1500 words

VoxEU

Most countries around the world use the value-added tax (VAT) as their primary indirect tax, and most countries have thresholds - based on turnover, the value of goods and services a business provides - below which businesses do not need to register for VAT. In the EU, all but two countries (Spain and Sweden) have registration thresholds. The UK's threshold of £81,000 is the EU's highest, and is perceived as a way for the government to reduce the compliance costs of small businesses not wishing to register for the VAT. However, thresholds are generally much higher in countries that have more recently introduced a VAT, such as Singapore, which currently has a threshold of about 540,000 Euro.

In the wake of the financial crisis, many governments have also tended to turn to VAT to fill in the hole in the public finances, either by increasing the standard VAT rate or lowering the registration threshold. It is a prime target; in the UK, for instance, VAT generates 21 percent of total tax revenue, ranking it only behind income tax and national insurance contributions as the largest source of tax revenue. Generally, registration involves an increase in tax liability for the firm, and also compliance costs, which may not be trivial. For example, in the UK, compliance costs for a firm with turnover at the VAT threshold are estimated to be around 1-2% of turnover, and the cost may be higher in other countries.

Thus, a key question to inform policy-making is how the VAT itself and, in particular, the registration threshold affect the behavior of small firms. We aim to understand the efficiency and welfare costs of VAT by analysing three important, behavioral responses to the registration threshold: voluntary registration, bunching, and growth effects.

Voluntary registration makes the VAT unique amongst all the major taxes. It refers to a situation where a firm registers for VAT even if it is below the turnover threshold, and thus not required to do so. This is likely to occur when a firm has large purchases of intermediate inputs, and/or they can pass most of VAT on output onto the purchaser. In this case, it may be profitable to voluntarily register for VAT so the firm can claim back input tax, while passing some or most of the burden of the output tax on to the purchaser. In our comprehensive UK data-set,, further described below, over 44% of companies in the UK with turnover below the threshold register voluntarily.

However, not all firms are in this position. A small trader selling services to households, such as a plumber or electrician, might have relatively small purchases of intermediate inputs, and face elastic demand from purchasers, who themselves cannot claim back the VAT that they pay. In this kind of case, bunching occurs, where a firm keeps its reported taxable turnover just below the registration threshold either legally, by restricting its scale of operations, or illegally, by misreporting sales. Growth effects are related to bunching, and occur where the firm restricts its scale of growth in order to keep below the threshold, and also possibly has a higher rate of 'catch-up' growth when it decides to register.

Several papers in the academic and policy literature have argued conceptually that voluntary registration, bunching and growth effects might exist. For example, the ground-breaking VAT model by Keen and Mintz (2004) found bunching below the threshold, and a hole above

where firms do not locate. However, voluntary registration is never optimal in their model because none of the burden of output VAT can be passed on to purchasers. Brashares et. al. (2014) discuss some of the possible determinants of voluntary registration and bunching in their calibration of the Keen-Mintz model to US data, but they are unable to test the predictions with data because the US has no VAT. To date, no work has yet established to what extent these effects actually occur, their magnitudes, and their determinants for a country where VAT is in place.

To fill in these gaps, we develop a conceptual framework for studying the two key aspects of behavioral response to VAT, including voluntary registration and bunching, and we test this framework using UK firm-level data on tax returns and firm characteristics.

We show that voluntary registration is more likely in two scenarios: when either the cost of inputs relative to sales is high, or when the proportion of business-to-consumer (B2C) sales is low. In the first scenario, when input costs are important, registration allows the firm to claim back a considerable amount of input VAT. In the second, if most customers are VAT-registered, the burden of an increase VAT can easily be passed on in the form of a higher price, because the customer himself can claim back the increase.

We show that the determinants of bunching at the registration threshold are the same as for voluntary registration, with the signs of the effects reversed. Specifically, bunching is more likely when the cost of inputs relative to sales is low, or when the proportion of B2C sales is high. We also show that the elasticity of value-added of registered firms with respect to the effective VAT rate can be recovered from an implicit function that relates the degree of bunching to the elasticity of value-added, a formula very similar to that of Kleven and Waseem (2013), who analysed notches in the personal income tax.

Finally, we show in the conceptual framework that the elasticity of value-added can be related in a simple way to the deadweight loss of a small increase in the statutory rate of VAT, thus extending the well-known results of Feldstein (1999) and Chetty (2009) to an indirect tax setting.

