How tax data unlocks new insights for industrial policy

Firm interactions shape industrial policy outcomes, but understanding these dynamics has been challenging for policymakers and researchers. Now, value-added tax (VAT) data are revolutionising our ability to map and analyse these relationships. Using data from Estonia, this blog explains how VAT data can be used to map networks of firms, identify the hidden superstars in national value chains, and understand how firms build relationships.

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What makes VAT data special for policy making?

Value-added tax (VAT) is a consumption tax applied at each stage of the supply chain whenever value is added to goods or services. Businesses collect and remit VAT. The VAT data that are collected represent a breakthrough in studying production networks because they capture actual transactions between firms at an unprecedented level of detail. Unlike traditional business surveys or administrative data that might tell us about a firm's size or industry, VAT records show us who does business with whom and for how much.

This data is particularly valuable because of its comprehensive coverage. In Estonia, for example, all VAT-registered businesses must report transactions above €1,000 per month, creating an almost complete picture of significant business relationships in the economy.

At least 15 countries now have such data available, including Belgium, Chile, Costa Rica, Estonia, and Italy. This growing availability creates opportunities for cross-country comparison and broader economic insights.

How we used VAT data to map Estonia's economic networks

A new OECD study of Estonia's firm-level production network reveals patterns in how businesses interact. The study used Estonia's comprehensive VAT data to reveal a network that encompasses more than 100 000 firms connected by over 850 000 business relationships annually.

One of the most important findings for industrial policy is the identification of 13 main business communities within Estonia's economy. Communities are detected by an algorithm that looks for groups of firms which trade with each other rather than with firms outside of their community. The analysis revealed that 75% of all transactions occur within rather than between communities. The 13 main communities shown below, represent most of the economic activity, accounting for 95% of firms and 97% of employment.

The communities are typically organised around specific value chains, bringing together firms from related but different sectors, for instance, construction and the non-metallic mineral sector, or farms and veterinary practices. In fact, the data show that these industrial value chain relationships are stronger than geographic proximity.

Source: KMD and MSR data, authors' calculations.

The existence and importance of these communities suggests that industrial policies might be more effective if they target interconnected groups of firms which may span different sectors, rather than individual sectors or regions. The high proportion of within-community transactions indicates strong interdependencies that policy should account for. This also suggests a high potential for diffusion within these communities, making targeted interventions on central firms an interesting policy lever.

Only a few “superstar” firms are connected to a large share of the network

Half of Estonian firms have at most two suppliers. However, a small number of firms – the "superstars" – maintain extensive business networks. We found 100 firms with more than 5 000 corporate buyers and 100 firms with more than 4 000 suppliers.

These superstar firms occupy central positions in Estonia's business network and share several distinctive characteristics. They tend to be:

- **Larger and older than average firms**, suggesting that building extensive business networks takes time and resources.
- **More productive than their peers**, indicating that network centrality and economic efficiency often go hand in hand.
- **More engaged in international trade**, connecting the domestic economy to global markets.
- **Concentrated in specific sectors**, particularly utilities, finance, and trade.

