals that for the same year and same closing date multiple versions with (partly) different values for (some of) the variables of interest exist. I exclude these firm-years from the sample. For consistency reasons, to prevent confounding effects of firms entering only the periods before or only after RCM, and to avoid singleton observations, I require firms to have at least one pre-RCM and one post-RCM observation with non-missing values for all variables.

MTIC fraud leverages the EU VAT rules and countries must have accessed the EU. Therefore, I include Cyprus, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Slovenia, Slovakia from 2004, Bulgaria and Romania from 2007 and Croatia from 2014. Since Croatia's accession to the EU was on July 1, 2013, I include Croatian firms from the following year onwards. An event is excluded from the sample when it has less than 10 treatment firms.[18]

[18] Clearly, restricting the treatment group to have 10 firms by event as a minimum is an arbitrary design choice. However, one must compromise between keeping a maximum number of events in the sample and having a variety of firms observed. Additionally, when the number of treatment firms is very low, different competition aspects can play a role in the effect of RCM. I test the sensitivity of the results by excluding certain cases. Regarding the B2B sample, 1) I exclude the event FR/01.2014 that includes the biggest treatment group in a single event, 2) I drop events with less than 50 treatment firms (SE/07.2007, FR/01.2008, IE/09.2008, SK/04.2009, SI/01.2010, LV/10.2011, CY/03.2012, GB/07.2014) and 3) I drop events with less than 100 treatment firms (additionally to less than 50 treatment firms this drops also DE/01.2011, PL/07.2011, SE/01.2013, NL/04.2013, DE/09.2013,

A testable setting regarding importing firms as exposure proxy is not achievable for all European firms since Orbis contains no information about import ratios. Hence, I make use of firm level data for German firms provided by BvD Dafne. Unfortunately, the respective import ratio is based on the last available year. Therefore, there is no variation in ratios that comes with the drawback that firms might have changed their import behavior over time.

Finally, I merge the dataset with the various country variables from the World Development Indicators (WDI) provided by World Bank and the standard VAT rates over time obtained by European Commission (2020). RCM introductions are hand-collected using EY (2014) and national VAT laws, information on legislative procedures and other sources (see Table 1 for more information). If the RCM applies before the sample period or an event has less than four pre-treatment or post-treatment years (that is RCM introductions before July 1, 2003, and after June 30, 2016), I do not include the respective events in the final sample.

6 Results

6.1 RCM and B2B Firms' Response

Baseline Results

Descriptive statistics of all variables for the treatment and control group in the B2B sample is presented in Table 5, Panel A and B, respectively. Panel A describes the summary statistics for the treatment group and Panel B displays the statistics for the (stacked) control group. It appears that on average treatment firms have lower sales, costs, and are less operational efficient as indicated by a lower *SCR*. This is accompanied by a lower EBIT (Orbis:

FI/01.2015) and the results are in all cases quantitively similar to the baseline results. Regarding the retail sample, 1) I exclude the event ES/04.2015 with the biggest treatment group in a single event and 2) I drop events with less than 100 (includes less than 50) treatment firms (IT/01.2007, DE/07.2011, AT/01.2014, DE/10.2014, CZ/04.2015) and the results are in all cases quantitively similar to the baseline results.

OPPL) and *ROA* for treatment firms. However, treatment firms are also smaller than control firms.

[Table 5 about here]

Figure 1 plots the point estimates from the event study based on Eq. (4) for all B2B events. Pre-reform differences between treatment and control firms are near zero and statistically insignificant, supporting the parallel trends assumption. After the RCM, these differences turn negative for all dependent variables. However, the point estimates post-RCM are only statistically significant for the dependent variable *SALES* in the first two years after RCM comes into force. Regarding *COSTS*, no dynamic effect if detectable, and for *SCR* the RCM is only statistically significant in year t+1. Nevertheless, all coefficients are negative in the post period. Examining the development of *SCR* a bit closer, it appears that the sales-to-costs ratio decreases with RCM but recovers at the end of t+4. This indicates that firms have sticky costs while the decline in sales is immediate.

[Figure 1 about here]

Table 6 below presents the static regression results from Eq. (5), i.e. the pooled average effect of the reform across all B2B events. *SALES* is lower after RCM for the treatment group compared to the counterfactual (see Table 6, Column (1)). This is indicated by the statistically significant coefficient for *RCM* of -0.032. This is in line with the prediction that sales decrease after the RCM because price increases are associated with lower sales. Notably, the decrease of sales by approximately 3% is very close to the finding by Pessina (2020) who finds a decrease of 2.2% when the VAT liability shifts to the buyer. Regarding *COSTS*, the coefficient of *RCM* is negative with -0.021, however, statistically insignificant (see Table 6, Column (2)). The sales-to-costs ratio *SCR* decreases with RCM with a statistically significant coefficient of -0.012 (see Table 6, Column (3)). Sales decrease stronger than costs. This reduces the operational efficiency of firms in RCM industries. In an alternative specification (not tabulated here for brevity), I exchange Event×Time FE for Event×Industry×Time FE and Event×Country×Time FE and find

quantitatively similar magnitudes for the coefficients. Notably, *RCM* is statistically significant in the alternative specification regarding *COSTS* with a coefficient of -0.02.

As indicated by the descriptive statistics, larger firms are more profitable than small firms as indicated by the statistically significant coefficient of 0.082 for *Size* in Column 3 of Table 6. Remarkably, VAT is negatively associated with *SALES* and *COSTS* (see Table 6, Column (1) and (2)), but positively correlated with *SCR* (see Table 6, Column (3)). This implies that firms in high VAT countries have lower sales and costs but are more operational efficient.

[Table 6 about here]

Firm Size

To test the prediction that smaller firms exhibit a stronger decline in the outcomes of interest, I group the data in quartiles by event based on pre-reform annual sales or pre-reform annual total assets, respectively. The results are shown in Panels A to D for each quartile group in Table 7.

Regarding *SALES*, it appears that *RCM* is only statistically significant if firm size is large as indicated by the statistically significant coefficients in Panel C, Column (2) and Panel D, Columns (1) and (2) of Table 7. A similar picture is drawn regarding *COSTS*. However, *RCM* correlates negatively and statistically significant with *SCR* in both specifications regarding the largest firms (the fourth quartile) (see Table 7, Panel D, Columns (5) and (6)). There is some weaker evidence of declining efficiency among small and medium-sized firms as indicated in Panel A, Column (5) and Panel B, Column (6) of Table 7.

[Table 7 about here]

Importing Firms

Turning to the test of H3 using German firms only due to data availability. Corresponding information on the import ratio is gathered from Dafne database by BvD. The

following specification intends to capture the effect of the RCM dependent on the import ratio (percentage of imports):

$$Y_{eijt} = \delta\, RCM_{ejt} + \varphi(RCM_{ejt} \times Import\ Ratio_{ei}) + X_{eit}\beta_x + \gamma_{ei} + \lambda_{et} + \varepsilon_{ceijt} \qquad (6)$$

where X_{it} includes only firm controls due to the single country analysis. Accordingly, standard errors are clustered on the event-industry level. Recall that the prediction states the higher the import ratio the more likely a firm competes with VAT fraudsters. Firms with high import ratios should therefore experience an increase in sales and efficiency.

The results are presented in Table 8. Sales and costs decline for low importing firms, represented by a negative coefficient for RCM of -0.037 and -0.033, respectively (see Table 8, Column (1) and (2)). However, the coefficient for RCM regarding *SALES* is statistically insignificant. The interaction with *Import Ratio*, however, is zero and insignificant throughout the specifications. This suggests that the import ratio does not explain any difference between treatment and control firms.

[Table 8 about here]

6.2 RCM and Retail Firms' Response

Baseline Results

I focus on two electronic retail industries with NACE Rev. 2 codes 4741 (retail sale of computers, peripheral units and software in specialised stores) and 4742 (retail sale of telecommunications equipment in specialised stores) for which several countries introduced the RCM. Never-treated retail industries are used as controls with some exceptions to account for possible confounding effects of the RCM in these industries. I identify 15 events with four years prior and after the RCM available to keep compositional balance (Wing et al. 2024). Using the same data cleaning and sample selection process as described for the sample of B2B events, 10 events are left for the analysis. The regression models for the retail sample are taken from Eqs. (4) and (5).

Detailed information on treatment and control group is presented in Table 9. Table 10 displays the descriptive statistics by group. Compared to the B2B sample, treatment and control firms in the retail sample seem to be more similar along the main variables.

[Table 9 about here]

[Table 10 about here]

The retail stage is prone to an increase in tax evasion because the withholding feature of VAT is suspended on the B2B level while the retailer collects VAT from its customer. Therefore, sales and costs should decrease, especially among smaller retailers due to underreporting. The ratio of sales-to-costs should be unaffected when retail firms underreport sales but accordingly underreport costs to limit audit risk. However, an opposing effect might occur when tax evasion is passed-through to the consumer resulting in lower prices and increasing overall sales. This effect is, however, suppressed by a predicted decrease in sales due to underreporting.

First, treatment and control group need to share parallel trends pre-reform. Figure 2 displays the point estimates from Eq. (4) using the retail sample. For *SALES* and *COSTS*, pre-RCM point estimates are near zero and negative post-RCM. All post-RCM point estimates are negative and statistically significant regarding sales and costs. The estimates regarding the *SCR* reveal that pre-RCM the ratio experiences a slight increase in the treatment group compared to the control group while post-RCM the coefficients are all negative. This suggests that sales decreased stronger than costs. A result that is confusing against the background of increased tax evasion as it would trigger audit probabilities. However, in case of RCM there is no input VAT deduction anymore. Therefore, the tax authorities cannot follow the simple metric of input VAT excess to decide which firm to audit. On the other side, this result of *SCR* mirrors the result found for the B2B sample. If sales decline due to economic reasons and costs are sticky, a decline in the *SCR* is unsurprising.

[Figure 2 about here]

The main results for *SALES* using the retail sample based on Eq. (5) are presented in Table 11. The coefficient on RCM is negative throughout the specifications and statistically significant (see Table 11, Columns (1) to (3)). A similar picture can be drawn regarding *COSTS*. Concerning *SCR*, the predicted decline in the ratio is observable. Thus, sales decreased stronger than costs.

[Table 11 about here]

Firm Size

Turning to the prediction that small retailers should underreport more relative to large retailers. I re-estimate Eq. (5) using the retail sample and grouping the sample into quartiles based on pre-reform annual sales or pre-reform annual total assets, respectively. The results are presented in Table 12.

Firms in the smallest and largest quartiles show no statistically significant effect of RCM throughout the specifications (see Table 12, Panel A and D, Columns (1) to (6)). There strong and robust negative effects among firms in the second quartile and some weaker evidence for the third quartile firms regarding all dependent variables across the specifications (see Table 12, Panels B and C, Columns (1) to (6)).

[Table 12 about here]

Price Effects

If the effect on the wholesale stage leads to overall higher prices and lower sales, this affects retail firms since they face higher input prices. Adding a variable into the model such as consumer prices would introduce bias when – and that is the assumption – RCM is correlated with the retail price. Therefore, I test the relationship between RCM and prices. The theory part of this paper predicts two opposing price effects. First, the B2B effect (consisting of the trade dynamics effect and compliance costs effect) should increase retail prices because retailers face higher input costs and must pass-on some of the cost increase. Second, a price-decreasing effect can occur when tax evasion opportunities are passed on to the consumer (e.g. Doerrenberg and

Duncan 2019). Note that the second effect should lead to higher *real* sales but to lower *reported* sales because of tax evasion.

As dependent variable I use the natural logarithm of the harmonized index of consumer prices available for all EU Member States from Eurostat: $HICP_{cjt}$.[19] Unlike the financial accounting data used in the main analysis, HICP is available at a monthly frequency so that in this analysis t is monthly and $t \in [-12, 11]$. The finer frequency is preferable since price effects might be detectable only for a short period after the event and can be confounded quickly further away. I use the following stacked regression model to test the relationship between consumer price and RCM:

$$HICP_{cejt} = \sum_{k \neq -1;\, -12}^{11} \delta_k \, RCM_{cejt}^{k} + X_{cet}\beta_x + FE_{cejt} + \varepsilon_{cejt} \tag{7}$$

where $RCM_{cejt}^{k} = \mathbb{1}[t = Month\ of\ Event_{cej} + k]$. RCM turns to unity when a month-year is k periods away from the actual month-year of an event in treatment country c and industry j with the period prior to the introduction ($k = -1$) set to zero as baseline for each event e. The event window spans 24 months with 12 months before and with RCM in force. Unlike in the main analysis on the firm level, industry j in country c is now the level of interest. Consequently, only country-level controls and industry-country FE instead of firm FE are included. X_{cet} also includes a time trend for every event-specific 3-digit industry code. The results are shown in Fig. 5.

[Figure 5 about here]

It appears that RCM does not change retail prices. However, the observer will notice that all point estimates are around zero pre-RCM while post-RCM, all point estimates are below zero with increasing standard errors. A result also found by Tassi (2023). Retail prices might

[19] The dataset is called "HICP - annual data (average index and rate of change)" (prc_hicp_aind__custom_8880529) and is available online on https://ec.europa.eu/eurostat.

decline as tax evasion profits are passed through to the consumer but this effect was most likely mitigated by the cost increases resulting from price increases on the B2B stage. Overall this could hint towards a tax evasion effect since prices are constant when they should increase based on the assumption that B2B prices increase. Unfortunately, this cannot be tested more in detail with the underlying model.

7 Robustness Tests

Placebo Test

To provide further evidence of a parallel trend between treatment and control group, I perform a placebo test in which the treatment timing is shifted forward in time. I restrict the sample to the four pre-RCM years and create a placebo RCM dummy that turns one already two years prior to the actual implementation for treated firms ($RCM_{Placebo}$) and zero otherwise. The results are presented in Table 13 and confirm statistically that no significant effect of the placebo RCM is observable in the pre-RCM periods. This supports the parallel trend prior to the actual implementation.

[Table 13 about here]

Truncation of the Observation Window

I re-estimate the baseline regressions reducing the sample to three and two years before and after an event, respectively. Therefore, event windows are narrowed down to span 6 years ($t \in [-3,2]$) and 4 years ($t \in [-2,1]$) in total, respectively. The results are displayed in Table 14 below and are in line with the baseline results. Notably, the adjusted R^2 increases in all cases displaying the increasing fit of the model with decreasing observation window.

[Table 14 about here]

Entropy Balancing

To address concerns regarding the comparability of treatment and control group, I use entropy balancing according to Hainmueller (2012). This procedure reweights the control

observations based on pre-reform firm-level covariates. I balance the two groups based on mean and variance (first and second moment).[20] Entropy balancing is performed by cohort and stacked together in event-time like Ouyang et al. (2024).

Panel A (Panel B) of Table 15 presents the mean of pre-RCM covariates of treatment and control group for the B2B (retail) sample. Balancing made both groups more similar as indicated by the decreased differences of firm-level covariates between treatment and control firms. However, no perfect balancing could be achieved. In some event, treatment and control firms are very different along the dimensions so that entropy balancing can only decrease the differences rather than eliminating them. In case of PPE in the retail sample, entropy balancing even slightly increased the difference in favour of reducing the difference regarding the other covariates. Panel C of Table 15 presents the regression output using the weights obtained by entropy balancing from the pre-RCM periods.[21]

Within the B2B sample, RCM correlates negatively with *SALES* presented by a coefficient of -0.048 (Table 15, Panel C, Column (1)). This is even higher than the baseline estimation of -0.032. Remarkably, the coefficient for RCM is statistically significant for *COSTS* (Table 15, Panel C, Column (2)) unlike in the baseline regression. However, the coefficient of -0.057 is higher than for *SALES*. This is contrary to the baseline results. The coefficient of *RCM* regarding *SCR* is insignificant (Table 15, Panel C, Column (3)). The results for the retail sample are not surprising, validating the baseline coefficients throughout the specifications (see Table 15, Panel C, Column (4) to (6)).