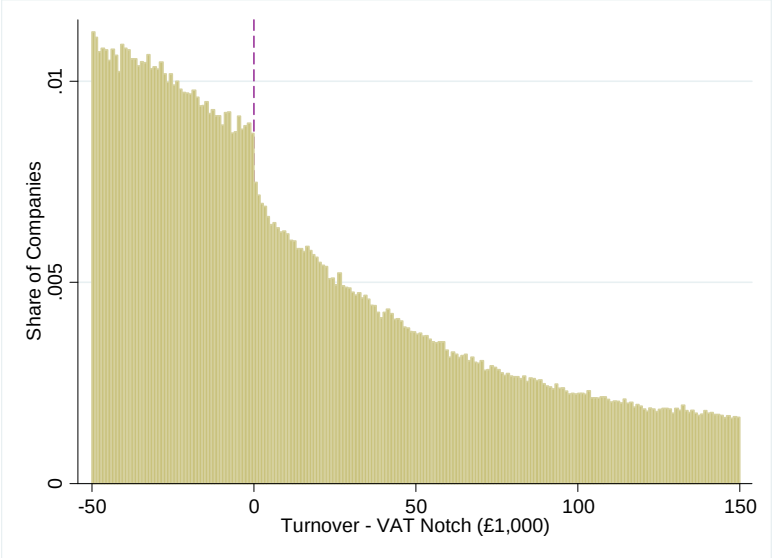
We bring these predictions to an administrative data-set created by linking the population of corporation and VAT tax records in the UK, which includes 1,408,517 observations for 435,688 companies between April 1, 2004 and March 30, 2010. We show that the empirical pattern of voluntary registration is consistent with the theory. In particular, voluntary registration is more likely with a low share of B2C sales or a high share of input costs.[1] Quantitatively, the probability that a firm voluntarily registers for VAT is increased by 0.05 for a one standard deviation increase in the share of B2C sales and by 0.02-0.05 for a one standard deviation increase in the input cost ratio.

We then look at bunching. To get a feel for the data, Figure 1 below shows a histogram of the distribution of firm turnover, pooling data across all years. To allow comparison across years, we measure turnover in deviations from the threshold in any given year. As the Figure shows, there is clear evidence of bunching at the VAT threshold, shown by the dotted line, which is

[1]

mainly driven by growing firms. This is the first evidence, to our knowledge, that a VAT notch leads to bunching.

Figure 1. Bunching Below the VAT Notch

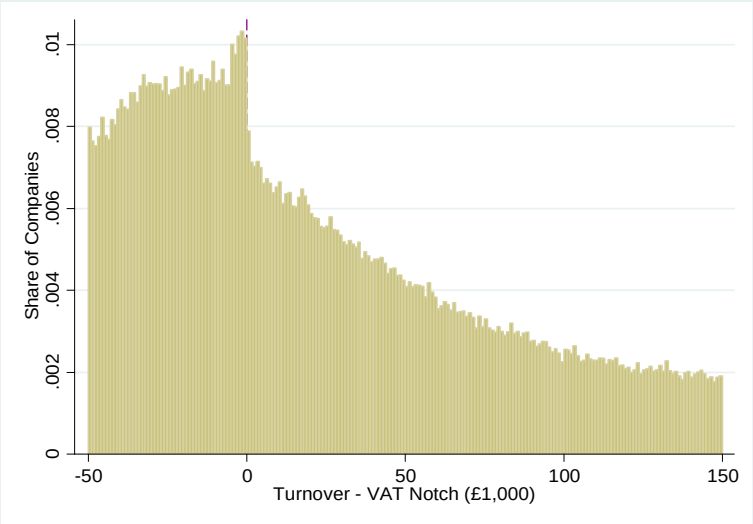


Investigating further, we find that firms are more likely to bunch at the threshold when either the cost of inputs relative to sales is high, or when the proportion of B2C sales is low, consistently with the theory. So, there is a clear pattern of heterogeneity in bunching.

The next question concerns how firms bunch; that is, what are the mechanism(s) at work? One possibility is that they genuinely restrict their sales to stay below the threshold. If so, the distribution of input-cost ratio should be smooth around the VAT notch. We provide some suggestive evidence that part of bunching is driven by under-reporting of sales. Specifically, we find that the salary-inclusive input-cost ratio moves in the parallel direction between the registered and non-registered group outside the bunching region but starts to increase substantially for the non-registered companies just below the threshold. We interpret the large and sharp increase in the salary-inclusive input-cost ratio to be partly driven by the fact that it is costly to underreport salary expenses due to third-party reporting.

In ongoing work, we are addressing the effects of the registration threshold on small firm growth. There is a vast empirical literature on the determinants of small-to-medium enterprise (SME) growth, but relatively little attention has been given to the role of ‘tax notches’ such as VAT registration. If we consider the analog of Figure 1 just for firms that are growing, we see that bunching is much sharper, suggesting that the threshold might inhibit firm growth.

Figure 2. Bunching by Growing Firms



We find that firms with turnover below the VAT threshold that are not registered for VAT have a significantly lower growth rate than a 'control group' of firms below the threshold that are voluntarily registered for VAT (and thus do not have a tax cost of registration). Firms that cross the VAT threshold in a given year have a higher growth rate in that year than a control group of firms already above the threshold. Moreover, these effects are stronger, the closer the 'treated' firms are to the threshold.

References

Brashares, E, M.J. Knittel, G. Silverstein, and A. Yuskavage (2014). Calculating the Optimal Small Business Exemption Threshold for a U.S. VAT. *National Tax Journal*, 67(2): 283-320.

Feldstein, M. 1999. Tax Avoidance and the Deadweight Loss of the Income Tax. *The Review of Economics and Statistics*, 81(4): 674.680.

Kumar, K. B., Rajan, R. G., & Zingales, L. (1999). *What determines firm size?*(No. w7208). National Bureau of Economic Research.

Liu, L. and B. Lockwood (2015), "VAT Notches", CEPR Discussion Paper 10606.

Keen, M, and J.Mintz. 2004. The Optimal Threshold for a Value-Added Tax *Journal of Public Economics*, 88(3-4): 559-576.

Saez, E. (2010). Do Taxpayers Bunch at Kink Points?. *American Economic Journal: Economic Policy*, 2(3): 180-212.