The New Gains from Trade

A crash course for policymakers on 21st century trade research

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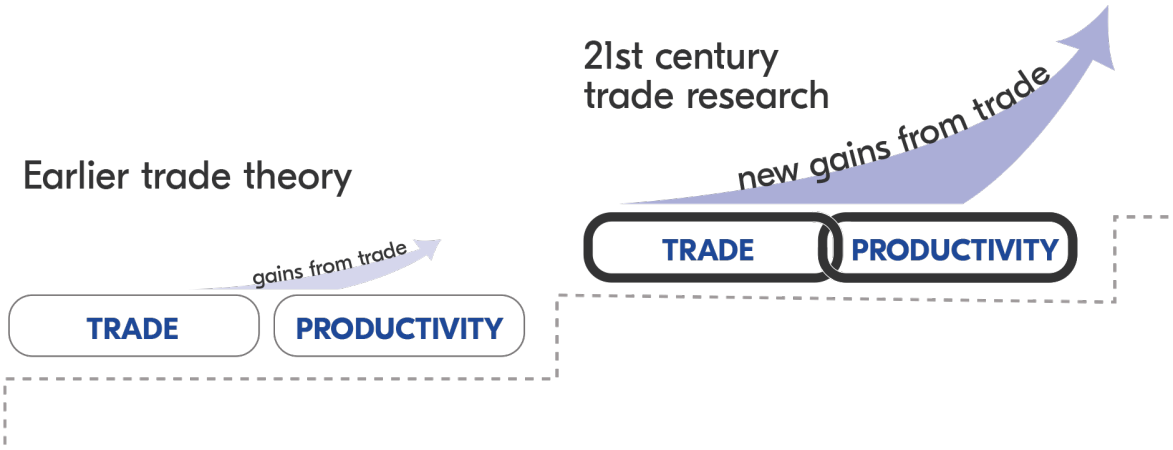
1. Background and purpose

During the past 20 years, trade research has uncovered stronger links between trade and productivity than predicted by earlier trade theory. As a consequence, the gains from trade are higher than previously thought. Unfortunately, these insights have not yet fully reached the level of policymaking. The purpose of this report is therefore to introduce the latest generation of trade research in this field to policymakers.

The research discussed here is largely limited to trade in goods. Effects on mergers and acquisitions, foreign direct investment and trade in services are not covered.



2 Trade, productivity and economic growth

Sustained, inclusive and sustainable economic growth is of obvious interest to policymakers due to its close correlation to other measures of development or welfare. It is in fact goal eight of the 2030 sustainable development goals. As **Nobel Prize laureate Robert Lucas** once remarked:

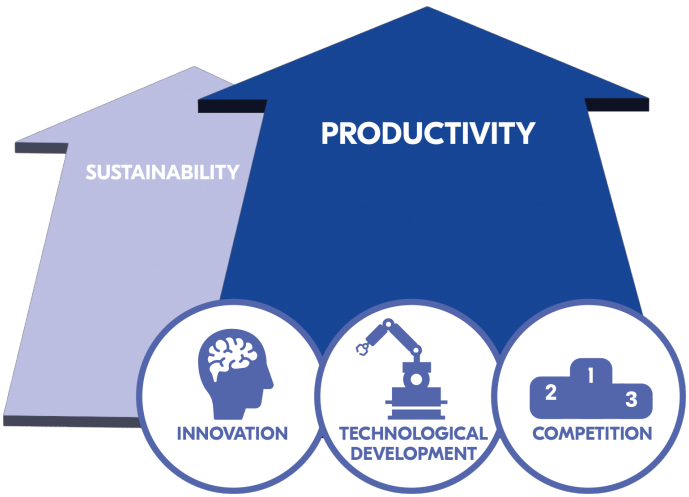
> “The consequences for human welfare involved in questions like these are simply staggering: once one starts to think about them, it is hard to think about anything else.”

Economic growth can occur either through factor accumulation (labour or capital) or increased productivity. While factor accumulation implies the addition of more resources to the economy, productivity improvements occur via a more efficient use of available resources.