[20] I use the Stata command 'ebalfit' to estimate weights based on pre-reform years. However, balancing is not feasible for all cohorts using the first two moments (mean and variance) and the default tolerance level of 0.00001. The estimation of weights was not feasible for 18 out of 42 events. Increasing the tolerance to 0.015 does not significantly increase the number of balanced events. Therefore, I balance for 16 events on the mean only but with the default tolerance level. The events 6/HU/05.2008 and 7/IE/09.2008 do not achieve convergence even when increasing the tolerance level to 0.015. The events are therefore dropped (3,697 observations). Regarding the retail sample, I balance on both moments with the default tolerance level. In 6 out of 10 events convergence was not achieved and balancing is performed using the mean only but with the default tolerance level.

[21] Due to weights of zero in some cases, the number of observations decreases in the B2B sample by 3,832 in addition to the 3,697 observations dropped due to the exclusion of two events (see footnote 17). In the retail sample, weights of zero lead to 89,576 less observations compared to the baseline.

[Table 15 about here]

Controlling for Outliers

To control for outliers, I winsorize all continuous variables at the bottom and top 1% by event-country-industry. The results are displayed in Table 16 and are in line with the baseline results regarding statistical significance, direction and magnitude.

[Table 16 about here]

Additional Country Characteristics

To the best of my knowledge, there is no compelling empirical evidence on location decisions of VAT fraudsters when it comes to certain country characteristics. The first glance falls on the VAT rate as a possible driver since profits of fraudsters mechanically increase with increasing VAT rate. However, the effect of the VAT rate is ambiguous towards fraud with empirical results indicating fraud-increasing (Gradeva 2014), fraud-decreasing (Stiller and Heinemann 2024), and fraud-independent (Bussy 2021) effects. To control for that effect, I included the VAT rate into the baseline model. However, if fraudsters tend to operate in countries that are more favourable along other dimensions, different proxies are needed.

First, I test whether a lower rule of law and less political stability have an influence. I add the variables $Rule\ of\ Law_{cet}$ and $Political\ Stability_{cet}$ to Eq. (5).[22] Data is gathered via World Bank from the WDI database. However, data are missing for 2001. I replace the missing value with the average of the respective values from 2000 and 2002. Second, I interact RCM with the VAT rate to check whether higher VAT rates affect the impact of RCM on firm outcomes.[23] The results are presented in Table 17.

It appears that a higher rule of law correlates with higher sales, costs and operational efficiency (see Table 17, Panel A, Column (1) to (3)) and political stability, on the other hand,

[22] Including further variables like *voice and accountability*, *government effectiveness*, *regulatory quality*, and *control of corruption* would not add to the model since they are highly correlated with the two used variables.
[23] I also test all possible interaction effect between RCM and Rule of Law or Political Stability. However, none of these are statistically significant and not displayed here for brevity.

decreases sales and costs but increases efficiency in the B2B sample (see Table 17, Panel A, Column (1) to (3)). In the retail sample, rule of law only affects the *SCR* (see Table 17, Panel A, Column (6)) while political stability affects sales and *SCR* positively (see Table 17, Panel A, Column (4) and (6)). Overall, the coefficients for RCM are similar compared to the baseline throughout the specifications even when including additional country characteristics.

Turning to the interaction effect between RCM and the VAT rate, there is a statistically significant and negative interaction for *SCR* in the B2B sample (see Table 17, Panel B, Column (3)). This indicates that the higher the VAT rate, the lower are sales after RCM comes into force. This could hint towards more fraud in high VAT countries and hence stronger effects of RCM on operational efficiency. However, there is a missing effect on sales and costs independently.

[Table 17 about here]

Lagged Independent Variables

Including current year's independent variables as predictors of current year's dependent variables can raise an endogeneity problem. Therefore, I lag all control variables by one year and re-estimate Eq. (5) in Table 18. However, due to the unbalanced panel data, a significant amount of observation is lost. The results are somewhat weaker in both samples. However, they generally confirm the baseline results.

[Table 18 about here]

Heterogeneity Analysis: Event-Specific Estimates

The heterogeneity across events is displayed in Fig. 3 for the B2B sample and Fig. 4 for the retail sample. They present the point estimates by event. Fig. 3 showcases that more events correlate with RCM statistically significant and negatively than positively. Regarding the retail sample, Fig. 4 displays across the dependent variables, that most events have negative point estimates of RCM. This exercise reveals the heterogeneity across countries.

[Figure 3 about here]

[Figure 4 about here]

Heterogeneity Analysis: Legal Form

Most firms in the baseline sample are limited liability companies (LLCs). About 95.9% of observations in the B2B sample and 92.6% in the retail sample stem from LLCs. However, the sample also consists of partnerships, sole traders, and other legal forms[24]. To test the sensitivity of the results to the legal form, I create a categorical variable LEGAL that is coded one for LLCs, two for partnerships, three for sole traders, and 4 for all other categories. This variable is included in the specification from Eq. (5) and interacted with RCM. Note that the main effect of LEGAL is omitted due to collinearity with the firm FE. The results are presented in Table 19.

[Table 19 about here]

So far, the corporate income tax (CIT) rate was omitted from the equations since the baseline sample consists also of non-corporate legal forms. To test the sensitivity of the results towards the CIT rate, I add corporate tax rates (incl. local taxes and surcharges) to the regression. Data are gathered from the OECD tax database "Statutory Corporate Income Tax Rates" from the Corporate Tax Statistics. Due to missing data for Cyprus, respective data are obtained by the Tax Foundation from the database "Corporate Tax Rates around the World, 2023". I do not tabulate the results here for brevity. The inclusion of CIT gives quantitatively similar results compared to the baseline.

[24] Other legal forms contain the Orbis categorization of branches, foreign companies, non-profit organizations, public authorities, companies with unknown/unrecorded legal form, and other legal forms. If the legal form is missing, I categorize the firm as unknown legal form.

8 Conclusion

Implementing VAT fraud measures such as the reverse charge mechanism that shifts the tax liability from the supplier to the purchaser to increase tax revenues and combat competitive distortions is a noble attempt. However, this paper seeks to fill the gap left in the literature that concentrated on tax revenue effects omitting the comprehensive analysis of firm level consequences. Using stacked regressions, the results suggest that B2B firms experienced a negative effect on sales and operational efficiency. This effect is concentrated among large firms while SMEs are generally unaffected. This gives rise to the conclusion that, in the B2B market, RCM does impose significant costs when firms and transactions are large due to compliance burdens. Against the prediction, small firms tend to not benefit nor suffer from the removal of the fraudsters.

The effects on the B2B level should transfer to the retail level. However, the RCM abolishes the withholding feature of VAT, an important characteristic of the self-enforcing mechanism of this type of consumption tax. Hence, VAT evasion at the retail stage becomes more profitable since retailers receive the full VAT from customers while on the upstream stage no input VAT is levied. This leads to the hypothesis that retailers gain more from tax evasion. This study finds evidence that reported sales, costs, and operational efficiency of electronic retailers decline on average. However, the smallest and largest retailers seem to be unaffected while only medium-sized firms are negatively affected by the RCM.

Overall, RCM affects firms differently along firm size and customer markets (B2B vs. B2C). This pronounced heterogeneity makes the evaluation of this measure more complex and needs to be considered in further research.

This paper intends to comprehensively analyze firm level effects of the RCM. Although the European Union is making its way to a more digitized taxation system, measures against fraud are still of high interest for Member States. The study also demonstrates the effectiveness

of the withholding feature of VAT and adds to the discussion of the difference between VAT and a RST.

We lack deeper understanding of measures such as RCM on the firm level. The effects are complex and interrelated. As found in this study, B2B and B2C level differ in their response to such measure. Future research could focus on holding certain channels that determine firm outcomes to the RCM constant to gain deeper understanding of the tax evasion channel and the trade dynamics. Another path could focus on liquidity effects of RCM and how firms change their financing behavior to stress the neutrality principle of VAT.

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Figures and Tables

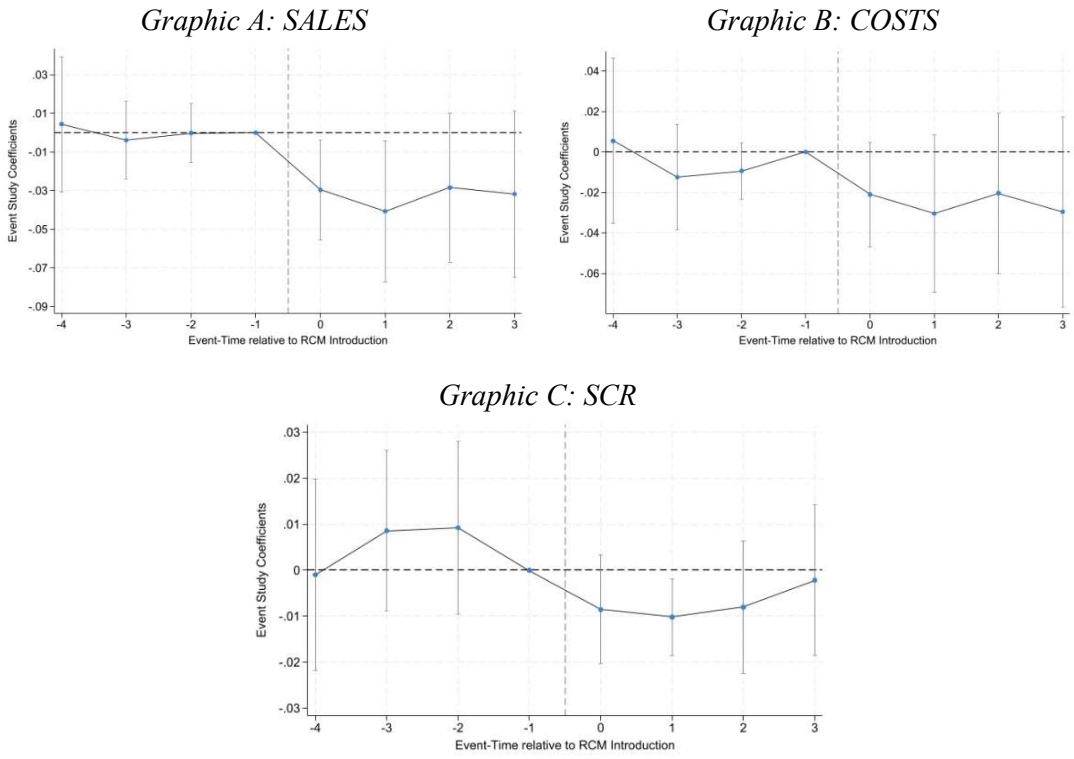

Figure 1. Stacked Event Study Estimates – B2B Sample

Notes: The panels show the stacked event study estimates for the respective dependent variable based on Eq. (4) with 95% confidence intervals as grey lines using the B2B sample. All events from Table 3 are stacked and the estimates show the pooled average difference of leads and lags of the RCM. The year prior to the RCM introduction (t_{-1}) serves as baseline and is set to zero.

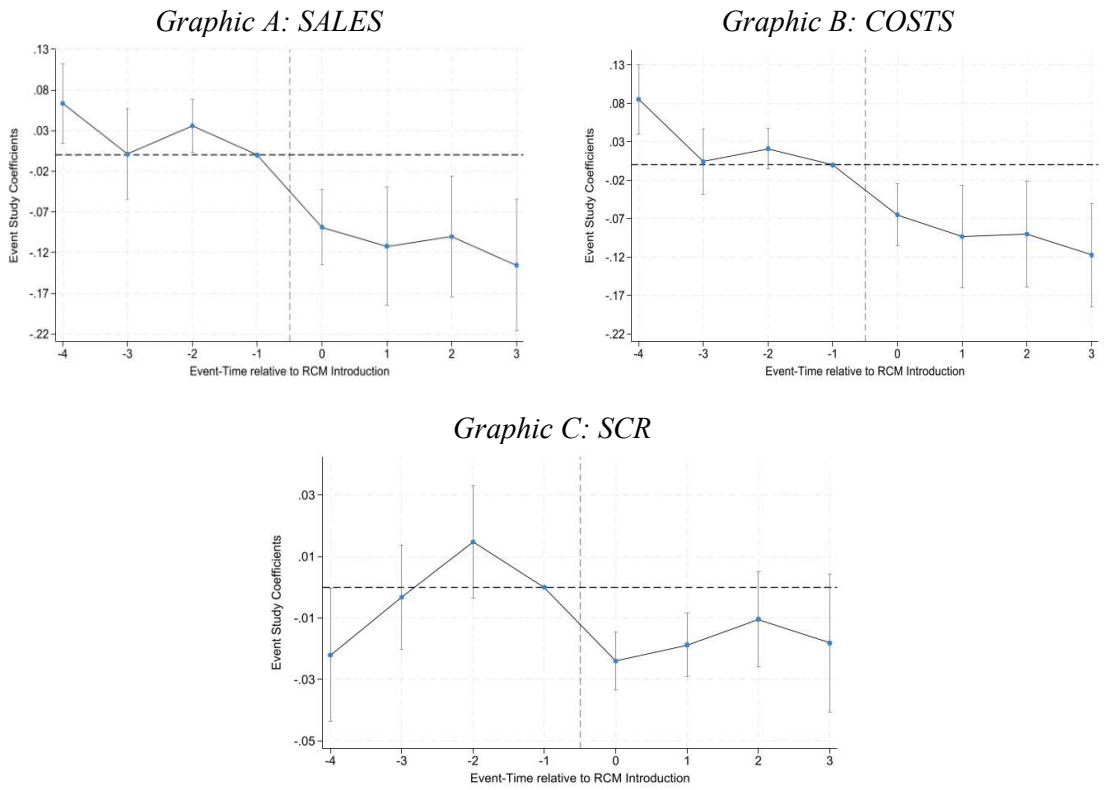

Figure 2. Stacked Event Study Estimates – Retail Sample

Notes: The panels show the stacked event study estimates for each dependent variable from Eq. (4) with 95% confidence intervals as grey lines using the retail sample. For information on industries, see Table 9. Events are stacked and the estimates show the pooled effect of leads and lags of the RCM. The year prior to the RCM introduction (t_{-1}) serves as baseline and is set to zero.