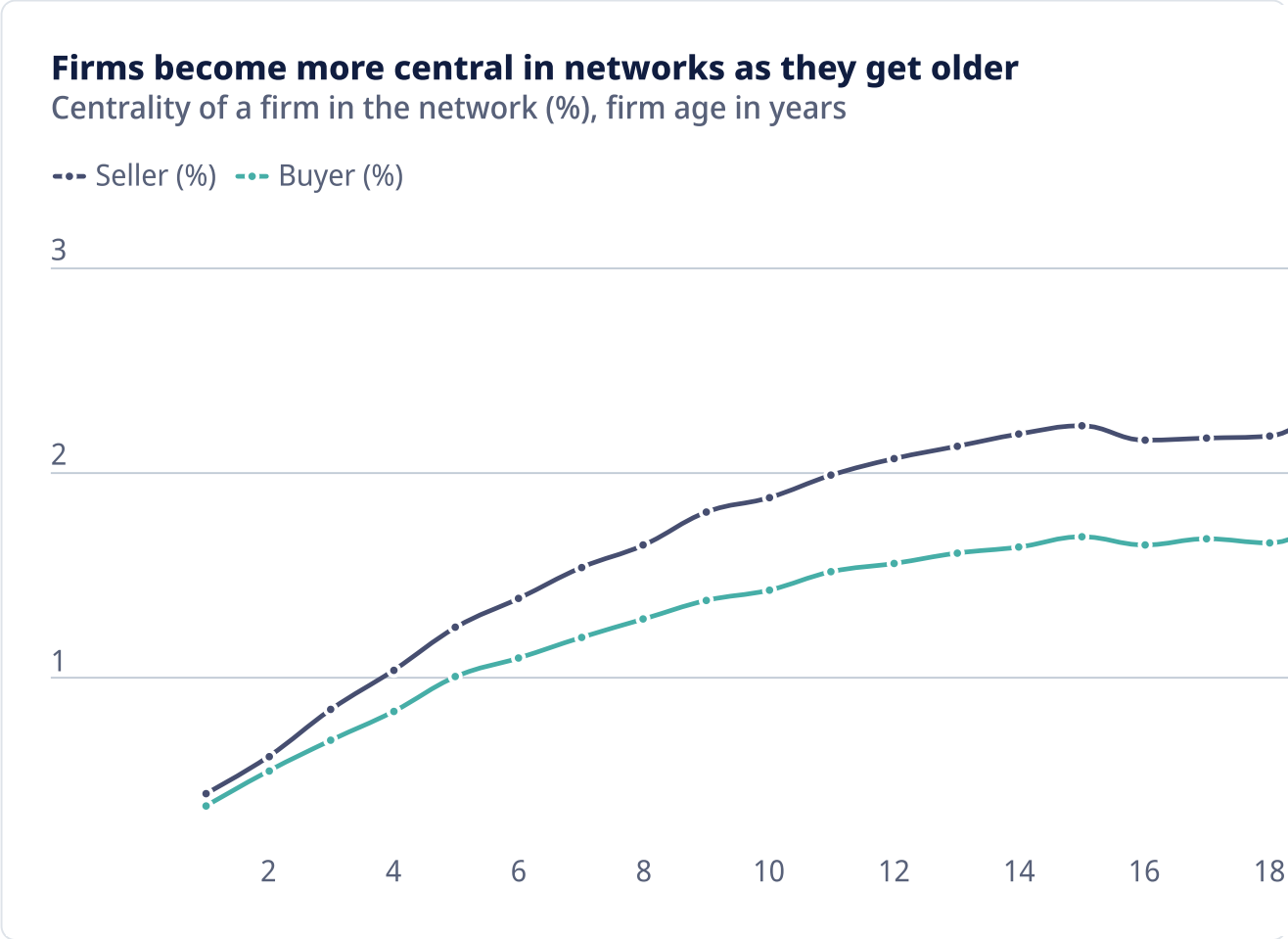
The graph below shows that firms which have the largest number of corporate buyers (the top 10% is equivalent to 14 buyers or more) are much more productive and much more likely to export than average. Similarly, firms which have the largest number of suppliers (the top 10% is equivalent to 17 suppliers or more) are much more productive and much more likely to export than average. These firms may have an important role to play in spreading best practices across the network.

The most central firms in a network are more productive and more likely to export than average

Labour productivity (value added in EURO / worker) (LH), share (%) of firms exporting any amount (RH)

Business relationships grow over time but change frequently

Another interesting discovery shows how firms develop their business relationships over time. Young firms typically start with a limited number of connections and gradually expand their network of suppliers and buyers. However, these relationships show considerable churn – about 50% survive from one year to the next, indicating a dynamic process of relationship formation and dissolution.



The figure shows that firms that are 10 years old are 1.5% more central as sellers (have more buyers, and more important buyers) than young firms. Further, 10-year-old firms are 2% more central as buyers (have more suppliers, and more important suppliers) than young firms. Importantly, this regression analysis focuses on micro-entrants (firms that are born with 9 employees or less) and controls for sector and location effects. Moreover, the finding still holds when controlling for labour productivity (which also tends to increase over the life-cycle of the firm), showing that firms' ability to form relationships is not only explained by productivity. Network capital is therefore a relevant dimension to target when designing business support policies, especially for young firms.

Important implications for industrial policy design

The analysis of Estonia's production network through VAT data reveals a complex economic ecosystem where a few highly connected firms play outsized roles, young firms gradually build their business relationships, and distinct communities of interconnected businesses drive economic activity.

These findings have important implications for industrial policy design. Rather than viewing the economy through the traditional lens of sectors or regions, policymakers might achieve better results by considering how firms are connected and targeting interventions at the community level. The gradual building of business relationships also suggests a new dimension where policy could support young firm growth. As more countries make VAT data available for analysis, similar insights could help shape more effective industrial policies that account for the networked nature of modern economies.

How the OECD supports policy makers in using VAT data

While VAT data offer new insights into national business networks, differences in data and methodology make cross-country comparisons difficult to interpret, and existing datasets in other countries remain untapped.

To maximise the benefits of these data for policy makers, we have created the Leveraging inter-firm transaction (LIFT) network, an international grouping of national administrations, practitioners and researchers with access and interest in using firm-to-firm transaction data. This work is supported by the European Commission's DG GROW and aims to explore common policy questions with a shared methodology to unlock new data sources for policy-relevant analysis.

Interested policy makers and experts can explore the recent OECD study on Estonia's firm-level production network: Lessons for industrial policy to better understand how VAT data could be used in their national context.

Additional tags

Industrial subsidies | Consumption taxes | Subsidies and industrial policy | Industrial policy | Quantifying industrial strategies