During the 1990s and early 2000s an intense debate on the empirical evidence of the link between trade and growth took place among economists. Dollar (1992), Sachs and Warner (1995), and Rodriguez and Rodrik (2000) are typical references in this debate. While more recent work (Wacziarg and Welch, 2008; Van den Berg and Lewer, 2015) strongly suggests that openness to trade indeed promotes economic growth, the earlier debate was never conclusively resolved.

Why focus on trade and productivity?

For several reasons this note focusses on productivity rather than economic growth. To begin with, the research under review typically studies productivity effects. Another reason is the fact that productivity is more closely linked to sustainable growth since productivity improvements reflect a more efficient use of available resources rather than extra labour or capital input, or even resource depletion. In addition, productivity improvements are closely associated with innovation, technological development and competitiveness – all of which tend to be important policy objectives.



Productivity is closely linked to sustainable growth and important policy objectives, such as innovation, technological development and competitiveness.

Yet another motivation for focussing on productivity has to do with the fact that productivity growth is particularly important for Europe. Claeys, Mouel and Sgaravatti (2022) argue that productivity growth is "important for increasing living standards and is a key indicator for European economies...However, in the past 20 years GDP growth in Europe has slowed significantly. *The decline in [productivity] growth is the main reason for that.*" (our emphasis).

A final motivation for our focus on productivity is the fact that the Swedish government recently announced a productivity commission to analyse the competitiveness of the Swedish economy (Statement of Government Policy, 2022). As we shall see, trade and trade policy have a key role to play in that context.

3 21st century trade theory — new gains from trade

3.1 Neoclassical trade theory

Many are aware of the classical gains from trade that follow from differences in endowment and specialisation according to comparative advantage. David Ricardo, Eli Heckscher and Bertil Ohlin are names associated with these early trade models. Ohlin received the Nobel Prize in economics in 1977 for his contributions. The gains from trade in these models are one-time effects that occur because available resources are used more efficiently under free trade than under autarky. Corresponding allocation gains are found in theories that model the movement of capital and labour across borders.

3.2 Late 20th century trade theory

Many also recall late 20th century trade research that relaxed assumptions about perfect competition and uncovered gains from trade associated with increasing returns to scale. Under this generation of trade research, sometimes referred to as "new trade theory", the gains from trade went from being of the "one-off" allocation kind, to allowing for links between trade and economic growth. The reason is that trade liberalisation allows falling unit costs as firms scale up to satisfy demand in the wider world market (Helpman and Krugman, 1985).

At the same time, "new trade theory" created an intellectual foundation for so-called strategic trade policies, which have received renewed relevance in our time. Paul Krugman received the Nobel Prize in economics in 2008 for this generation of trade research.

3.3 21st century trade research

While older generations of trade research are still of great relevance, they are also more well known to trade policymakers. Consequently, we focus the remainder of this report on 21st century trade theory.

The story of 21st century trade research starts with the observation that high-productivity firms dominate international trade. Firms that trade are larger, more productive and pay higher wages than firms that do not (Bernard and Jensen, 1995; 1999). This observation led Melitz (2003) to develop a theoretical framework that departed from the assumption that all firms have access to the same technology and are therefore equally productive. From this new framework, a large body of research emerged. The consequence of the assumption that firms are heterogeneous is that high-productive firms scale up under open trade, whereas less productive firms scale back. As a result, average productivity within an industry increases in response to trade liberalisation (Melitz, 2003; Melitz and Redding, 2014; IMF, 2020).

More recently, researchers have combined such "Melitz" effects with the older literature on trade and technology diffusion (Coe and Helpman, 1995; Keller, 2004). Sampson (2016), for instance, observes that firm selection and technology diffusion are mutually reinforcing.

Some stylised facts

The productivity profile of Swedish industrial firms that trade

According to our own calculations based on firm-level data for 2019, Swedish industrial firms that engage in international trade (i.e. they both import and export) have a 48 per cent higher labour productivity and pay 44 percent higher wages, than firms in the same category that do not trade. In other words, the stylised facts that jump-started the research agenda discussed in this note very much describe the situation in Sweden today.
Data source: Statistics Sweden

> "The combination of selection and technology diffusion creates a new channel through which trade increases growth and generates a new source of gains from trade...technology diffusion magnifies the rise in average productivity following trade liberalization. More importantly, it leads to a permanent increase in the long-run growth rate"

According to Sampson's calculation, this dynamic selection effect at least doubles the gains from trade.