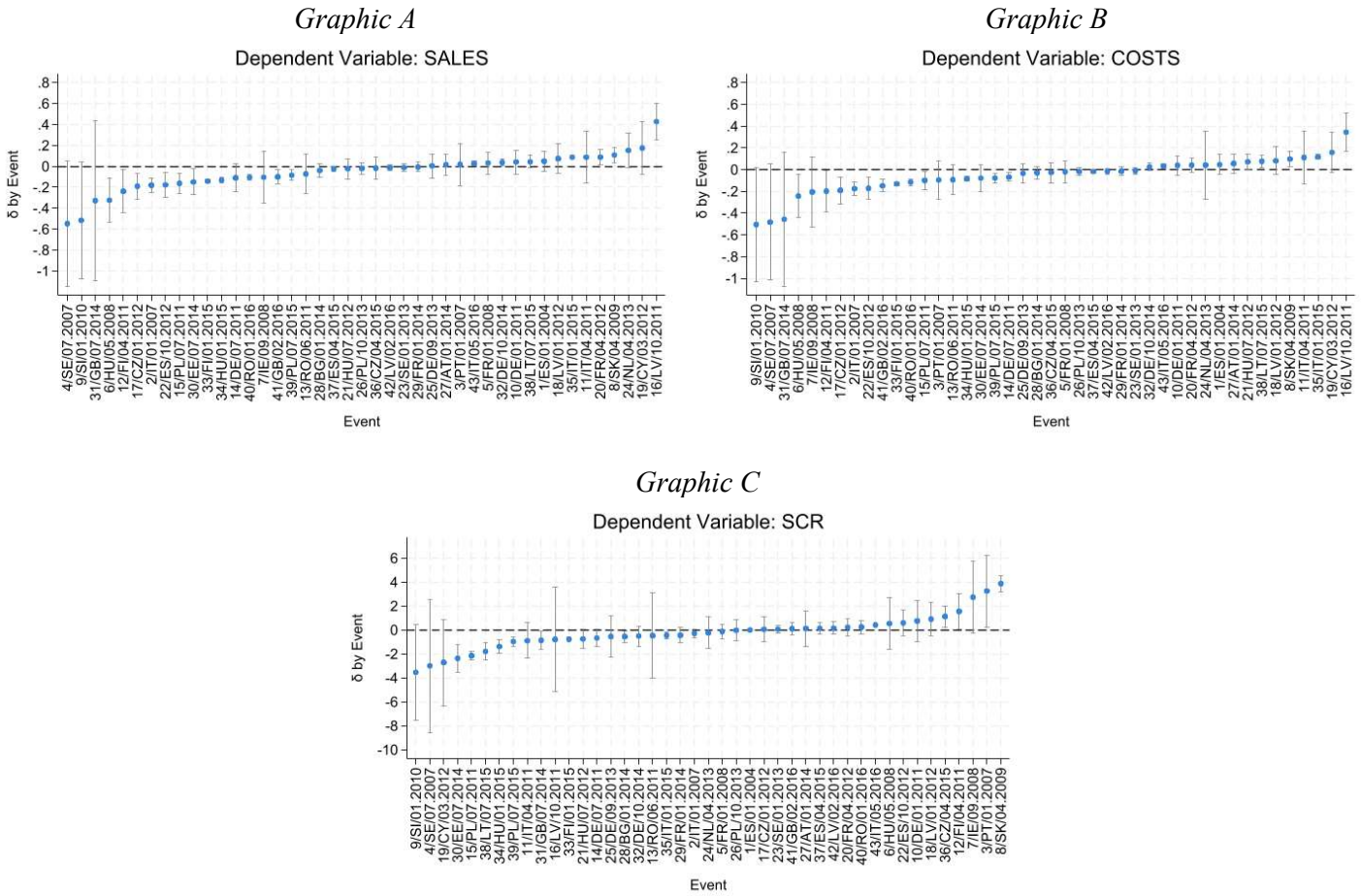

Figure 3. Stacked Event Study Estimates by Event – B2B Sample

Notes: The panels show the event study estimates by each event for the respective dependent variable based on Eq. (5) with 95% confidence intervals as grey lines using the B2B sample.

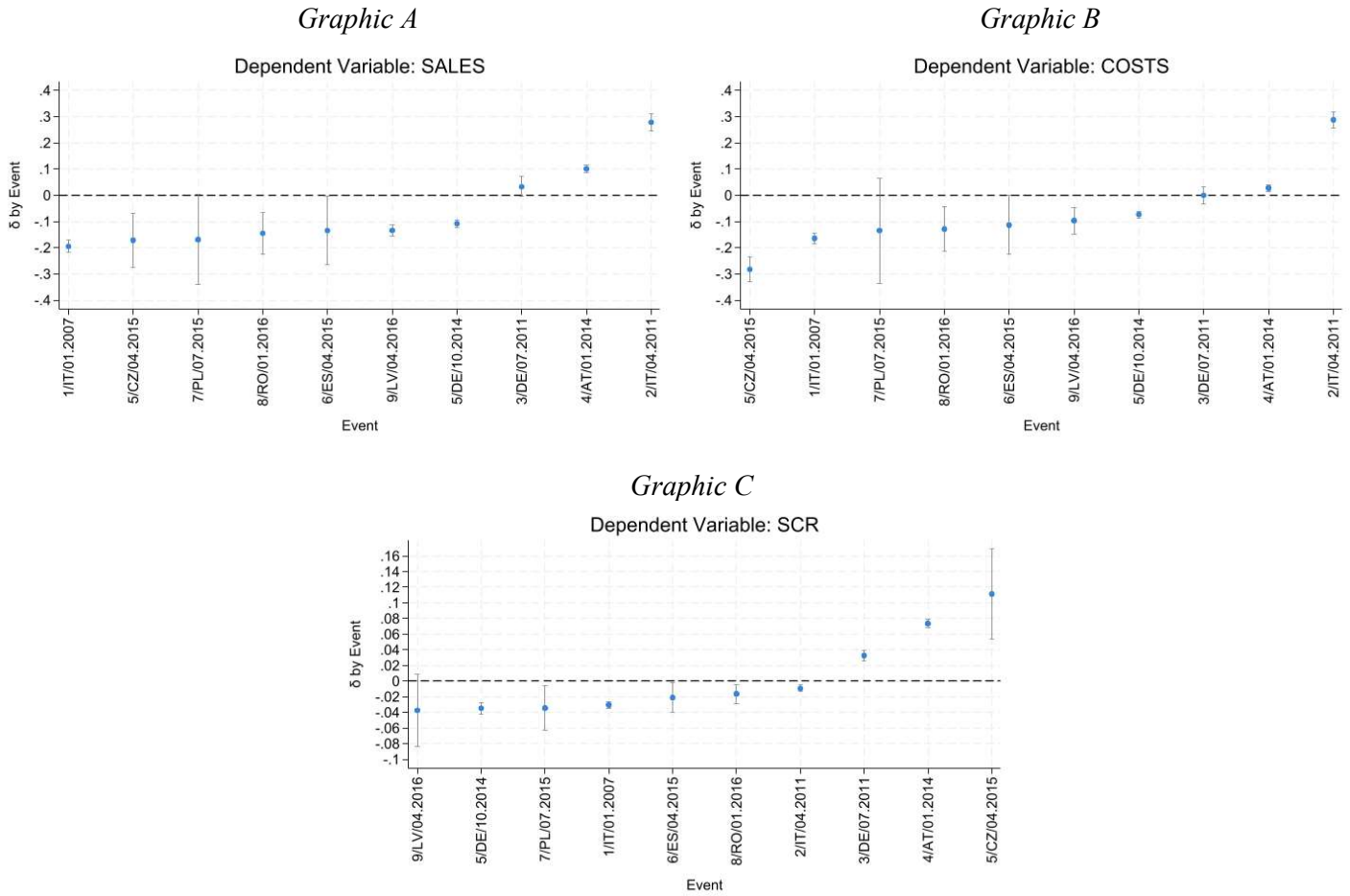

Figure 4. Stacked Event Study Estimates by Event – Retail Sample

Notes: The panels show the event study estimates by each event for the respective dependent variable based on Eq. (5) with 95% confidence intervals as grey lines using the B2C sample.

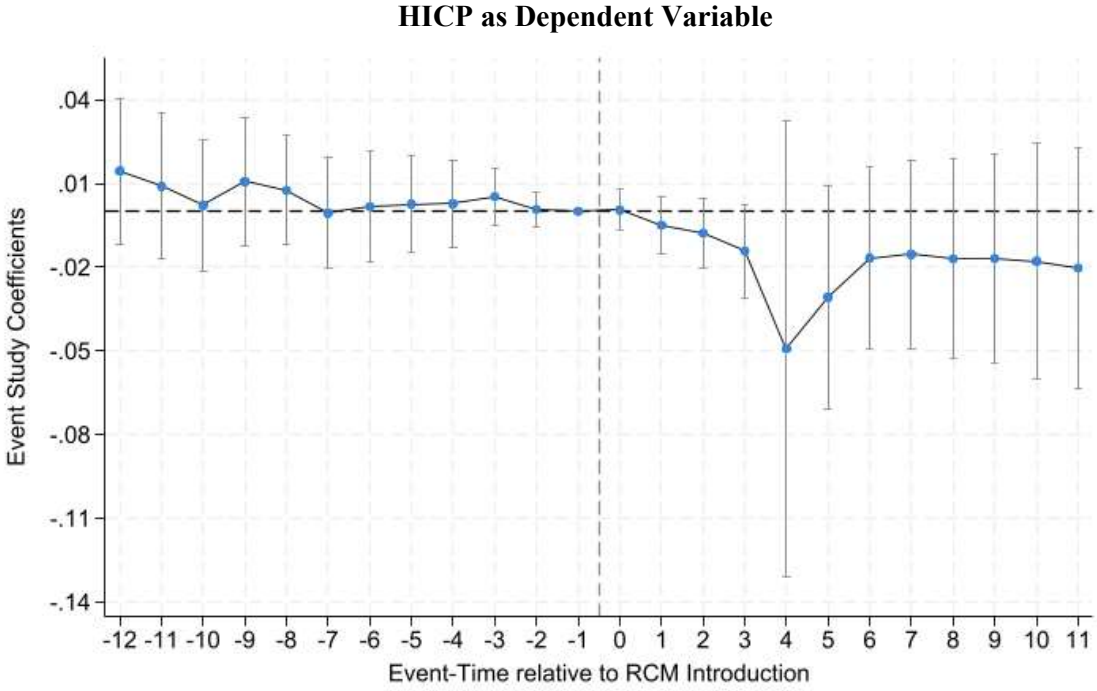

Figure 5. Stacked Event Study Estimates – Retail Prices

Notes: The graphic shows the stacked event study estimates for the dependent variable HICP from Eq. (7) with 95% confidence intervals as grey lines using the retail sample. Events are stacked and the estimates show the coefficients of leads and lags of the RCM. The year prior to the RCM introduction (t_{-1}) serves as baseline and is set to zero.

Table 1. RCM Introductions with corresponding Industry Codes in the EU until 2019

Country	Introduction Date	Industry Code	Group	Source(s)
Austria (AT)	October 1, 2002	41**, 42**, 43**	Direct	EY (2014); 2. Tax Amendment Act 2002, BGBl. I Nr. 132/2002
	January 1, 2005	3512, 3522 3511, 3513, 3514, 3521, 3523	Direct Indirect	Tax Amendment Act 2004 - AbgÄG 2004, BGBl. I Nr. 180/2004
	July 1, 2007	(3811, 3832)[b], 4677 3821	Direct Indirect	Budget Accompanying Act 2007, BGBl. I Nr. 24/2007 in conjunction with Scrap Sales Tax Ordinance, BGBl. II Nr. 129/2007
	January 1, 2012	2611, 2612, 2630, 4652 4742	Direct Indirect	EY (2014); Tax Amendment Act 2011 - AbgÄG 2011, BGBl. I Nr. 76/2011
	January 1, 2014	2410, 2441-2445, 2451-2454, 2620, 2640, 4643, 4651, 4672 0710, 0729, 4741	Direct Indirect	EY (2014); VAT Anti-Fraud Ordinance – UStBBKV, BGBl. II Nr. 369/2013
Bulgaria (BG)	January 1, 2007	3811, 3832, 4677	Direct	EY (2014); Part One of Annex 2 to Chapter 19a in conjunction with Art. 163a of the Bulgarian VAT Act
	January 1, 2014	0111, 0112 1041, 1061, 1062	Direct Indirect	EY (2014); Part Two of Annex 2 to Chapter 19a in conjunction with Art. 163a of the Bulgarian VAT Act
	July 1, 2019	07**, 08**, 20**, 24**, 4672 2561, 2652	Direct Indirect	Annex No. 3 to Art. 167a of the Bulgarian VAT Act
Cyprus (CY)	March 21, 2012	41**, 42**, 43**	Direct	EY (2014); Law 16(I)/2012: The VAT Law of 2011
	October 11, 2013	4677 3811, 3821, 3832	Direct Indirect	EY (2014); Law 118(I)/2013: The VAT (Amendment) (No. 2) Act of 2013
Czech Republic (CZ)	April 1, 2011	4677 3811, 3821, 3832	Direct Indirect	EY (2014); Grasgruber et al. (2013); Attachment No. 5 to Act No. 235/2004 Coll.
	January 1, 2012	41**, 42**, 43**	Direct	EY (2014); Grasgruber et al. (2013)
	April 1, 2015	0111, 0112, 2410, 2441-2445, 2451-2454, 2611, 2612, 2620, 2630, 2640, 4643, 4651, 4652, 4672 0710, 0729, 1041, 1061, 1062, 4741, 4742	Direct Indirect	https://www.tmf-group.com/en/news-insights/articles/2015/august/czech-reverse-charge/; Annex No. 6 to Act No. 235/2004 Coll
	September 1, 2015	0113	Indirect	
	February 1, 2016	3512, 3522	Direct	Government Decree No. 11/2016

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		3511, 3513, 3514, 3521, 3523	Indirect	
Germany (DE)	January 1, 2002	41**, 42**, 43** 6810	Direct Indirect	EY (2014); Budget Support Act 2004 (HBeglG 2004), BGBl. 2003 I 3076, 2004
	January 1, 2005[a]	3512, 3522 3511, 3513, 3514, 3521, 3523	Direct Indirect	EY (2014); Directive Implementation Act (EURLUmsG), BGBl. 2004 I, 3310
	January 1, 2011	3530, 4677, 8121, 8122, 8129 3811, 3821, 3832	Direct Indirect	EY (2014); Jahressteuergesetz 2010 (JStG 2010)
	July 1, 2011	2611, 2612, 2630, 4652 4742	Direct Indirect	Sixth Act Amending Excise Tax Laws, BGBl. I 2011, Nr. 29 of June 24, 2011, 1090
	September 1, 2013	3512, 3522 3511, 3513, 3514, 3521, 3523	Direct Indirect	Administrative Assistance Directive Implementation Act – AmtshilfeRLUmsG, Law of June 26, 2013 – BGBl. I 2013, Nr. 32, Announcement of July 27, 2013 – BGBl. II 2013, Nr. 21, 1120b
	October 1, 2014	2410, 2441-2445, 2451-2454, 2620, 2640, 4643, 4651, 4672 0710, 0729, 4741	Direct Indirect	Croatia Adjustment Act (KroatienAnpG) of July 25, 2014, BGBl. 2014 I, 1266
Denmark (DK)	July 1, 2012	4677 3811, 3821, 3832	Direct Indirect	EY (2014); Art. 3 of Law No. 590 of June 18, 2012
	July 1, 2014	2611, 2612, 2620, 2630, 2640, 4643, 4651, 4652 4741, 4742	Direct Indirect	EY (2014), Art. 46 (1), Pos. 8-10 of the Danish VAT Act
Estonia (EE)	January 1, 2011	6810	Indirect	EY (2014), the Estonian VAT Act shows all introduction dates; see https://www.riigiteataja.ee/en/eli/ee/527022014003/consolide/current; RT I, 10.12.2010, 3
	July 1, 2014	2441, 4672, 4677	Direct	EY (2014); RT I, 06.06.2014, 2
	July 1, 2017	2410, 2442-2445, 2451-2454 0710, 0729	Direct Indirect	RT I, 08.11.2016, 1
Spain (ES)	January 1, 2004	2410, 2441-2445, 2451-2454, 4672, 4677	Direct	EY (2014); Annex 7 of the Spanish VAT Act

