Political Economic Digest Series 34

Dear Political Economic Digest Series Participant,

Welcome to the thirty fourth issue of Political Economic Digest Series. In the last issue of Political Economic Digest Series we had readings on The Problem of Price Control by Fiona M. Scott Morton. This issue will cover reading on Trade and Growth which is a chapter from the book International Trade Free, Fair and Open by Patrick Love and Ralph Lattimore.

This particular chapter focuses on how open trade policy contributes to economic growth. It also discusses on the factors contributing to economic growth and relationship between trade and R&D, trade and the diffusion of new technologies, and trade and investment.

We hope you enjoy the reading.

Trade and Growth

By way of introduction...

In this chapter, we won't try to prove that trade is good for growth and that liberalisation is good for trade, so liberalisation is always good for growth whatever the circumstances. But we will demonstrate that an open trade policy is more likely to contribute to economic growth than alternative policies. We'll start by looking at the different factors that contribute to economic growth and how trade affects them, and then we'll look at the relationship between trade and R&D, trade and the diffusion of new technologies, and trade and investment.

They say that if you ask any two economists what they think about something, you're bound to get at least three opinions. Recipes for economic growth and the role of trade is a case in point. For a start, economists would make a distinction between the impact of trade and the impact of trade policy on productivity and growth. This sounds like splitting hairs, but while economists generally agree that trade as such is good for growth, they might disagree as to whether a policy of trade liberalization is good, bad or irrelevant for growth in a given country at a given moment.

There is a basic consensus that trade, income and productivity levels are positively and strongly correlated, with robust evidence to support it. An increase of one percentage point in the share of trade in GDP raises income level by 0.9% to 3%. Nevertheless, a policy of trade liberalization alone will not guarantee income and productivity growth. Economic growth is an extremely complex phenomenon, and trade is only one contributor, interacting with many others. That's why throughout this book, we stress the importance of other influence ranging from physical geography to education, health and culture.

Productivity growth depends on human and physical capital and on the way production is organized. Behind this first, readily identified layer of phenomena, there are deeper causes. These include the quality of the financial sector and the legal situation, especially property rights and enforcement of contracts. Such institutional factors are often difficult to quantify. They may be affected by hundreds of years of history and tradition and be influenced by foreign and domestic customers and suppliers, investors or changing social norms and ideas. Think of the growing influence of environmental concerns, for instance.

Trade and the sources of economic growth

Expanding knowledge is the ultimate source of long-run economic growth. The great leaps in productivity brought about by the Industrial Revolution and the Agricultural Revolution that preceded it were made possible by new understanding of the laws of physics, chemistry, biology and the other sciences. But for this knowledge to generate economic growth it had to be transformed into new machines, the skills to use them and better ways of organising production to make the most of those machines and skills. The steam engine, for instance, revolutionised production and transport. But to do so, it needed a whole range of new professions and new ways of organising work. Society had to accept (or at least tolerate) the changes. We take these changes for granted now. Yet the idea of working a

fixed number of hours with set times for starting and finishing was a radical change. An agricultural economy traditionally thought in terms of years, seasons and days, not weeks, hours and minutes. Even then, different towns had different times, and Britain only adopted Greenwich Mean Time as the nationwide official time to replace “local mean time” in 1880 (although the railways had adopted it in 1847).

So if growth is stimulated by adopting knowledge, how does trade contribute? For a start, trade helps to pass on the knowledge people elsewhere have put into goods. When you buy a computer, you buy a share of the research and know-how that went into designing, building and selling the final product and its many components. Knowledge isn’t just contained in physical objects – trade in services can also be important for the transmission of knowledge. For instance, if the computer has a problem, the hotline you call may be in another country, so in effect you’re importing the after-sales service. Licenses are another way to gain access to knowledge – the technology isn’t transferred, but the information needed to recreate or use it is. Nowadays, foreign technology accounts for the bulk of domestic productivity growth in most countries and the smaller the country, the more this is the case.

Trade liberalisation also allows the most productive firms to expand into the bigger markets it creates. The least productive firms will not only be unable to profit from the new opportunities,they may be forced out of business completely by competition from new companies. It can be argued that the higher level of productivity of firms that export has little to do with trade in itself since the firms that take advantage of the new opportunities have to be more dynamic and more productive in their traditional markets to begin with. In other words, there is a kind of self-selection of exporting firms.

Trade also encourages gains from specialization and the division of labour. Previously, this happened within the firm. In the auto industry, for instance, the big companies made most of the parts that went into a vehicle themselves. Today, the industry still has a relatively high degree of vertical integration – a BMW still has a BMW engine and is sold in a BMW dealership. But a modern car is assembled from over 30 000 components, compared with 700 in a Model-T Ford, and it doesn’t make economic sense for a single company to try to develop all the mechanical and electronic parts it needs.