Perla, Tonetti and Waugh (2021) reach a similar conclusion:

> "the reallocation effects of a trade liberalization (i.e., low-productivity firms contract, high-productivity exporting firms expand) change firms' incentives to adopt a better technology and lead to faster within-firm productivity gains. Because these choices lead to more adoption and technology diffusion, the aggregate consequence is faster economic growth. Quantitatively, trade-induced increases in technology adoption and aggregate growth lead to large welfare gains from trade."

What the modern textbook says

The latest evidence

In his 2015 textbook on advanced international trade, Robert Feenstra sums up the latest evidence.

"In international trade, we are particularly interested in the hypothesis that trade promotes pro-ductivity growth. It is natural then, to consider the heterogeneous firm model of Melitz (2003) ...The first papers incorporating growth into the heterogeneous firm models obtained ambiguous effects of trade on productivity growth: see Baldwin and Robert-Nicoud (2008) and Gustafsson and Segerstrom (2010) ... But there are now papers showing how trade can enhance productivity growth, even in the long run, due to a positive selection effect on firms. This long-run result is now available from the work of Perla, Tonetti and Waugh (2014) and Sampson (2016)."

4 The empirical evidence

In theory then, 21st century research has uncovered new and larger gains from trade. But what is the empirical evidence to support this? To a large extent, modern trade theory and empirics emerged in tandem. Theory was developed partly in response to surprisingly strong estimates of productivity effects in connection with trade liberalisation. Pavcnik (2002) found large firm-level productivity improvement in response to trade liberalisation in Chile. Similar results were obtained by Trefler (2004) and Lileva and Trefler (2010) for Canada, Amiti and Konings (2007) for Indonesia, Goldberg et al. (2010), as well as Khandelwal and Topalova (2011) for India, and Bloom et al. (2016) for Europe.

Recently, empirical evidence of trade-induced productivity improvements has been collected more systematically by Shu and Steinwender (2019).

The Maple Leaf example

> “Canadian manufacturing labour productivity rose by 13,8 per cent (in response to the Canada–U.S. free trade agreement). The idea that a single government policy could raise productivity by such a large amount and in such a short time-span is truly remarkable.”
>
> *Melitz and Trefler (2012)*

Empirical estimates of productivity-based gains from trade can be divided into firm-level and industry-level effects, and into import-related and export-related effects. It is obviously difficult to disentangle the different influences so we will limit the review to some main results, while adding a few reflections.

4.1 Industry-level productivity effects from openness to trade

The industry-level effects derive from the firm selection dynamic described above. Melitz and Trefler (2012) attribute around 60 per cent of the productivity improvements observed in Canada due to its free trade agreement with the US to firm reallocation within a sector. The remaining share is firm-level effects associated with exporting firms investing in productivity, or improved access to intermediate inputs from the US.

4.2 Firm-level productivity effects from openness to trade

There are essentially three different channels through which trade in goods could stimulate productivity at the firm level. All of them link trade to the diffusion of or investment in new ideas and technology.

- improved access to intermediate goods
- increased import competition
- increased export opportunities.

4.2.1 Effects from improved access to imported intermediates

The idea that trade stimulates productivity via technological diffusion embodied in imported goods is not new. In a seminal paper, Keller (2002) found that research and development (R&D) embodied in intermediate inputs represented 20 per cent of the total R&D effect on productivity in eight OECD countries. In recent years, there has been more empirical documentation of such effects.

According to Shu and Steinwender (2019), 18 of 20 reviewed papers found a statistically significant and positive effect on firm productivity from better access to imported intermediates. No paper found negative effects. This is about as close to empirical proof that one can get in the social sciences. Auboin, Koopman and Xu's 2021 survey of the literature yields similar results.

An evidence-based trade policy would adjust quickly to this overwhelming stock of evidence by removing tariffs and other import barriers on input goods unilaterally. Countries such as Canada

and Switzerland have already decided to do this, but most countries have generally been slow to act on this evidence.