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		0710, 0729, 3811, 3821, 3832	Indirect	
	October 31, 2012	41**, 42**, 43**	Direct	EY (2014)
	April 1, 2015	2611, 2612, 2620, 2630, 2640, 4643, 4651, 4652	Direct	Annex 10 of the Spanish VAT Act
		4741, 4742	Indirect	
Finland (FI)	April 1, 2011	41**, 42**, 43**	Direct	EY (2014)
	January 1, 2015	4677	Direct	EY (2014), 27/06/2014/507 modifying art 8d of the 30.12.1993/1501 VAT Act
		3811, 3821, 3832	Indirect	
France (FR)	January 1, 2008	4677	Direct	EY (2014); Law No. 2007-1824 of December 25, 2007 - art. 57
		3811, 3821, 3832	Indirect	
	March 11, 2010	3512, 3522, 3530	Direct	EY (2014); Law No. 2010-237 of March 9, 2010 - art. 16
		3511, 3513, 3514, 3521, 3523	Indirect	
	April 1, 2012	61**	Direct	EY (2014); Law No. 2012-354 of March 14, 2012 - art. 16 (V)
	January 1, 2014	41**, 42**, 43**	Direct	EY (2014); Law No. 2013-1278 of December 29, 2013 - art. 25
Great Britain (GB)	June 1, 2007	2611, 2612, 2630, 4652	Direct	EY (2014); VAT Notice 735 by HM Revenue & Customs
		4742	Indirect	
	July 1, 2014	3512, 3522	Direct	
		3511, 3513, 3514, 3521, 3523	Indirect	
	February 1, 2016	61**	Direct	
Greece (GR)	January 1, 2007	4677	Direct	EY (2014); Law No. 3522/2006 – art. 21 (2)
		3811, 3821, 3832	Indirect	
	August 1, 2017	2611, 2612, 2620, 2630, 2640, 4643, 4651, 4652	Direct	EY (2014); Law No. 4484/2017 – art. 67
		4741, 4742	Indirect	
Croatia (HR)	July 1, 2013	41**, 42**, 43**, 4677	Direct	EY (2014); Official Gazette (NN) 148/13; Art. 75 Croatian VAT Act
		3811, 3821, 3832, 6810	Indirect	
	January 1, 2019	2410, 2420, 2451, 2452, 2591, 4672	Direct	Official Gazette (NN) 106/18; Art. 75 Croatian VAT Act
		0710	Indirect	

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Hungary (HU)	January 1, 2006	4677 3811, 3821, 3832	Direct Indirect	EY (2014) states January 1, 2008, however, several other sources like 'https://online.kpr.hu/t/forditott-adozas.php' state January 1, 2006 as introduction date
	January 1, 2008	6810	Indirect	EY 2014
	May 1, 2008	41**, 42**, 43**	Direct	EY 2014
	July 1, 2012	0111 1061	Direct Indirect	EY (2014); Act XLIX of 2012
	January 1, 2015	2410, 2420, 2451, 2452, 2591, 4672 0710	Direct Indirect	Act XXXIII of 2014
Ireland (IE)	July 1, 2007	6810	Indirect	EY (2014)
	September 1, 2008[c]	41**, 42**, 43**	Direct	EY (2014); Irish Revenue Commissioners (2008)
	May 1, 2011	4677 3811, 3821, 3832	Direct Indirect	EY (2014); Finance Act 2011
Italy (IT)	October 2, 2003[e]	2410, 2420, 2441-2445, 2451-2454, (3811, 3832)[b], 4672, 4677 0710, 0729, 3821	Direct Indirect	Legislative Decree of September 30, 2003 No. 269
	January 1, 2007	0811, 2370, 41**, 42**, 43**, 4651[i] 4741	Direct Indirect	EY (2014); Law of 12/27/2006 No. 296
	October 1, 2007	6810	Indirect	EY (2014); Decree of the Minister of Economy and Finance of 25 May 2007, published in the Official Gazette
	April 1, 2011	2611, 2612, 2630, 4652[d] 4742	Direct Indirect	EY (2014); Circular No. 59/E dated December 23, 2010
	January 1, 2015	3512, 3522, 4617, 8121, 8122, 8129 3511, 3513, 3514, 3521, 3523, 4634, 4635, 4639, 4711	Direct Indirect	Law of December 23, 2014 No. 190
	May 2, 2016	4617, 4634, 4635, 4639, 4711 4643	RCM repealed Direct	Legislative Decree of February 11, 2016 No. 24

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Lithuania (LT)	January 1, 2008	4673, 4677 0210, 0220, 16, 3811, 3821, 3832	Direct Indirect	EY (2014); Resolution No. 1390 of December 19, 2007
	July 1, 2015	41**, 42**, 43**	Direct	Order of the Finance Minister of the Republic of Lithuania No. 1K-123 of March 31, 2015
	August 1, 2019	2611, 2612, 2620, 2630, 2640, 4651, 4652 4741, 4742	Direct Indirect	Resolution No. 6962 of April 24, 2019
Latvia (LV)	July 1, 1999	4673 0210, 0220, 16**	Direct Indirect	EY (2014); Law 133/135 of April 30, 1999; https://breicis.com/reversais-pvn/
	October 1, 2011	(3811, 3832)[b], 4677 3821	Direct Indirect	EY (2014); https://breicis.com/reversais-pvn/
	January 1, 2012	41**, 42**, 43**	Direct	EY (2014); https://breicis.com/reversais-pvn/
	April 1, 2016	2611, 2612, 2620, 2630, 4651, 4652 4741, 4742	Direct Direct	https://breicis.com/reversais-pvn/; Law 2015/248.18
	July 1, 2016	0111 1061	Direct Indirect	https://breicis.com/reversais-pvn/; Law 2016/120.2
	January 1, 2017	2441, 2454, 4672 0710, 0729	Direct Indirect	https://breicis.com/reversais-pvn/; Law 2016/241.48
	January 1, 2018[f]	2442-2445, 2451-2453, 2640, 4643	Direct	https://breicis.com/reversais-pvn/; Law 2017/228.10 and Law 2017/156.11
Netherlands (NL)	January 1, 1982	41**, 42**, 43**	Direct	EY (2014)
	January 1, 1989	6810	Indirect	EY (2014)
	1992 – April 1, 2013	4642 4771, 4782	Direct Indirect	VAT Implementing Ordiance OB 1968
	January 1, 2007	(3811, 3832)[b], 4677 3821	Direct Indirect	EY (2014); Uitv. Besl. OB 1968, Articles 24ba and 24bb; Staatsblad 2006, 684
	April 1, 2013	2611, 2612, 2620, 2630, 4643, 4651, 4652 4741, 4742	Direct Indirect	EY (2014); Staatsblad 2012, 694

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	September 1, 2017	61**	Direct	Staatsblad 2017, 325
Poland (PL)	July 1, 2011[g,h]	4677 3811, 3821, 3832	Direct Indirect	EY (2014); OJ 2011 No. 134 item 780
	October 1, 2013[h]	2410, 2442-2445, 2451-2454, 4672 0710, 0729	Direct Indirect	EY (2014); OJ 2013 item 1027
	July 1, 2015	2611, 2612, 2620, 2630, 4651, 4652 4741, 4742	Direct Indirect	OJ 2015 item 605
	January 1, 2017	2441, 2652, 41**, 42**, 43**, 4648 3212, 4777	Direct Indirect	OJ 2017 item 2024
	November 1, 2019	All RCM industries		Poland replaced the RCM with the split payment mechanism
Portugal (PT)	October 1, 2006	4677 3811, 3821, 3832	Direct Indirect	EY (2014); Law No. 33/2006; Article 2 Paragraph 1 i) in conjunction with Article 36 Paragraph 13 of the Portuguese VAT Code
	January 1, 2007	41**, 42**, 43** 6810	Direct Indirect	EY (2014); Circular Letter No. 30101, dated May 24, 2007; Article 2 Paragraph 1 j) in conjunction with Article 36 Paragraph 13 of the Portuguese VAT Code
Romania (RO)	January 1, 2005	(3811, 3832)[b], 4673, 4677 0210, 0220, 16**, 3821	Direct Indirect	EY (2014); Law 571/2003, Law 172/2006 and Law 2572/2009; Wood defined by defined by Law No. 46/2008
	June 1, 2011	0111 1061	Direct Indirect	EY (2014); Emergency Order No. 49 of May 31, 2011
	September 1, 2013	3512 3511, 3513, 3514	Direct Indirect	EY (2014); Government Ordinance 16/2013
	January 1, 2016	2611, 2612, 2620, 2630, 4651, 4652 4741, 4742, 6810	Direct Indirect	Law No. 227/2015
Sweden (SE)	July 1, 2007	41**, 42**, 43**, 8121, 8122, 8129	Direct	EY (2014); Act (2006:1031)
	January 1, 2013	4677 3811, 3821, 3832	Direct Indirect	EY (2014); Act (2013:368)
Slovenia (SI)	January 1, 2010	41**, 42**, 43**, 4677 3811, 3821, 3832, 6810	Direct Indirect	EY (2014); Official Gazette of the Republic of Slovenia, No. 85/2009, October 39, 2009

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Slovakia (SK)	April 1, 2009	4677	Direct	EY (2014); Coll. 83/2009
		3811, 3821, 3832	Indirect	
	October 1, 2012	6810	Indirect	EY (2014)
	January 1, 2014	2410, 2420, 2451, 2452, 2591, 2611, 2612, 2630, 0111, 4652, 4672	Direct	EY (2014); Coll. 360/2013
		0710, 1061, 4742	Indirect	

Notes: Industry codes are presented as two- or four-digit NACE Rev. 2 Codes. "Direct" assignment indicates that the respective industry is directly affected by the RCM. "Indirectly", on the other hand, indicates that a respective industry is on a down- or upstream stage or the RCM applies not comprehensively. Not included are those RCM implementations by EU Member States for which a specific industry is not identifiable. E.g. the supply of CO^2 gas emission certificates or the sale of items assigned as security. Belgium, Luxembourg, and Malta are not included in the list since the RCM is not applicable to any specific industry until the end of 2019. Note that in the Orbis database all NACE Rev. 1.1 codes were replaced by NACE Rev. 2 codes that were in place from January 1, 2008.

Explanations:
[*] Marks that all digits of the NACE Rev. 2 Code are included.
[a] Applies only if supplier is foreign. Therefore, I treat these industries as non-treated and assign them to the treatment group later when also domestic suppliers fall under the RCM since carousel frauds require a domestic importing firm.
[b] Besides the supply of waste and scrap and scrap metals also related services fall under the RCM.
[c] According to Irish Revenue Commissioners (2008) the RCM was implemented on services from a subcontractor to a principal. The Finance Act 2012 extended the RCM to all construction works between taxable persons from May 1, 2012. However, I treat the first introduction as already relevant and assign the industry to the control group.
[d] The RCM applies to the supply of terminal equipment for public land mobile radio service of communication. However, I treat the industry 4652 as treated when the RCM applies on mobile phones, etc. since this first introduction should cover less trade within the industry.
[e] Before that date, the products were tax-exempted.
[f] Consumer electronics are repealed from July 1, 2019. However, game consoles are still an RCM product so that I treat industry 4643 still as affected.
[g] Initially, RCM was introduced April 1, 2011 (see https://www.podatki.gov.pl/vat/abc-vat/obowiazek-podatkowy/reverse-charge-tzw-odwrotne-obciazenie/). However, on July 1, 2011, the list of RCM products was significantly broadened. Therefore, I treat the respective industries as treated from July 1, 2011.
[h] Extended by numerous products due to OJ 2015 item 605 (July 1, 2015) and OJ 2016 item 2024 (January 1, 2017).
[i] The RCM applies from January 1, 2007 on personal computers that was repealed by May 5, 2016 and exchanged by RCM on laptops and tablet-PCs. Therefore, I treat this industry in Italy as treated from 2007 on (Legislative Decree No. 24 of 11.2.2016.

Table 2. Treatment and Control Groups – B2B Events

Event/Country/Date	Group	Firms	Obs.	Industry Codes
1/ ES/ 01.2004	Control	4,032	22,293	23**, 25**, 467*
	Treatment	293	1,629	2410, 2441-2445, 2451-2454, 4672, 4677
2/ IT/ 01.2007	Control	7,447	40,882	081*, 236*, 239*, 37**, 39**, 464*, 466*
	Treatment	3,304	17,459	0811, 2370, 41**, 42**, 43**, 4651
3/ PT/ 01.2007	Control	121	647	37**, 39**
	Treatment	203	808	41**, 42**, 43**
4/ SE/ 07.2007	Control	5,095	26,037	37**, 39**, 80**, 82**
	Treatment	12	48	41**, 42**, 43**, 8121, 8122, 8129
5/ FR/ 01.2008	Control	3,486	18,764	467*
	Treatment	27	169	4677
6/ HU/ 05.2008	Control	169	919	37**, 39**
	Treatment	302	1,446	41**, 42**, 43**
7/ IE/ 09.2008	Control	224	1,225	37**, 39**
	Treatment	26	107	41**, 42**, 43**
8/ SK/ 04.2009	Control	4,443	23,904	467*
	Treatment	11	48	4677
9/ SI/ 01.2010	Control	5,811	31,257	37**, 39**, 467*
	Treatment	17	90	41**, 42**, 43**,4677
10/ DE/ 01.2011	Control	25,049	132,122	32**, 33**, 467*, 80**, 82**
	Treatment	75	283	3530, 4677, 8121, 8122, 8129
11/ IT/ 04.2011	Control	26,741	142,596	25**, 27**, 464*, 466*
	Treatment	116	656	2611, 2612, 2630, 4652
12/ FI/ 04.2011	Control	384	2,011	37**, 39**
	Treatment	328	1,409	41**, 42**, 43**
13/ RO/ 06.2011	Control	2,174	11,049	011*
	Treatment	100	424	0111
14/ DE/ 07.2011	Control	41,982	212,660	25**, 27**, 464*, 466*
	Treatment	171	670	2611, 2612, 2630, 4652
15/ PL/ 07.2011	Control	11,741	58,455	467*
	Treatment	55	252	4677
16/ LV/ 10.2011	Control	12,371	61,591	37**, 39**, 467*
	Treatment	39	185	3811, 3832, 4677
17/ CZ/ 01.2012	Control	630	3,136	37**, 39**
	Treatment	2,288	11,052	41**, 42**, 43**
18/ LV/ 01.2012	Control	630	3,136	37**, 39**
	Treatment	1,184	5,547	41**, 42**, 43**
19/ CY/ 03.2012	Control	630	3,136	37**, 39**
	Treatment	20	78	41**, 42**, 43**
20/ FR/ 04.2012	Control	18,384	90,166	60**, 62**
	Treatment	336	1,744	61**
21/ HU/ 07.2012	Control	11,082	54,322	011*
	Treatment	2,436	11,721	0111