4.2.2 Effects from increased import competition

Studies on the effects of import competition on firm-level productivity also find positive effects, particularly for large firms. In terms of geography, Shu and Steinwender find "overwhelmingly positive evidence in developing economies, largely positive evidence in Europe, and mixed evidence in Northern America" from the competition effect. Their review, moreover, indicates that the "access to imported intermediates-effect" (section 4.2.1) is stronger than the "competition effect" (4.2.2) on domestic firm productivity.

4.2.3 Effects from increased export opportunities

For firm-level, export-related productivity improvements in response to trade liberalisation there are two potential mechanisms: the market-size effect and the learning-by-exporting effect.

The market-size effect

Expanded markets create incentives for firms to innovate and invest in more efficient production. Consistent with theory, empirical studies on the link between increased export opportunities and firm productivity generally find positive effects on firm-level productivity, particularly for technologically advanced firms (Steinwender and Shu, 2019). Aubmain, Koopman and Xu (2021) provide a long list of studies that confirm this result for countries such as Canada, Argentina, France and Taiwan. Furthermore, they note that the empirical effect has also been identified among downstream domestic suppliers of exporting firms.

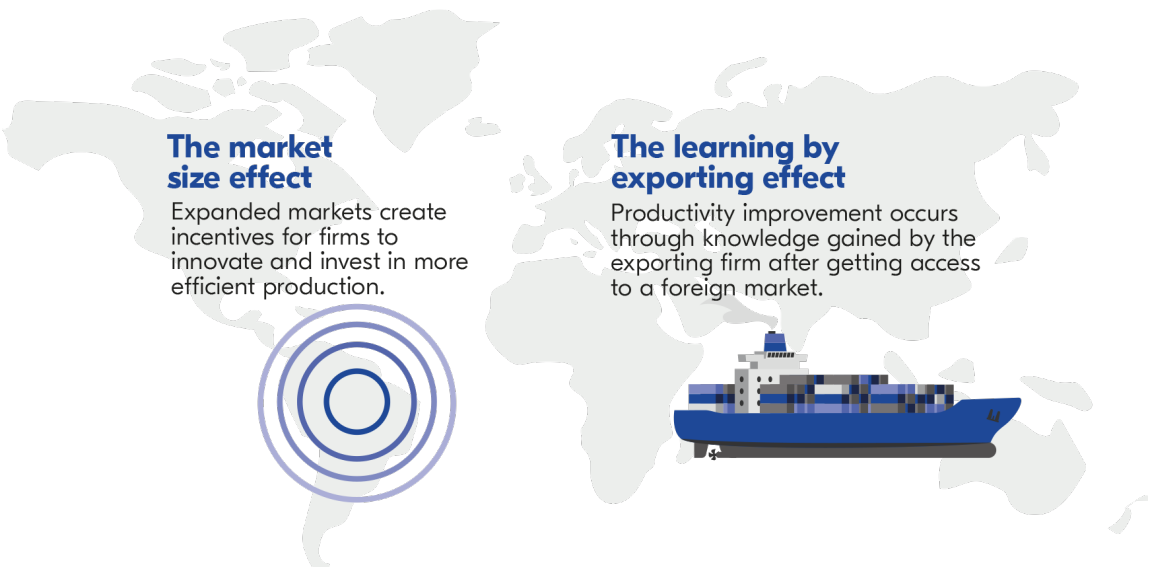
According to Melitz and Trefler (2012) around 35 per cent of the productivity effects from Canada's free trade agreement with the US arise due to exporters' productivity-enhancing investment.

Learning by exporting

The learning-by-exporting effect is different from the market-size effect in that productivity improvement occurs through knowledge gained by the exporting firm in the export market. In other words, the productivity effect comes after a firm gains access to a foreign market.

By contrast, the market-size effect occurs because of intentional productivity-enhancing investment designed to reap the benefit of the larger market.

The learning-by-exporting literature is smaller than the market-size literature and the results are therefore less certain in our view. According to Steinwender and Shu's review of three studies in this category, learning by exporting happens predominantly in firms that export to developed economies. They speculate that this is the case because firms can learn from technologically advanced buyers. Aubmain, Koopman and Xu (2021) list one study that identifies learning-by-exporting effects.