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22/ ES/ 10.2012	Control	2,388	11,690	37**, 39**
	Treatment	67,811	342,442	41**, 42**, 43**
23/ SE/ 01.2013	Control	46,323	228,920	467*
	Treatment	82	376	4677
24/ NL/ 04.2013	Control	158,073	785,503	25**, 27**, 464*, 466*
	Treatment	66	264	2611, 2612, 2620, 2630, 4651, 4652
25/ DE/ 09.2013	Control	38,153	215,683	32**, 33**
	Treatment	85	478	3512, 3522
26/ PL/ 10.2013	Control	129,853	742,540	23**, 25**, 467*
	Treatment	455	2,353	2410, 2442-2445, 2451-2454, 4672
27/ AT/ 01.2014	Control	226,628	1,290,950	23**, 25**, 464*, 465*, 466*, 467*
	Treatment	128	670	2410, 2441-2445, 2451-2454, 2620, 2640, 4643, 4651, 4672
28/ BG/ 01.2014	Control	12,359	68,173	011*
	Treatment	4,165	23,885	0111, 0112
29/ FR/ 01.2014	Control	2,486	14,094	37**, 39**
	Treatment	44,956	245,897	41**, 42**, 43**
30/ EE/ 07.2014	Control	130,885	838,349	23**, 25**, 467*
	Treatment	141	879	2441, 4672, 4677
31/ GB/ 07.2014	Control	40,688	255,201	32**, 33**
	Treatment	23	150	3512, 3522
32/ DE/ 10.2014	Control	290,185	1,845,130	23**, 25**, 27**, 463*, 464*, 466*, 467*
	Treatment	406	2,423	2410, 2441-2445, 2451-2454, 2620, 2640, 4643, 4651, 4672
33/ FI/ 01.2015	Control	51,861	329,823	467*
	Treatment	81	503	4677
34/ HU/ 01.2015	Control	147,609	945,643	23**, 25**, 27**, 467*
	Treatment	215	1,432	2410, 2420, 2451, 2452, 2591, 4672
35/ IT/ 01.2015	Control	149,798	909,154	32**, 33**, 461*, 80**, 82**
	Treatment	4,226	26,922	3512, 3522, 4617, 8121, 8122, 8129
36/ CZ/ 04.2015	Control	303,577	1,926,702	011*, 23**, 25**, 27**, 463*, 464*, 466*, 467*
	Treatment	489	2,958	0111, 0112, 2410, 2441-2445, 2451-2454, 2611, 2612, 2620, 2630, 2640, 4643, 4651, 4652, 4672
37/ ES/ 04.2015	Control	221,600	1,408,013	25**, 27**, 463*, 464*, 466*
	Treatment	4,512	29,580	2611, 2612, 2620, 2630, 2640, 4643, 4651, 4652
38/ LT/ 07.2015	Control	2,844	19,533	37**, 39**
	Treatment	1,144	5,548	41**, 42**, 43**

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39/ PL/ 07.2015	Control	181,775	1,269,993	25**, 27**, 464*, 466*
	Treatment	1,139	6,519	2611, 2612, 2620, 2630, 4651, 4652
40/ RO/ 01.2016	Control	229,317	1,594,263	25**, 27**, 463*, 464*, 466*
	Treatment	1,335	8,073	2611, 2612, 2620, 2630, 4643, 4651, 4652
41/ GB/ 02.2016	Control	82,291	535,208	60**, 62**
	Treatment	328	2,062	61**
42/ LV/ 02.2016	Control	181,775	1,269,993	25**, 27**, 464*, 466*
	Treatment	327	2,306	2611, 2612, 2620, 2630, 4651, 4652
43/ IT/ 05.2016	Control	61,780	421,460	464*
	Treatment	1,069	7,841	4643

Notes: Event dates are displayed in the format MM.YYYY. For the exact dates see Table 1. All NACE Rev. 2 codes are presented in the Appendix.
* is a placeholder for all industry codes that fall under a certain industry level.

Table 3. Variable Definitions

Variable	Definition	Source
Dependent Variables		
$SALES_{it}$	Sales defined as the natural logarithm of sales (Orbis: TURN) of firm i at time t.	Orbis
$COSTS_{it}$	Costs defined as natural logarithm of the difference between EBIT (Orbis: OPPL) and sales (Orbis: TURN) of firm i at time t. The logarithm is only taken of the absolute value of costs when Sales-EBIT is positive. In cases where the result is negative, the observation is set to missing.	Orbis
SCR_{it}	Sales-to-costs ratio defined as the natural logarithm of sales over costs of firm i at time t.	Orbis
$HICP_{cjt}$	Natural logarithm of the harmonized index of consumer prices in country c and industry j at time t. The HICP is expressed as monthly average index with base year 2015. Data code: prc_hicp_midx__custom_10565383.	Eurostat
DD Variable		
RCM_{cjt}	Dummy variable constructed of a treatment variable $TREAT_i$ and event-specific time variable $POST_t$. A firm belongs to the treatment group if the reverse charge mechanism (RCM) has been introduced in its industry j in country c at time t. The time variable is different across the events. RCM turns to unity for a treatment firm when the mechanism applies. Introductions after June 30 are accrued to the next year.	Orbis
Firm Variables		
$Size_{it}$	Natural logarithm of total assets (Orbis: TOAS).	Orbis
ROA_{it}	Pre-tax income (Orbis: PLBT) divided by total assets (Orbis: TOAS).	Orbis
PPE_{it}	Fixed assets (Orbis: FIAS) divided by total assets (Orbis: TOAS).	Orbis
$Debt_{it}$	Long-term debt (Orbis: LTDB) divided by total assets (Orbis: TOAS).	Orbis
$Import\ Ratio_i$	Import ratio of firm i (German firms only).	Dafne
$LEGAL_i$	Legal form of a firm. Coded as categorical variable with value one when firm i is a (private or public) limited liability company, two when it is a partnership, three when it is a sole trader, and 4 if any other category. The latter category comprises unknown legal forms, branches, foreign companies, non-profit organizations, other legal forms, and public authorities.	Orbis
Country Variables		
DRR_{ct}	Digital Reporting Requirements as dummy variable that takes on the value of one from time t that the importing country implemented one of the following digital reporting requirements according to Luchetta et al. (2022) and zero otherwise: VAT Listings in Bulgaria from 1.1.2006, Latvia from 1.1.2011, Slovakia from 1.1.2014, Estonia from 1.11.2014, Czech Republic 1.1.2016, Hungary from 1.1.2019; SAF-T in Portugal from 1.1.2013, Poland from 1.7.2016, Lithuania from 1.10.2016; Real-time reporting in Spain from 1.7.2017, Hungary from 1.7.2018; E-Invoicing in Italy from 1.1.2019.	Luchetta et al. (2022)

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VAT_{ct}	Standard value-added tax rate in country c at time t. Changes after June 30 are accrued to the next year.	European Commission (2020)
$Inflation_{ct}$	Consumer price change in country c at time t.	WDI
$GDP\ Growth_{ct}$	GDP growth in country c at time t.	WDI
$Unemployment_{ct}$	Unemployment in country c at time t.	WDI
$Consumption_{ct}$	Households and NPISHs final consumption expenditure in % of GDP in country c at time t.	WDI
CIT_{ct}	Corporate income tax rate in country c at time t.	OECD and Tax Foundation
$Rule\ of\ Law_{ct}$	"Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5." (WDI)	WDI
$Political\ Stability_{ct}$	"Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5." (WDI)	WDI

Table 4. Summary of Hypotheses

	Expected Change in Dependent Variable due to the RCM		
Hypothesis Description	*SALES*	*COSTS*	*SCR*
H1: B2B Firms	↓	↓	↓
H2: Small compared to large B2B Firms	↓	↓	↓
H3: High compared to low-importing B2B Firms	↑	↑	↑
H4: Retail Firms	↓	↓	↓
H5: Small compared to large Retailers	↓	↓	↓

Notes: The Table shows predictions based on Section 4. The arrows indicate the predicted sign of δ RCM (for explanation see Table 3).

Table 5. Descriptive Statistics – B2B Events

Panel A: Treatment Group	N	Mean	SD	Skewness	p25	Median	p75
$SALES_{it}$	769,386	12.84205	1.818	0.097	11.789	12.78	13.881
Orbis: TURN	769,386	5.017	129.83	106.821	0.132	0.355	1.068
$COSTS_{it}$	769,386	12.84196	1.76	0.251	11.786	12.756	13.843
Orbis:(TURN-OPPL)	769,386	4.819	126.673	108.099	0.131	0.347	1.028
SCR_{it}	769,386	0.00008	0.472	-3.46	-0.016	0.029	0.09
Orbis: OPPL	769,386	0.198	7.789	186.36	-0.003	0.011	0.049
RCM_{cjt}	769,386	0.599	0.49	-0.402	0	1	1
$Size_{it}$	769,386	12.968	1.785	0.433	11.793	12.842	13.996
Orbis: TOAS	769,386	5.965	156.887	109.736	0.132	0.378	1.198
ROA_{it}	769,386	-0.086	48.479	-275.619	-0.015	0.023	0.099
Orbis: PLBT	769,386	0.202	9.219	115.797	-0.005	0.007	0.043
PPE_{it}	769,386	0.261	0.916	775.566	0.053	0.171	0.402
Orbis: FIAS	769,386	2.45	99.492	127.728	0.012	0.055	0.249
$Debt_{it}$	769,386	0.206	20.171	475.732	0	0.005	0.153
Orbis: LTDB	769,386	0.937	46.605	249.678	0	0.002	0.072
$Import\ Ratio_i$	3,774	14.07	27.803	2.057	0	0	14
DRR_{ct}	769,386	0.057	0.231	3.839	0	0	0
VAT_{ct}	769,386	20.161	1.651	0.587	19.6	20	21
$Inflation_{ct}$	769,386	0.998	1.204	0.623	-0.151	0.864	1.954
$GDP\ Growth_{ct}$	769,386	0.876	2.133	-0.373	-0.56	1.095	2.291
$Unemployment_{ct}$	769,386	15.96	7.051	0.14	9.91	12.61	24.44
$Consumption_{ct}$	769,386	57.33	2.938	-0.52	54.636	58.457	59.336

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Panel B: Control Group	N	Mean	SD	Skewness	p25	Median	p75
$SALES_{it}$	17,866,325	13.371	2.19	-0.188	12.038	13.444	14.754
Orbis: TURN	17,866,325	8.844	277.252	385.608	0.169	0.69	2.555
$COSTS_{it}$	17,866,325	13.328	2.175	-0.144	11.991	13.396	14.701
Orbis:(TURN-OPPL)	17,866,325	8.441	270.282	391.056	0.161	0.657	2.425
SCR_{it}	17,866,325	0.043	0.380	-1.49	0.007	0.037	0.094
Orbis: OPPL	17,866,325	0.403	25.97	559.771	0.002	0.022	0.107
RCM_{cjt}	17,866,325	0	0	0	0	0	0
$Size_{it}$	17,866,325	13.264	2.038	-0.091	12.008	13.305	14.55
Orbis: TOAS	17,866,325	6.718	313.228	552.615	0.164	0.6	2.083
ROA_{it}	17,866,325	0.123	996.937	3584.444	0.003	0.035	0.111
Orbis: PLBT	17,866,325	0.433	30.962	492.641	0.001	0.016	0.09
PPE_{it}	17,866,325	0.238	0.25	14.381	0.037	0.153	0.378
Orbis: FIAS	17,866,325	2.568	149.616	416.804	0.01	0.077	0.435
$Debt_{it}$	17,866,325	0.125	39.341	1500.937	0	0	0.075
Orbis: LTDB	17,866,325	0.706	91.482	647.998	0	0	0.058
$Import\ Ratio_{i}$	149,740	13.175	27.128	2.144	0	0	10
DRR_{ct}	17,866,325	0.199	0.399	1.509	0	0	0
VAT_{ct}	17,866,325	21.689	2.096	0.697	20	21	23
$Inflation_{ct}$	17,866,325	1.075	1.309	0.783	0.038	1.032	1.954
$GDP\ Growth_{ct}$	17,866,325	1.328	2.242	-0.316	0.313	1.396	2.858
$Unemployment_{ct}$	17,866,325	12.102	5.791	1.014	8.05	10.65	13.9
$Consumption_{ct}$	17,866,325	58.147	4.985	-0.649	54.636	59.336	60.901

Notes: Orbis variables are presented in million euros. Information on the number of firms in treatment and control group by event are presented in Table 2. Variable definitions are in Table 3. Panel A displays the descriptive statistics for the treatment group in which a certain firm-year is presented only once. Panel B displays the descriptive statistics for the control group using the stacked events. Thus, multiple counts of the same firm-year are possible.

Table 6. Regression Results – Baseline Effect of RCM

	(1)	(2)	(3)
Dependent Variable	*SALES*	*COSTS*	*SCR*
RCM	-0.032*	-0.021	-0.012***
	(0.019)	(0.020)	(0.004)
Size	0.763***	0.680***	0.082***
	(0.004)	(0.004)	(0.001)
ROA	0.000	0.000	0.000***
	(0.000)	(0.000)	(0.000)
PPE	-0.120	-0.070	-0.051
	(0.090)	(0.054)	(0.036)
Debt	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
DRR	0.004	0.005***	-0.001*
	(0.002)	(0.002)	(0.001)
VAT	-0.002**	-0.003***	0.001**
	(0.001)	(0.001)	(0.000)
Inflation	0.001	0.002**	-0.001***
	(0.001)	(0.001)	(0.000)
GDP Growth	0.007***	0.004***	0.003***
	(0.000)	(0.000)	(0.000)
Unemployment	-0.006***	-0.005***	-0.002***
	(0.001)	(0.001)	(0.000)
Consumption	0.005***	0.002***	0.003***
	(0.001)	(0.001)	(0.000)
Observations	18,635,711	18,635,711	18,635,711
Adjusted R^2	0.943	0.949	0.416
Event×Firm FE	✓	✓	✓
Event×Time FE	✓	✓	✓
Sample	B2B	B2B	B2B

Notes: Detailed information on treatment and control groups by event is provided in Table 2. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on variables, see Table 3. Estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7. Regression Results – Firm Size B2B Sample

Panel A: Quartile 1	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	0.006	-0.023	0.023	-0.013	**-0.017***	-0.010
	(0.037)	(0.028)	(0.041)	(0.033)	**(0.010)**	(0.009)
Observations	4762630	4,808,874	4762630	4,808,874	4762630	4,808,874
Adjusted R^2	0.754	0.821	0.776	0.833	0.415	0.395
Panel B: Quartile 2	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	-0.013	-0.027	-0.010	-0.012	-0.003	**-0.015*** **
	(0.024)	(0.024)	(0.026)	(0.024)	(0.006)	**(0.005)**
Observations	4611180	4,582,749	4611180	4,582,749	4611180	4,582,749
Adjusted R^2	0.722	0.840	0.749	0.856	0.426	0.413
Panel C: Quartile 3	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	-0.029	**-0.031***	-0.027	-0.024	-0.002	-0.007
	(0.019)	**(0.017)**	(0.019)	(0.018)	(0.004)	(0.004)
Observations	4595641	4,578,482	4595641	4,578,482	4595641	4,578,482
Adjusted R^2	0.777	0.876	0.796	0.888	0.371	0.414
Panel D: Quartile 4	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	**-0.049****	**-0.037****	**-0.037***	**-0.026***	**-0.013*****	**-0.011***
	(0.024)	**(0.018)**	**(0.021)**	**(0.014)**	**(0.005)**	**(0.006)**
Observations	4666259	4,665,606	4666259	4,665,606	4666259	4,665,606
Adjusted R^2	0.931	0.939	0.940	0.948	0.411	0.469
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	B2B	B2B	B2B

Notes: Quartiles are calculated based on pre-reform annual sales or total assets by event. Therefore, thresholds vary by event. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on all variables, see Table 3. Information on treatment and control groups is provided in Table 2. For explanations on all variables, see Table 3. Stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8. Regression Results – Competitors Firms

	(1)	(2)	(3)
Dependent Variable	*SALES*	*COSTS*	*SCR*
RCM	-0.037	-0.033*	-0.004
	(0.023)	(0.017)	(0.012)
RCM×Import Ratio	0.000	0.000	-0.000
	(0.001)	(0.000)	(0.000)
Observations	153,514	153,514	153,514
Adjusted R^2	0.978	0.978	0.666
Firm Controls	✓	✓	✓
Event×Firm FE	✓	✓	✓
Event×Time FE	✓	✓	✓
Sample	German Firms	German Firms	German Firms

Notes: Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on all variables, see Table 3. Detailed information on the treatment and control groups by event is provided in Table 2. Estimates are based on Eq. (6). Standard errors are clustered by event-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 9. Descriptive Information by Events for Electronic Retailer Sample

Event/Country/Date	Group	Firms	Obs.	Industries
1/ IT/ 01.2007	Control	21,884	120,414	47**, except for 4741 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	41	262	4741
2/ IT/ 04.2011	Control	54,821	293,241	47**, except for 4741, 4742 (other countries), 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	151	881	4742
3 / DE/ 07.2011	Control	87,719	437,504	47**, except for 4741, 4742 (other countries), 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	27	95	4742
4/ AT/ 01.2014	Control	264,776	1,459,624	47**, except for 4741 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	12	57	4741
5/ DE/ 10.2014	Control	279,429	1,702,377	47**, except for 4741 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	20	104	4741
6/ CZ/ 04.2015	Control	279,429	1,702,377	47**, except for 4741 (other countries), 4742 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	25	132	4741, 4742
7/ ES/ 04.2015	Control	279,429	1,702,377	47**, except for 4741 (other countries), 4742 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	2,383	15,368	4741, 4742
8/ PL/ 07.2015	Control	289,282	1,906,162	47**, except for 4741 (other countries), 4742 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	243	1,286	4741, 4742
9/ RO/ 01.2016	Control	289,282	1,906,162	47**, except for 4741 (other countries), 4742 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	860	4,818	4741, 4742
10/ LV/ 04.2016	Control	289,282	1,906,162	47**, except for 4741 (other countries), 4742 (other countries), 4742, 4743, 4777, 478*, 479*, 4771 and 4782 in NL, 4711 in Italy
	Treatment	121	884	4741, 4742

Table 10. Descriptive Statistics – Electronic Retailers

Panel A: Treatment Group	N	Mean	SD	Skewness	p25	Median	p75
$SALES_{it}$	23,887	12.211	1.877	-0.106	11.164	12.249	13.285
Orbis: TURN	23,887	2.666	43.316	47.765	0.071	0.209	0.588
$COSTS_{it}$	23,887	12.196	1.865	-0.105	11.169	12.235	13.261
Orbis:(TURN-OPPL)	23,887	2.612	43.091	48.34	0.071	0.206	0.574
SCR_{it}	23,887	0.014	0.376	-1.142	-0.016	0.018	0.064
Orbis: OPPL	23,887	0.055	0.658	22.336	-0.002	0.004	0.018
RCM_{cjt}	23,887	0.531	0.499	-0.124	0	1	1
$Size_{it}$	23,887	11.816	1.749	-0.124	10.796	11.852	12.876
Orbis: TOAS	23,887	1.019	10.839	34.739	0.049	0.14	0.391
ROA_{it}	23,887	0.082	32.043	132.688	-0.025	0.019	0.095
Orbis: PLBT	23,887	0.053	0.691	22.616	-0.002	0.003	0.015
PPE_{it}	23,887	0.243	0.262	7.411	0.034	0.161	0.391
Orbis: FIAS	23,887	0.212	1.545	26.672	0.003	0.022	0.094
$Debt_{it}$	23,887	0.47	48.292	154.439	0	0	0.136
Orbis: LTDB	23,887	0.174	6.356	70.645	0	0	0.03
DRR_{ct}	23,887	0.14	0.347	2.075	0	0	0
VAT_{ct}	23,887	20.829	1.590	0.126	20	21	21
$Inflation_{ct}$	23,887	1.246	1.492	0.222	-0.203	1.409	2.258
$GDP\ Growth_{ct}$	23,887	1.893	2.604	-0.296	0.27	2.284	3.312
$Unemployment_{ct}$	23,887	16.238	7.758	-0.292	7.1	17.22	24.44
$Consumption_{ct}$	23,887	59.501	1.922	-0.553	58.332	58.956	60.606

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Panel B: Control Group	N	Mean	SD	Skewness	p25	Median	p75
$SALES_{it}$	13,136,400	12.251	2.082	-0.054	10.903	12.351	13.593
Orbis: TURN	13,136,400	4.249	171.856	225.105	0.054	0.231	0.801
$COSTS_{it}$	13,136,400	12.242	2.057	-0.021	10.92	12.331	13.562
Orbis:(TURN-OPPL)	13,136,400	4.128	169.315	228.92	0.055	0.227	0.776
SCR_{it}	13,136,400	0.009	0.333	-1.77	-0.007	0.022	0.067
Orbis: OPPL	13,136,400	0.121	7.632	-121.061	-0.001	0.004	0.024
RCM_{cjt}	13,136,400	0	0.000	0	0	0	0
$Size_{it}$	13,136,400	11.823	2.032	-0.088	10.487	11.954	13.176
Orbis: TOAS	13,136,400	2.551	117.088	206.873	0.036	0.155	0.528
ROA_{it}	13,136,400	0.069	350.722	1,314.86	-0.014	0.028	0.109
Orbis: PLBT	13,136,400	0.136	20.539	1,437.389	-0.001	0.003	0.02
PPE_{it}	13,136,400	0.234	0.313	193.942	0.013	0.13	0.391
Orbis: FIAS	13,136,400	1.31	74.704	179.95	0.001	0.019	0.123
$Debt_{it}$	13,136,400	0.219	81.872	1,936.048	0	0	0.058
Orbis: LTDB	13,136,400	0.322	26.464	262.97	0	0	0.017
DRR_{ct}	13,136,400	0.307	0.461	0.835	0	0	1
VAT_{ct}	13,136,400	21.647	2.328	0.757	20	21	23
$Inflation_{ct}$	13,136,400	1.181	1.507	0.64	-0.062	1.041	2.062
$GDP\ Growth_{ct}$	13,136,400	1.824	2.250	-0.132	0.755	1.95	3.04
$Unemployment_{ct}$	13,136,400	11.103	5.631	1.146	6.81	9.95	12.68
$Consumption_{ct}$	13,136,400	58.665	4.928	-0.697	54.719	59.816	62.023

Notes: Orbis variables are presented in million euros. Information on the number of firms in treatment and control group by event are presented in Table 2. Variable definitions are in Table 3. Panel A displays the descriptive statistics for the treatment group in which a certain firm-year is presented only once. Panel B displays the descriptive statistics for the control group using the stacked events. Thus, multiple counts of the same firm-year are possible.

Table 11. Regression Results – Effect of RCM on Electronic Retailers

	(1)	(2)	(3)
Dependent Variable	*SALES*	*COSTS*	*SCR*
RCM	-0.126***	-0.107***	-0.019***
	(0.044)	(0.039)	(0.006)
Size	0.553***	0.484***	0.069***
	(0.008)	(0.008)	(0.001)
ROA	0.000***	0.000*	0.000***
	(0.000)	(0.000)	(0.000)
PPE	-0.065***	-0.021**	-0.044***
	(0.021)	(0.010)	(0.011)
Debt	0.000***	0.000***	-0.000
	(0.000)	(0.000)	(0.000)
DRR	0.006**	0.007***	-0.001
	(0.003)	(0.003)	(0.001)
VAT	-0.021***	-0.014***	-0.007***
	(0.001)	(0.001)	(0.000)
Inflation	-0.008***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.000)
GDP Growth	0.002***	0.001	0.002***
	(0.001)	(0.000)	(0.000)
Unemployment	-0.007***	-0.005***	-0.002***
	(0.001)	(0.001)	(0.000)
Consumption	0.010***	0.006***	0.003***
	(0.001)	(0.001)	(0.000)
Observations	13,160,287	13,160,287	13,160,287
Adjusted R^2	0.938	0.943	0.404
Event×Firm FE	✓	✓	✓
Event×Time FE	✓	✓	✓
Sample	Retail	Retail	Retail

Notes: Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. Detailed information on treatment and control groups by event is provided in Table 2. For explanations on variables, see Table 3. Estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 12. Regression Results – Firm Size Retail Sample

Panel A: Quartile 1	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	-0.103	-0.086	-0.091	-0.081	-0.011	-0.005
	(0.078)	(0.062)	(0.077)	(0.063)	(0.009)	(0.007)
Observations	3,357,199	3,332,876	3,357,199	3,332,876	3,357,199	3,332,876
Adjusted R^2	0.684	0.792	0.710	0.806	0.425	0.390
Panel B: Quartile 2	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	**-0.108*** **	**-0.149*** **	**-0.091*** **	**-0.132*** **	**-0.018*** **	**-0.016*** **
	(0.022)	**(0.023)**	**(0.024)**	**(0.022)**	**(0.006)**	**(0.003)**
Observations	3,263,368	3,263,154	3,263,368	3,263,154	3,263,368	3,263,154
Adjusted R^2	0.584	0.827	0.600	0.839	0.346	0.403
Panel C: Quartile 3	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	**-0.134***	**-0.101***	**-0.114***	**-0.070**	**-0.021** **	**-0.031*** **
	(0.069)	**(0.054)**	**(0.061)**	**(0.047)**	**(0.009)**	**(0.008)**
Observations	3,232,180	3,230,537	3,232,180	3,230,537	3,232,180	3,230,537
Adjusted R^2	0.610	0.856	0.618	0.863	0.317	0.398
Panel D: Quartile 4	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*SALES*	*COSTS*	*COSTS*	*SCR*	*SCR*
based on pre-reform annual	Sales	Total Assets	Sales	Total Assets	Sales	Total Assets
RCM	-0.121	-0.151	-0.093	-0.122	-0.029	-0.029
	(0.106)	(0.114)	(0.081)	(0.092)	(0.026)	(0.025)
Observations	3,218,560	3,244,740	3,218,560	3,244,740	3,218,560	3,244,740
Adjusted R^2	0.916	0.933	0.923	0.938	0.295	0.421
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	Retail	Retail	Retail	Retail	Retail	Retail

Notes: Quartiles are calculated based on pre-reform annual sales or total assets by event. Therefore, thresholds vary by event. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on all variables, see Table 3. Information on treatment and control groups is provided in Table 9. For explanations on all variables, see Table 3. Stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 13. Regression Results – Placebo Test

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
$RCM_{Placebo}$	0.006	0.009	-0.003	-0.021	-0.028	0.007
	(0.011)	(0.015)	(0.006)	(0.020)	(0.019)	(0.005)
Observations	7,435,234	7,435,234	7,435,234	5,658,216	5,658,216	5,658,216
Adjusted R^2	0.958	0.963	0.505	0.955	0.958	0.487
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail

Notes: The sample is reduced to pre-RCM periods and $RCM_{Placebo}$ is set to one already in t_{-1} and t_{-2} for treated firms and zero otherwise. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. Information on treatment and control groups is provided in Table 2 for the B2B Sample and Table 9 for the Retail Sample. For explanations on all variables, see Table 3. Stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 14. Regression Results – Truncation of the Sample Period

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var.	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
RCM	-0.031*	-0.018	-0.013***	-0.107***	-0.088**	-0.019***
	(0.018)	(0.018)	(0.004)	(0.041)	(0.036)	(0.006)
Observations	15,228,162	15,228,162	15,228,162	10,664,563	10,664,563	10,664,563
Adjusted R^2	0.947	0.953	0.442	0.943	0.948	0.430
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail
	$t \in [-3,2]$	$t \in [-3,2]$	$t \in [-3,2]$	$t \in [-3,2]$	$t \in [-3,2]$	$t \in [-3,2]$
Panel B:	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var.	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
RCM	-0.033**	-0.020	-0.013***	-0.107***	-0.084***	-0.023***
	(0.017)	(0.017)	(0.003)	(0.037)	(0.032)	(0.006)
Observations	10,713,274	10,713,274	10,713,274	7,458,709	7,458,709	7,458,709
Adjusted R^2	0.954	0.959	0.482	0.951	0.956	0.473
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail
	$t \in [-2,1]$	$t \in [-2,1]$	$t \in [-2,1]$	$t \in [-2,1]$	$t \in [-2,1]$	$t \in [-2,1]$

Notes: Data used in this table consists of three years for Panel A and two years for Panel B prior and after the RCM. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. Information on treatment and control groups is provided in Table 2 for the B2B Sample and Table 9 for the Retail Sample. For explanations on all variables, see Table 3. Stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 15. Entropy Balancing

Panel A: Descriptive Statistics B2B Sample	Treatment Group N=308,258	Control Group N=7,702,190		Treatment Group N=308,258	Control Group N=7,702,190	
		Unbalanced			*Balanced*	
Balanced Firm Level Covariates	Mean Post=0	Mean Post=0	*Difference*	Mean Post=0	Mean Post=0	*Difference*
Size	12.9303	13.2284	-0.2980***	12.9303	12.9134	0.0170***
ROA	-0.0699	0.5316	-0.6015	-0.0699	0.2024	-0.2723
PPE	0.2466	0.2379	0.0086***	0.2466	0.2518	-0.0052***
Debt	0.1503	0.0889	0.0615***	0.1503	0.1421	0.0082***
Panel B: Descriptive Statistics Retail Sample	Treatment Group N=11,263	Control Group N=5,978,716		Treatment Group N=11,263	Control Group N=5,978,716	
		Unbalanced			*Balanced*	
Balanced Firm Level Covariates	Mean if Post=0	Mean if Post=0	*Difference*	Mean if Post=0	Mean if Post=0	*Difference*
Size	11.7735	11.8243	0.0507***	11.7735	11.7789	-0.0054***
ROA	-0.0377	-0.0975	-0.0591	-0.0377	-0.0832	0.0455**
PPE	0.2422	0.2429	0.0008	0.2422	0.2409	0.0013***
Debt	0.1589	0.1103	-0.0484	0.1589	0.1382	0.0207***
Panel C: Regression Results	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
RCM	-0.048**	-0.057***	0.009	-0.116***	-0.094***	-0.022***
	(0.023)	(0.018)	(0.008)	(0.039)	(0.035)	(0.006)
Observations	18,628,182	18,628,182	18,628,182	13,070,711	13,070,711	13,070,711
Adjusted R^2	0.915	0.925	0.406	0.922	0.930	0.407
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail

Notes: Panel A and B display the descriptive statistics between treatment and control group pre-RCM before and after entropy balancing. Panel C presents the regression results. The regressions include the weights obtained from entropy balancing according to Hainmueller (2012). The following firm level covariates are used for balancing on the pre-RCM periods: Size, ROA, PPE, and Debt. For explanations on all variables, see Table 3. Information on treatment and control groups is provided in Table 2 for the B2B sample and Table 9 for the retail sample. Static stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 16. Regression Results – Controlling for Outliers

Dep. Var.	(1) *SALES Winsorized*	(2) *COSTS Winsorized*	(3) *SCR Winsorized*	(4) *SALES Winsorized*	(5) *COSTS Winsorized*	(6) *SCR Winsorized*
RCM	-0.033*	-0.022	-0.011***	-0.117***	-0.103***	-0.012**
	(0.017)	(0.019)	(0.004)	(0.042)	(0.037)	(0.005)
Observations	18,635,711	18,635,711	18,635,711	13,160,287	13,160,287	13,160,287
Adjusted R^2	0.949	0.954	0.472	0.944	0.948	0.455
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail

Notes: Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on all variables, see Table 3. All continuous variables are winsorized at the top and bottom 1% by event-country-industry. Information on treatment and control groups is provided in Table 2 for the B2B Sample and Table 9 for the Retail Sample. For explanations on all variables, see Table 3. Stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 17. Regression Results – Country Characteristics