5 Structural adjustment costs

Sometimes the gains from trade are treated as if they can be separated from social adjustment costs that occur when some firms contract, and others expand. In the real world, they happen simultaneously. If the gains from trade are larger than previously known, it implies additional adjustment in the economy in response to trade liberalisation. In other words, the literature on the new gains from trade presented in this note does not change the basic analysis that there are winners and losers associated with trade liberalisation and that this creates a role for public policy to provide adequate social safety nets and facilitate labour market adjustments.

There is one potential qualification to this observation, however. Under neoclassical trade models, efficiency gains from trade require production factors to shift between sectors. If the main gains from trade instead occur via productivity improvements within sectors or even within firms, the resource reallocation also takes place within sectors/firms. And since less retraining is arguably required when the adjustment takes place within sectors or firms, the reallocation costs could be lower than previously assumed. It is also possible that adjustment support should be designed differently, given the insights from the new generation of trade research. This is an aspect of 21st century trade research that has seen surprisingly little work so far and we recommend that more research be devoted to it.

Ultimately, technological change is a stronger driver of structural change than trade (Buera et al., 2022). But irrespective of whether the source of structural change is trade or technological change, policies that prevent structural change tend to stifle productivity growth, while policies that accommodate adjustment are likely to reap the long-term benefits of openness and technological development. An evidence-based approach that identifies best practices for improving trade adjustment programmes therefore represents the best way forward.

6 Policy conclusions

In this section, we highlight policy conclusions that can be drawn from our survey of 21st century trade research. Below, core research insights are matched by policy implications.

Research insight 1

21st century trade research has uncovered stronger links between trade and productivity than previously known. Overall, the gains from trade are likely to be higher than predicted by earlier trade theory.

Policy implication

The cost–benefit analysis of trade reform, whether unilateral, regional or multilateral, is more favourable than we thought 20 years ago. Trade reform designed to stimulate productivity is particularly important for the EU, which has seen a decline in productivity growth during the past 20 years.

Research insight 2

The empirical evidence of productivity effects from improved access to intermediate goods is particularly strong and consistent.

Policy implication

Remove tariffs and other import barriers to intermediate goods. There is no point in saving import tariffs on intermediate goods as "chips" for future trade negotiations.

Research insight 3

To a large extent, productivity improvements are found on the import side of trade. While our review confirms that productivity improvements are associated with better access to export markets, the most important productivity effects are linked to imports.

Policy implication

Mercantilist perceptions are not supported by evidence (now or before). Countries should continue to seek reciprocal agreements that create harmonised and predictable trade rules internationally, but the emphasis should be on improved import- and export opportunities equally.

Research insight 4

Technological diffusion associated with trade and trade liberalisation is a strong productivity multiplier.

Policy implication

Governments should support technology diffusion and refrain from policies based on the premise that self-sufficiency makes domestic industries stronger and more productive. Such policies are in fact incompatible with an agenda to improve EU economic competitiveness.

Research insight 5

According to neoclassical trade theory, gains from trade largely occur via inter-industry trade (wine for cloth). In more recent trade theory, the observation that international trade mostly takes place within industries is better accounted for.

Policy implication

The gains from trade are not limited to specific export interests within clearly defined sectors. Instead, they are potentially available in sectors where we do not perceive an initial comparative advantage.

Research insight 6

Like earlier generations of trade research, the new literature suggests that there are winners and losers associated with trade liberalisation. If economic adjustment mainly takes place within rather than between sectors, social adjustment costs could be lower than previously assumed.

Policy implication

As before, public policies play an important role by providing social safety nets and facilitating economic adjustment through life-long learning and on-the-job training. More research is needed to determine how such support is best designed.

7 Concluding remarks

Advances in 21st century trade research are closely linked to the issue of economic productivity. There are two reasons for this. First, the main theoretical innovation was to relax the assumption that firms are homogenous, most importantly with respect to productivity. Secondly, theoretical advances partly came in response to empirical work that identified surprisingly strong links between trade liberalisation and productivity. For both these reasons, it is natural to introduce the new evidence to policymakers in the context of a discussion of trade and productivity.