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var.	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
RCM	-0.032*	-0.021	-0.011***	-0.128***	-0.107***	-0.021***
	(0.019)	(0.020)	(0.004)	(0.044)	(0.039)	(0.006)
Rule of Law	0.040***	0.024***	0.016***	0.011	-0.006	0.016***
	(0.008)	(0.007)	(0.003)	(0.015)	(0.014)	(0.003)
Political	-0.024***	-0.043***	0.019***	0.038***	0.004	0.034***
Stability	(0.006)	(0.005)	(0.002)	(0.009)	(0.008)	(0.002)
Observations	18,635,711	18,635,711	18,635,711	13,160,287	13,160,287	13,160,287
Adjusted R^2	0.943	0.949	0.416	0.938	0.943	0.404
Panel B:	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var.	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
RCM	-0.061	-0.221	0.160***	-0.230	-0.304	0.075
	(0.160)	(0.136)	(0.048)	(0.448)	(0.497)	(0.097)
VAT	-0.002**	-0.003***	0.001**	-0.021***	-0.014***	-0.007***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)
RCM×VAT	0.001	0.009	-0.008***	0.005	0.010	-0.005
	(0.008)	(0.007)	(0.002)	(0.022)	(0.024)	(0.005)
Observations	18,635,711	18,635,711	18,635,711	13,160,287	13,160,287	13,160,287
Adjusted R^2	0.943	0.949	0.416	0.938	0.943	0.404
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail

Notes: Detailed information on treatment and control groups by event is provided in Table 2. Additionally, all indirectly affected industries from Table 1 are included for the respective event. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on variables, see Table 3. Estimates are based on Eq. (5). Standard errors are clustered by cohort-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 18. Regression Results – Lagged Independent Variables

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*SALES*	*COSTS*	*SCR*	*SALES*	*COSTS*	*SCR*
RCM	-0.021*	-0.020	-0.001	-0.085*	-0.073*	-0.012
	(0.011)	(0.012)	(0.004)	(0.044)	(0.039)	(0.007)
Observations	15,014,408	15,014,408	15,014,408	10,571,276	10,571,276	10,571,276
Adjusted R^2	0.947	0.957	0.456	0.950	0.956	0.448
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail

Notes: Detailed information on treatment and control groups by event is provided in Table 2. Additionally, all indirectly affected industries from Table 1 are included for the respective event. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. All control variables are lagged by one year. For explanations on variables, see Table 3. Estimates are based on Eq. (5). Standard errors are clustered by cohort-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 19. Regression Results – Legal Form

Dependent Variable	(1) *SALES*	(2) *COSTS*	(3) *SCR*	(5) *SALES*	(6) *COSTS*	(7) *SCR*
RCM	-0.034**	-0.023	-0.010***	-0.126***	-0.106***	-0.019***
	(0.016)	(0.017)	(0.004)	(0.044)	(0.039)	(0.007)
RCM	0.028	0.043	-0.015	-0.038	-0.077	0.039**
×*Partnership*	(0.033)	(0.029)	(0.013)	(0.136)	(0.133)	(0.018)
RCM	-0.022	-0.025	0.003	-0.094	-0.114	0.020
×*Sole Trader*	(0.026)	(0.021)	(0.014)	(0.172)	(0.155)	(0.018)
RCM	-0.052	-0.105	0.053*	0.303***	0.268***	0.035*
×*Other Legal Form*	(0.123)	(0.138)	(0.028)	(0.046)	(0.040)	(0.020)
Observations	18,635,711	18,635,711	18,635,711	13,160,287	13,160,287	13,160,287
Adjusted R^2	0.943	0.949	0.416	0.938	0.943	0.404
Controls	✓	✓	✓	✓	✓	✓
Event×Firm FE	✓	✓	✓	✓	✓	✓
Event×Time FE	✓	✓	✓	✓	✓	✓
Sample	B2B	B2B	B2B	Retail	Retail	Retail

Notes: The baseline is RCM×*limited liability company* and is omitted. Each event forms a stack with treated and never treated (control) firms. These stacks are appended so that control firms can appear in multiple stacks. For explanations on all variables, see Table 3. Information on treatment and control groups is provided in Table 2 for the B2B Sample and Table 9 for the Retail Sample. For explanations on all variables, see Table 3. Stacked regression estimates are based on Eq. (5). Standard errors are clustered by event-country-industry and are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Appendix: NACE Rev. 2 Codes

To quickly look up the industry codes mentioned in the paper, I include the official list of NACE Rev. 2 Codes from Eurostat in the following table. The codes are obtained from the following URL: https://ec.europa.eu/competition/mergers/cases/index/nace_all.html.

List of NACE Rev. 2 Codes

0111 - Growing of cereals (except rice), leguminous crops and oil seeds
0112 - Growing of rice
0113 - Growing of vegetables and melons, roots and tubers
0114 - Growing of sugar cane
0115 - Growing of tobacco
0116 - Growing of fibre crops
0119 - Growing of other non-perennial crops
0121 - Growing of grapes
0122 - Growing of tropical and subtropical fruits
0123 - Growing of citrus fruits
0124 - Growing of pome fruits and stone fruits
0125 - Growing of other tree and bush fruits and nuts
0126 - Growing of oleaginous fruits
0127 - Growing of beverage crops
0128 - Growing of spices, aromatic, drug and pharmaceutical crops
0129 - Growing of other perennial crops
0130 - Plant propagation
0141 - Raising of dairy cattle
0142 - Raising of other cattle and buffaloes
0143 - Raising of horses and other equines
0144 - Raising of camels and camelids
0145 - Raising of sheep and goats
0146 - Raising of swine/pigs
0147 - Raising of poultry
0149 - Raising of other animals
0150 - Mixed farming
0161 - Support activities for crop production
0162 - Support activities for animal production
0163 - Post-harvest crop activities
0164 - Seed processing for propagation
0170 - Hunting, trapping and related service activities
0210 - Silviculture and other forestry activities
0220 - Logging
0230 - Gathering of wild growing non-wood products
0240 - Support services to forestry
0311 - Marine fishing
0312 - Freshwater fishing
0321 - Marine aquaculture
0322 - Freshwater aquaculture
0510 - Mining of hard coal
0520 - Mining of lignite
0610 - Extraction of crude petroleum
0620 - Extraction of natural gas
0710 - Mining of iron ores
0721 - Mining of uranium and thorium ores
0729 - Mining of other non-ferrous metal ores

0811 - Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
0812 - Operation of gravel and sand pits; mining of clays and kaolin
0891 - Mining of chemical and fertiliser minerals
0892 - Extraction of peat
0893 - Extraction of salt
0899 - Other mining and quarrying n.e.c.
0910 - Support activities for petroleum and natural gas extraction
0990 - Support activities for other mining and quarrying
1011 - Processing and preserving of meat
1012 - Processing and preserving of poultry meat
1013 - Production of meat and poultry meat products
1020 - Processing and preserving of fish, crustaceans and molluscs
1031 - Processing and preserving of potatoes
1032 - Manufacture of fruit and vegetable juice
1039 - Other processing and preserving of fruit and vegetables
1041 - Manufacture of oils and fats
1042 - Manufacture of margarine and similar edible fats
1051 - Operation of dairies and cheese making
1052 - Manufacture of ice cream
1061 - Manufacture of grain mill products
1062 - Manufacture of starches and starch products
1071 - Manufacture of bread; manufacture of fresh pastry goods and cakes
1072 - Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes
1073 - Manufacture of macaroni, noodles, couscous and similar farinaceous products
1081 - Manufacture of sugar
1082 - Manufacture of cocoa, chocolate and sugar confectionery
1083 - Processing of tea and coffee
1084 - Manufacture of condiments and seasonings
1085 - Manufacture of prepared meals and dishes
1086 - Manufacture of homogenised food preparations and dietetic food
1089 - Manufacture of other food products n.e.c.
1091 - Manufacture of prepared feeds for farm animals
1092 - Manufacture of prepared pet foods
1101 - Distilling, rectifying and blending of spirits
1102 - Manufacture of wine from grape
1103 - Manufacture of cider and other fruit wines
1104 - Manufacture of other non-distilled fermented beverages
1105 - Manufacture of beer
1106 - Manufacture of malt
1107 - Manufacture of soft drinks; production of mineral waters and other bottled waters
1200 - Manufacture of tobacco products
1310 - Preparation and spinning of textile fibres
1320 - Weaving of textiles
1330 - Finishing of textiles
1391 - Manufacture of knitted and crocheted fabrics
1392 - Manufacture of made-up textile articles, except apparel
1393 - Manufacture of carpets and rugs
1394 - Manufacture of cordage, rope, twine and netting
1395 - Manufacture of non-wovens and articles made from non-wovens, except apparel
1396 - Manufacture of other technical and industrial textiles
1399 - Manufacture of other textiles n.e.c.
1411 - Manufacture of leather clothes
1412 - Manufacture of workwear
1413 - Manufacture of other outerwear
1414 - Manufacture of underwear
1419 - Manufacture of other wearing apparel and accessories
1420 - Manufacture of articles of fur
1431 - Manufacture of knitted and crocheted hosiery
1439 - Manufacture of other knitted and crocheted apparel

1511 - Tanning and dressing of leather; dressing and dyeing of fur
1512 - Manufacture of luggage, handbags and the like, saddlery and harness
1520 - Manufacture of footwear
1610 - Sawmilling and planing of wood
1621 - Manufacture of veneer sheets and wood-based panels
1622 - Manufacture of assembled parquet floors
1623 - Manufacture of other builders' carpentry and joinery
1624 - Manufacture of wooden containers
1629 - Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
1711 - Manufacture of pulp
1712 - Manufacture of paper and paperboard
1721 - Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
1722 - Manufacture of household and sanitary goods and of toilet requisites
1723 - Manufacture of paper stationery
1724 - Manufacture of wallpaper
1729 - Manufacture of other articles of paper and paperboard
1811 - Printing of newspapers
1812 - Other printing
1813 - Pre-press and pre-media services
1814 - Binding and related servicesC1820 - Reproduction of recorded media
1910 - Manufacture of coke oven products
1920 - Manufacture of refined petroleum products
2011 - Manufacture of industrial gases
2012 - Manufacture of dyes and pigments
2013 - Manufacture of other inorganic basic chemicals
2014 - Manufacture of other organic basic chemicals
2015 - Manufacture of fertilisers and nitrogen compounds
2016 - Manufacture of plastics in primary forms
2017 - Manufacture of synthetic rubber in primary forms
2020 - Manufacture of pesticides and other agrochemical products
2030 - Manufacture of paints, varnishes and similar coatings, printing ink and mastics
2041 - Manufacture of soap and detergents, cleaning and polishing preparations
2042 - Manufacture of perfumes and toilet preparations
2051 - Manufacture of explosives
2052 - Manufacture of glues
2053 - Manufacture of essential oils
2059 - Manufacture of other chemical products n.e.c.
2060 - Manufacture of man-made fibres
2110 - Manufacture of basic pharmaceutical products
2120 - Manufacture of pharmaceutical preparations
2211 - Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
2219 - Manufacture of other rubber products
2221 - Manufacture of plastic plates, sheets, tubes and profiles
2222 - Manufacture of plastic packing goods
2223 - Manufacture of builders’ ware of plastic
2229 - Manufacture of other plastic products
2311 - Manufacture of flat glass
2312 - Shaping and processing of flat glass
2313 - Manufacture of hollow glass
2314 - Manufacture of glass fibres
2319 - Manufacture and processing of other glass, including technical glassware
2320 - Manufacture of refractory products
2331 - Manufacture of ceramic tiles and flags
2332 - Manufacture of bricks, tiles and construction products, in baked clay
2341 - Manufacture of ceramic household and ornamental articles
2342 - Manufacture of ceramic sanitary fixtures
2343 - Manufacture of ceramic insulators and insulating fittings
2344 - Manufacture of other technical ceramic products
2349 - Manufacture of other ceramic products

2351 - Manufacture of cement
2352 - Manufacture of lime and plaster
2361 - Manufacture of concrete products for construction purposes
2362 - Manufacture of plaster products for construction purposes
2363 - Manufacture of ready-mixed concrete
2364 - Manufacture of mortars
2365 - Manufacture of fibre cement
2369 - Manufacture of other articles of concrete, plaster and cement
2370 - Cutting, shaping and finishing of stone
2391 - Production of abrasive products
2399 - Manufacture of other non-metallic mineral products n.e.c.
2410 - Manufacture of basic iron and steel and of ferro-alloys
2420 - Manufacture of tubes, pipes, hollow profiles and related fittings, of steel
2431 - Cold drawing of bars
2432 - Cold rolling of narrow strip
2433 - Cold forming or folding
2434 - Cold drawing of wire
2441 - Precious metals production
2442 - Aluminium production
2443 - Lead, zinc and tin production
2444 - Copper production
2445 - Other non-ferrous metal production
2446 - Processing of nuclear fuel
2451 - Casting of iron
2452 - Casting of steel
2453 - Casting of light metals
2454 - Casting of other non-ferrous metals
2511 - Manufacture of metal structures and parts of structures
2512 - Manufacture of doors and windows of metal
2521 - Manufacture of central heating radiators and boilers
2529 - Manufacture of other tanks, reservoirs and containers of metal
2530 - Manufacture of steam generators, except central heating hot water boilers
2540 - Manufacture of weapons and ammunition
2550 - Forging, pressing, stamping and roll-forming of metal; powder metallurgy
2561 - Treatment and coating of metals
2562 - Machining
2571 - Manufacture of cutlery
2572 - Manufacture of locks and hinges
2573 - Manufacture of tools
2591 - Manufacture of steel drums and similar containers
2592 - Manufacture of light metal packaging
2593 - Manufacture of wire products, chain and springs
2594 - Manufacture of fasteners and screw machine products
2599 - Manufacture of other fabricated metal products n.e.c.
2611 - Manufacture of electronic components
2612 - Manufacture of loaded electronic boards
2620 - Manufacture of computers and peripheral equipment
2630 - Manufacture of communication equipment
2640 - Manufacture of consumer electronics
2651 - Manufacture of instruments and appliances for measuring, testing and navigation
2652 - Manufacture of watches and clocks
2660 - Manufacture of irradiation, electromedical and electrotherapeutic equipment
2670 - Manufacture of optical instruments and photographic equipment
2680 - Manufacture of magnetic and optical media
2711 - Manufacture of electric motors, generators and transformers
2712 - Manufacture of electricity distribution and control apparatus
2720 - Manufacture of batteries and accumulators
2731 - Manufacture of fibre optic cables
2732 - Manufacture of other electronic and electric wires and cables