However, theoretical models based on firm heterogeneity can obviously be applied to a range of other issues, with other dependent variables. Issues such as economic geography and localisation of production, distributional effects of trade liberalisation, as well as social and environmental sustainability are all well covered in 21st century trade research – with or without Melitz-type theoretical assumptions. For obvious reasons, we have not been able to survey all of this vast literature, but we hope that others will take inspiration and summarise the policy implications for other issues that are of interest to policymakers.

In the future, we also expect a revival of research related to so-called strategic trade policy. As we mentioned in section 3.2, the intellectual foundation for such policies was laid in the late 20th century. The latest generation of research suggests large opportunity costs from such policies, particularly if they are designed to promote self-sufficiency. It remains to be seen how policymakers respond to the latest generation of research, but to be able to respond at all the evidence must be introduced to a wider audience. We hope that our report has contributed to this objective.

Literature

Amiti, M., & Konings, J. (2007). Trade liberalization, intermediate inputs, and productivity: Evidence from Indonesia. *American Economic Review*, 97(5), 1611–1638.

Auboin, M., Koopman, R., & Xu, A. (2021). Trade and innovation policies: Coexistence and spillovers. *Journal of Policy Modeling*, 43(4), 844–872.

Baldwin, R. E., & Robert-Nicoud, F. (2008). Trade and growth with heterogeneous firms. *Journal of International Economics*, 74(1), 21–34.

Bernard, A. B., Jensen, J. B., & Lawrence, R. Z. (1995). Exporters, jobs, and wages in US manufacturing: 1976-1987. *Brookings papers on economic activity. Microeconomics*, 1995, 67–119.

Bernard, A. B., & Jensen, J. B. (1999). Exceptional exporter performance: cause, effect, or both?. *Journal of international economics*, 47(1), 1–25.

Bloom, N., Draca, M., & Van Reenen, J. (2016). Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity. The review of economic studies, 83(1), 87–117.

Buera, F. J., Kaboski, J. P., Rogerson, R., & Vizcaino, J. I. (2022). Skill-biased structural change. *The Review of Economic Studies*, 89(2), 592–625.

Claeys, G., Le Mouel, M, & Sgaravatti, G. (2022). The low productivity of European firms: how can policies enhance the allocation of resources? Bruegel.

Coe, D. T., & Helpman, E. (1995). International r&d spillovers. *European economic review*, 39(5), 859-887.

Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. *Economic development and cultural change*, 40(3), 523–544.

Feenstra, R. C. (2015). *Advanced international trade: theory and evidence*. Princeton university press.

Goldberg, P. K., Khandelwal, A. K., Pavcnik, N., & Topalova, P. (2010). Imported intermediate inputs and domestic product growth: Evidence from India. *The Quarterly journal of economics*, 125(4), 1727–1767.

Gustafsson, P., & Segerstrom, P. (2010). Trade liberalization and productivity growth. *Review of International Economics*, 18(2), 207–228.

Helpman, E. and Krugman, P. (1985). *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy.* MIT Press, Cambridge.

IMF (2020). Trade, Productivity and (Mis)allocation. *IMF Working Paper*. WP/20/163.

Keller, W. (2004). International technology diffusion. *Journal of economic literature*, 42(3), 752–782.

Keller, W. (2002). Geographic localization of international technology diffusion. *American Economic Review*, 92(1), 120–142..

Lileeva, A., & Trefler, D. (2010). Improved access to foreign markets raises plant-level productivity... for some plants. *The Quarterly journal of economics*, 125(3), 1051–1099.

Melitz, M. J. (2003). The impact of trade on intra industry reallocations and aggregate industry productivity. *Econometrica*, 71(6), 1695–1725.

Melitz, M. J., & Redding, S. J. (2014). Heterogeneous firms and trade. *Handbook of international economics*, 4, 1–54.

Melitz, M. J., & Trefler, D. (2012). Gains from trade when firms matter. *Journal of Economic Perspectives*, 26(2), 91–118.

Pavcnik, N. (2002). Trade liberalization, exit, and productivity improvements: Evidence from Chilean plants. *The Review of economic studies*, 69(1), 245–276.

Perla, J., Tonetti, C., & Waugh, M. E. (2021). Equilibrium technology diffusion, trade, and growth. *American Economic Review*, 111(1), 73–128.

Rodriguez, F., & Rodrik, D. (2000). Trade policy and economic growth: a skeptic's guide to the cross-national evidence. *NBER macroeconomics annual*, 15, 261–325.

Sachs, J. D., & Warner, A. (1995). Economic convergence and economic policies. *NBER Working paper*, 5039.

Sampson, T. (2016). Dynamic selection: an idea flows theory of entry, trade, and growth. *The Quarterly Journal of Economics*, 131(1), 315–380.

Shu, P., & Steinwender, C. (2019). The impact of trade liberalization on firm productivity and innovation. *Innovation Policy and the Economy*, 19(1), 39–68.

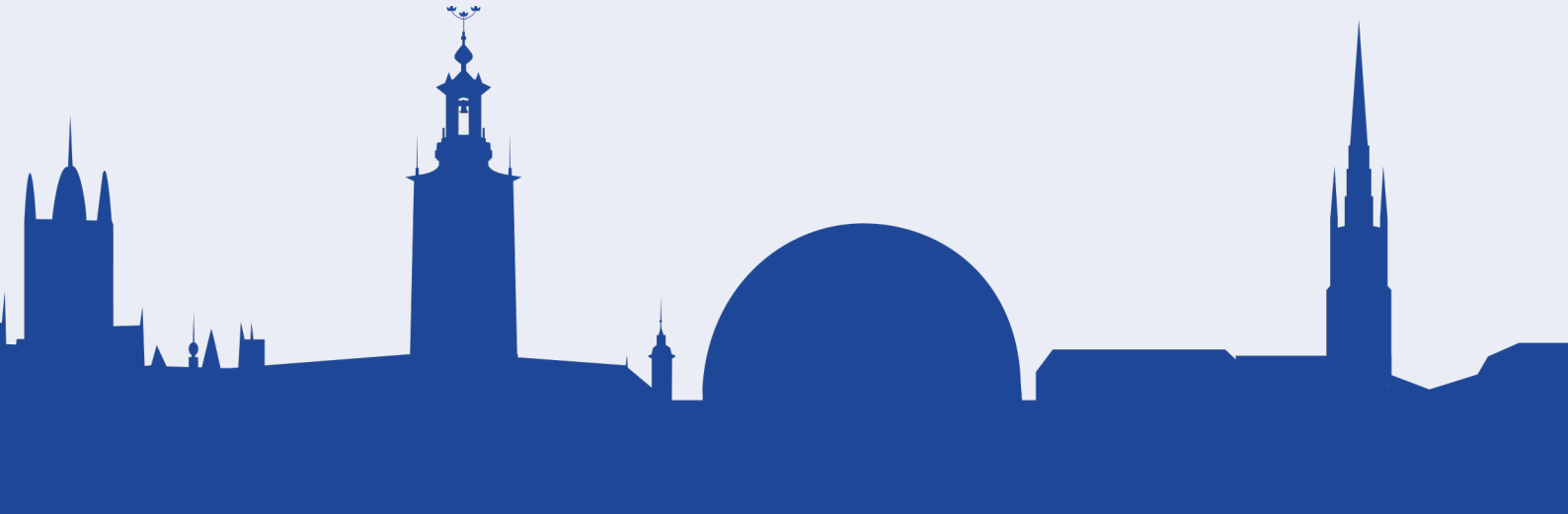
Statement of Government Policy (2022). Statement of Government Policy delivered by Sweden's Prime Minister Ulf Kristersson to the Swedish Parliament on 18 October 2022.

Topalova, P., & Khandelwal, A. (2011). Trade liberalization and firm productivity: The case of India. *Review of economics and statistics*, 93(3), 995–1009.

Trefler, D. (2004). The long and short of the Canada-US free trade agreement. *American Economic Review*, 94(4), 870–895.

Van den Berg, H., & Lewer, J. J. (2015). *International trade and economic growth*. Routledge.

Wacziarg, R., & Welch, K. H. (2008). Trade liberalization and growth: New evidence. *The World Bank Economic Review*, 22(2), 187–231.



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