2733 - Manufacture of wiring devices
2740 - Manufacture of electric lighting equipment
2751 - Manufacture of electric domestic appliances
2752 - Manufacture of non-electric domestic appliances
2790 - Manufacture of other electrical equipment
2811 - Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
2812 - Manufacture of fluid power equipment
2813 - Manufacture of other pumps and compressors
2814 - Manufacture of other taps and valves
2815 - Manufacture of bearings, gears, gearing and driving elements
2821 - Manufacture of ovens, furnaces and furnace burners
2822 - Manufacture of lifting and handling equipment
2823 - Manufacture of office machinery and equipment (except computers and peripheral equipment)
2824 - Manufacture of power-driven hand tools
2825 - Manufacture of non-domestic cooling and ventilation equipment
2829 - Manufacture of other general-purpose machinery n.e.c.
2830 - Manufacture of agricultural and forestry machinery
2849 - Manufacture of other machine tools
2891 - Manufacture of machinery for metallurgy
2892 - Manufacture of machinery for mining, quarrying and construction
2893 - Manufacture of machinery for food, beverage and tobacco processing
2894 - Manufacture of machinery for textile, apparel and leather production
2895 - Manufacture of machinery for paper and paperboard production
2896 - Manufacture of plastics and rubber machinery
2899 - Manufacture of other special-purpose machinery n.e.c.
2910 - Manufacture of motor vehicles
2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
2931 - Manufacture of electrical and electronic equipment for motor vehicles
2932 - Manufacture of other parts and accessories for motor vehicles
3011 - Building of ships and floating structures
3012 - Building of pleasure and sporting boats
3020 - Manufacture of railway locomotives and rolling stock
3030 - Manufacture of air and spacecraft and related machinery
3040 - Manufacture of military fighting vehicles
3091 - Manufacture of motorcycles
3092 - Manufacture of bicycles and invalid carriages
3099 - Manufacture of other transport equipment n.e.c.
3101 - Manufacture of office and shop furniture
3102 - Manufacture of kitchen furniture
3103 - Manufacture of mattresses
3109 - Manufacture of other furniture
3211 - Striking of coins
3212 - Manufacture of jewellery and related articles
3213 - Manufacture of imitation jewellery and related articles
3220 - Manufacture of musical instruments
3230 - Manufacture of sports goods
3240 - Manufacture of games and toys
3250 - Manufacture of medical and dental instruments and supplies
3291 - Manufacture of brooms and brushes
3299 - Other manufacturing n.e.c.
3311 - Repair of fabricated metal products
3312 - Repair of machinery
3313 - Repair of electronic and optical equipment
3314 - Repair of electrical equipment
3315 - Repair and maintenance of ships and boats
3316 - Repair and maintenance of aircraft and spacecraft
3317 - Repair and maintenance of other transport equipment
3319 - Repair of other equipment
3320 - Installation of industrial machinery and equipment

3511 - Production of electricity
3512 - Transmission of electricity
3513 - Distribution of electricity
3514 - Trade of electricity
3521 - Manufacture of gas
3522 - Distribution of gaseous fuels through mains
3523 - Trade of gas through mains
3530 - Steam and air conditioning supply
3600 - Water collection, treatment and supply
3700 - Sewerage
3811 - Collection of non-hazardous waste
3812 - Collection of hazardous waste
3821 - Treatment and disposal of non-hazardous waste
3822 - Treatment and disposal of hazardous waste
3831 - Dismantling of wrecks
3832 - Recovery of sorted materials
3900 - Remediation activities and other waste management services
4110 - Development of building projects
4120 - Construction of residential and non-residential buildings
4211 - Construction of roads and motorways
4212 - Construction of railways and underground railways
4213 - Construction of bridges and tunnels
4221 - Construction of utility projects for fluids
4222 - Construction of utility projects for electricity and telecommunications
4291 - Construction of water projects
4299 - Construction of other civil engineering projects n.e.c.
4311 - Demolition
4312 - Site preparation
4313 - Test drilling and boring
4321 - Electrical installation
4322 - Plumbing, heat and air-conditioning installation
4329 - Other construction installation
4331 - Plastering
4332 - Joinery installation
4333 - Floor and wall covering
4334 - Painting and glazing
4339 - Other building completion and finishing
4391 - Roofing activities
4399 - Other specialised construction activities n.e.c.
4511 - Sale of cars and light motor vehicles
4519 - Sale of other motor vehicles
4520 - Maintenance and repair of motor vehicles
4531 - Wholesale trade of motor vehicle parts and accessories
4532 - Retail trade of motor vehicle parts and accessories
4540 - Sale, maintenance and repair of motorcycles and related parts and accessories
4611 - Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods
4612 - Agents involved in the sale of fuels, ores, metals and industrial chemicals
4613 - Agents involved in the sale of timber and building materials
4614 - Agents involved in the sale of machinery, industrial equipment, ships and aircraft
4615 - Agents involved in the sale of furniture, household goods, hardware and ironmongery
4616 - Agents involved in the sale of textiles, clothing, fur, footwear and leather goods
4617 - Agents involved in the sale of food, beverages and tobacco
4618 - Agents specialised in the sale of other particular products
4619 - Agents involved in the sale of a variety of goods
4621 - Wholesale of grain, unmanufactured tobacco, seeds and animal feeds
4622 - Wholesale of flowers and plants
4623 - Wholesale of live animals
4624 - Wholesale of hides, skins and leather

4631 - Wholesale of fruit and vegetables
4632 - Wholesale of meat and meat products
4633 - Wholesale of dairy products, eggs and edible oils and fats
4634 - Wholesale of beverages
4635 - Wholesale of tobacco products
4636 - Wholesale of sugar and chocolate and sugar confectionery
4637 - Wholesale of coffee, tea, cocoa and spices
4638 - Wholesale of other food, including fish, crustaceans and molluscs
4639 - Non-specialised wholesale of food, beverages and tobacco
4641 - Wholesale of textiles
4642 - Wholesale of clothing and footwear
4643 - Wholesale of electrical household appliances
4644 - Wholesale of china and glassware and cleaning materials
4645 - Wholesale of perfume and cosmetics
4646 - Wholesale of pharmaceutical goods
4647 - Wholesale of furniture, carpets and lighting equipment
4648 - Wholesale of watches and jewellery
4649 - Wholesale of other household goods
4651 - Wholesale of computers, computer peripheral equipment and software
4652 - Wholesale of electronic and telecommunications equipment and parts
4661 - Wholesale of agricultural machinery, equipment and supplies
4662 - Wholesale of machine tools
4663 - Wholesale of mining, construction and civil engineering machinery
4664 - Wholesale of machinery for the textile industry and of sewing and knitting machines
4665 - Wholesale of office furniture
4666 - Wholesale of other office machinery and equipment
4669 - Wholesale of other machinery and equipment
4671 - Wholesale of solid, liquid and gaseous fuels and related products
4672 - Wholesale of metals and metal ores
4673 - Wholesale of wood, construction materials and sanitary equipment
4674 - Wholesale of hardware, plumbing and heating equipment and supplies
4675 - Wholesale of chemical products
4676 - Wholesale of other intermediate products
4677 - Wholesale of waste and scrap
4690 - Non-specialised wholesale trade
4711 - Retail sale in non-specialised stores with food, beverages or tobacco predominating
4719 - Other retail sale in non-specialised stores
4721 - Retail sale of fruit and vegetables in specialised stores
4722 - Retail sale of meat and meat products in specialised stores
4723 - Retail sale of fish, crustaceans and molluscs in specialised stores
4724 - Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores
4725 - Retail sale of beverages in specialised stores
4726 - Retail sale of tobacco products in specialised stores
4729 - Other retail sale of food in specialised stores
4730 - Retail sale of automotive fuel in specialised stores
4741 - Retail sale of computers, peripheral units and software in specialised stores
4742 - Retail sale of telecommunications equipment in specialised stores
4743 - Retail sale of audio and video equipment in specialised stores
4751 - Retail sale of textiles in specialised stores
4752 - Retail sale of hardware, paints and glass in specialised stores
4753 - Retail sale of carpets, rugs, wall and floor coverings in specialised stores
4754 - Retail sale of electrical household appliances in specialised stores
4759 - Retail sale of furniture, lighting equipment and other household articles in specialised stores
4761 - Retail sale of books in specialised stores
4762 - Retail sale of newspapers and stationery in specialised stores
4763 - Retail sale of music and video recordings in specialised stores
4764 - Retail sale of sporting equipment in specialised stores
4765 - Retail sale of games and toys in specialised stores
4771 - Retail sale of clothing in specialised stores

4772 - Retail sale of footwear and leather goods in specialised stores
4773 - Dispensing chemist in specialised stores
4774 - Retail sale of medical and orthopaedic goods in specialised stores
4775 - Retail sale of cosmetic and toilet articles in specialised stores
4776 - Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores
4777 - Retail sale of watches and jewellery in specialised stores
4778 - Other retail sale of new goods in specialised stores
4779 - Retail sale of second-hand goods in stores
4781 - Retail sale via stalls and markets of food, beverages and tobacco products
4782 - Retail sale via stalls and markets of textiles, clothing and footwear
4789 - Retail sale via stalls and markets of other goods
4791 - Retail sale via mail order houses or via Internet
4799 - Other retail sale not in stores, stalls or markets
4910 - Passenger rail transport, interurban
4920 - Freight rail transport
4931 - Urban and suburban passenger land transport
4932 - Taxi operation
4939 - Other passenger land transport n.e.c.
4941 - Freight transport by road
4942 - Removal services
4950 - Transport via pipeline
5010 - Sea and coastal passenger water transport
5020 - Sea and coastal freight water transport
5030 - Inland passenger water transport
5040 - Inland freight water transport
5110 - Passenger air transport
5121 - Freight air transport
5122 - Space transport
5210 - Warehousing and storage
5221 - Service activities incidental to land transportation
5222 - Service activities incidental to water transportation
5223 - Service activities incidental to air transportation
5224 - Cargo handling
5229 - Other transportation support activities
5310 - Postal activities under universal service obligation
5320 - Other postal and courier activities
5510 - Hotels and similar accommodation
5520 - Holiday and other short-stay accommodation
5530 - Camping grounds, recreational vehicle parks and trailer parks
5590 - Other accommodation
5610 - Restaurants and mobile food service activities
5621 - Event catering activities
5629 - Other food service activities
5630 - Beverage serving activities
5811 - Book publishing
5812 - Publishing of directories and mailing lists
5813 - Publishing of newspapers
5814 - Publishing of journals and periodicals
5819 - Other publishing activities
5821 - Publishing of computer games
5829 - Other software publishing
5911 - Motion picture, video and television programme production activities
5912 - Motion picture, video and television programme post-production activities
5913 - Motion picture, video and television programme distribution activities
5914 - Motion picture projection activities
5920 - Sound recording and music publishing activities
6010 - Radio broadcasting
6020 - Television programming and broadcasting activities
6110 - Wired telecommunications activities

6120 - Wireless telecommunications activities
6130 - Satellite telecommunications activities
6190 - Other telecommunications activities
6201 - Computer programming activities
6202 - Computer consultancy activities
6203 - Computer facilities management activities
6209 - Other information technology and computer service activities
6311 - Data processing, hosting and related activities
6312 - Web portals
6391 - News agency activities
6399 - Other information service activities n.e.c.
6411 - Central banking
6419 - Other monetary intermediation
6420 - Activities of holding companies
6430 - Trusts, funds and similar financial entities
6491 - Financial leasing
6492 - Other credit granting
6499 - Other financial service activities, except insurance and pension funding n.e.c.
6511 - Life insurance
6512 - Non-life insurance
6520 - Reinsurance
6530 - Pension funding
6611 - Administration of financial markets
6612 - Security and commodity contracts brokerage
6619 - Other activities auxiliary to financial services, except insurance and pension funding
6621 - Risk and damage evaluation
6622 - Activities of insurance agents and brokers
6629 - Other activities auxiliary to insurance and pension funding
6630 - Fund management activities
6810 - Buying and selling of own real estate
6820 - Renting and operating of own or leased real estate
6831 - Real estate agencies
6832 - Management of real estate on a fee or contract basis
6910 - Legal activities
6920 - Accounting, bookkeeping and auditing activities; tax consultancy
7010 - Activities of head offices
7021 - Public relations and communication activities
7022 - Business and other management consultancy activities
7111 - Architectural activities
7112 - Engineering activities and related technical consultancy
7120 - Technical testing and analysis
7211 - Research and experimental development on biotechnology
7219 - Other research and experimental development on natural sciences and engineering
7220 - Research and experimental development on social sciences and humanities
7311 - Advertising agencies
7312 - Media representation
7320 - Market research and public opinion polling
7410 - Specialised design activities
7420 - Photographic activities
7430 - Translation and interpretation activities
7490 - Other professional, scientific and technical activities n.e.c.
7500 - Veterinary activities
7711 - Renting and leasing of cars and light motor vehicles
7712 - Renting and leasing of trucks
7721 - Renting and leasing of recreational and sports goods
7722 - Renting of video tapes and disks
7729 - Renting and leasing of other personal and household goods
7731 - Renting and leasing of agricultural machinery and equipment
7732 - Renting and leasing of construction and civil engineering machinery and equipment

7733 - Renting and leasing of office machinery and equipment (including computers)
7734 - Renting and leasing of water transport equipment
7735 - Renting and leasing of air transport equipment
7739 - Renting and leasing of other machinery, equipment and tangible goods n.e.c.
7740 - Leasing of intellectual property and similar products, except copyrighted works
7810 - Activities of employment placement agencies
7820 - Temporary employment agency activities
7830 - Other human resources provision
7911 - Travel agency activities
7912 - Tour operator activities
7990 - Other reservation service and related activities
8010 - Private security activities
8020 - Security systems service activities
8030 - Investigation activities
8110 - Combined facilities support activities
8121 - General cleaning of buildings
8122 - Other building and industrial cleaning activities
8129 - Other cleaning activities
8130 - Landscape service activities
8211 - Combined office administrative service activities
8219 - Photocopying, document preparation and other specialised office support activities
8220 - Activities of call centres
8230 - Organisation of conventions and trade shows
8291 - Activities of collection agencies and credit bureaus
8292 - Packaging activities
8299 - Other business support service activities n.e.c.
8411 - General public administration activities
8412 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security
8413 - Regulation of and contribution to more efficient operation of businesses
8421 - Foreign affairs
8422 - Defence activities
8423 - Justice and judicial activities
8424 - Public order and safety activities
8425 - Fire service activities
8430 - Compulsory social security activities
8510 - Pre-primary education
8520 - Primary education
8531 - General secondary education
8532 - Technical and vocational secondary education
8541 - Post-secondary non-tertiary education
8542 - Tertiary education
8551 - Sports and recreation education
8552 - Cultural education
8553 - Driving school activities
8559 - Other education n.e.c.
8560 - Educational support activities
8610 - Hospital activities
8621 - General medical practice activities
8622 - Specialist medical practice activities
8623 - Dental practice activities
8690 - Other human health activities
8710 - Residential nursing care activities
8720 - Residential care activities for mental retardation, mental health and substance abuse
8730 - Residential care activities for the elderly and disabled
8790 - Other residential care activities
8810 - Social work activities without accommodation for the elderly and disabled
8891 - Child day-care activities
8899 - Other social work activities without accommodation n.e.c.

9001 - Performing arts
9002 - Support activities to performing arts
9003 - Artistic creation
9004 - Operation of arts facilities
9101 - Library and archives activities
9102 - Museums activities
9103 - Operation of historical sites and buildings and similar visitor attractions
9104 - Botanical and zoological gardens and nature reserves activities
9200 - Gambling and betting activities
9311 - Operation of sports facilities
9312 - Activities of sport clubs
9313 - Fitness facilities
9319 - Other sports activities
9321 - Activities of amusement parks and theme parks
9329 - Other amusement and recreation activities
9411 - Activities of business and employers membership organisations
9412 - Activities of professional membership organisations
9420 - Activities of trade unions
9491 - Activities of religious organisations
9492 - Activities of political organisations
9499 - Activities of other membership organisations n.e.c.
9511 - Repair of computers and peripheral equipment
9512 - Repair of communication equipment
9521 - Repair of consumer electronics
9522 - Repair of household appliances and home and garden equipment
9523 - Repair of footwear and leather goods
9524 - Repair of furniture and home furnishings
9525 - Repair of watches, clocks and jewellery
9529 - Repair of other personal and household goods
9601 - Washing and (dry-)cleaning of textile and fur products
9602 - Hairdressing and other beauty treatment
9603 - Funeral and related activities
9604 - Physical well-being activities
9609 - Other personal service activities n.e.c.
9700 - Activities of households as employers of domestic personnel
9810 - Undifferentiated goods-producing activities of private households for own use
9820 - Undifferentiated service-producing activities of private households for own use
9900 - Activities of extraterritorial organisations and bodies