Specialization therefore takes place among firms rather than within firms. Trade expands potential markets, and these larger markets mean that a firm can specialize more narrowly and still find enough customers. The result is a deeper division of labour, and this means that even a firm from a small country can prosper in activities where its home market is restricted. But even firms in large countries take advantage of the international division of labour to reduce costs and expand sales. The extent to which a country or a firm can benefit from global value chains depends on how much it costs to trade, not only in financial terms such as tariffs, but in the time it takes to transport goods or deal with the paperwork.

Does it have to be high-tech?

If specialization contributes to growth, what kinds of specialization should a government encourage or should a company or investor concentrate on? The obvious answer would be the new dynamic sectors. Profit margins are low in mature sectors and leave few resources for R&D and growth. Worse, in a free

trade regime, and given the pace of change in today's economy, it would become harder and harder to catch up, leaving those countries specializing in mature sectors further and further behind.

A look at productivity growth statistics for manufacturing lends some support to this argument. A study of US data over 1960-1996 shows that, as you might expect, computer-related sectors have the fastest productivity growth. But a closer look reveals some interesting changes over time. For a start, "computer-related" is a huge category and while this broad definition is at the top of the classification, the subsectors that compose it change places over time. Semiconductors were in sixth place over 1960-1987, with computer storage devices taking first place. Over the following ten years, storage slips to seventh place, and semiconductors are top. Even more interesting, the entire ranking for the first period consists of what most of us would spontaneously consider as high-tech sectors. But take a look at the next period. Three of the ten sectors seeing the fastest growth are in clothing and footwear. Indeed shoes rank fourth. Competition from imports probably incited the US clothing industry to upgrade its operations using the latest product design and manufacturing technologies. So what matters for productivity levels and growth rates is less what is produced than how it is produced.

THE TEN US MANUFACTURING SECTORS WITH FASTEST GROWING PRODUCTIVITY, 1960-1987 and 1987-1996

1960-87

Name	Productivity
Computer storage devices	20.8
Electronic computers	20.2
Computer peripheral equipment not elsewhere classified	18.7
Computer terminals	15.7
Magnetic and optical recording media	5.6
Semiconductors and related services	5.0
Calculating and accounting machines, except electronic computers	3.4
Laboratory analytical instruments	3.0
Optical instruments and lenses	3.0
Medicinal chemicals and botanical products	2.9

1987-96

Name	Productivity
Semiconductors and related services	8.2
Electronic computers	2.9
Computer peripheral equipment not elsewhere classified	2.1
Footwear except rubber, not elsewhere classified	1.7
Computer terminals	1.7
Telephone and telegraph apparatus	1.6
Computer storage devices	1.5
Cigars	1.5
Dress and work gloves, except knit and all-leather	1.5
Knit outwear mills	1.4

Source: "Dynamic Gains from Trade", OECD Trade Policy Working Papers.

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Historical data confirm that there are various paths to improving productivity and growth. A country that has a high rate of capital investment over time will gradually come to specialise in capitalintensive sectors. In other words the countries' comparative advantages are moving towards capital-intensive operations. Likewise, a country that invests in education will shift towards skills-intensive industries or skills-intensive activities within industries, provided markets are permitted to allocate the resources. Data for Japan suggest that companies focus on more skills-intensive activities while outsourcing the less skillsintensive activities to neighbouring countries.

The empirical evidence then does not justify fears of being locked into an unfavourable pattern of specialisation in a free trade scenario. A country that invests in human and physical capital as well as in R&D can shift its comparative advantage and adapt its industrial structure to take advantage of new opportunities, as Korea has shown.

Trade and investment

To profit from trade liberalisation then, a country has to invest.Trade liberalisation in turn can help countries to make the most of this investment in several ways. Open countries have access to larger markets. This makes it worthwhile to invest in sectors where the initial costs for machinery and so on are high – capital intensive sectors – because fixed costs can be spread out over a larger number of units of output. For example, in 2007 Intel opened Fab 32, a new factory in Arizona to produce the latest generation of microprocessors. This single factory cost $3 billion, but it will produce tens of millions of processors for world markets.

Trade liberalization also facilitates the import of cheaper foreign-produced intermediate goods and services. The price of capital goods and services also drops, and since the production of capital equipment is concentrated in a small number of countries, trade liberalization is particularly important in providing access to them. The spectacular success of some developing countries as exporters would not have been possible without affordable machinery (and sources of intermediate products).

And in many cases foreign capital has been a valuable addition to local savings. Liberalisation of trade and investment encourages FDI from foreign firms seeking to rationalise their production and benefit from economies of scale. At the same time, high trade barriers can also encourage FDI. This is known as "tariff-jumping" – investing in a country to which it's hard or impossible to export, in order to get around trade barriers. But in this case, investment is likely to concentrate on producing only for the domestic market.

Trade and R&D

Now we'll look at how international trade affects R&D, the search for knowledge. Private firms, motivated by expected profits, engage in R&D to develop new products or processes. Innovating firms can earn a handsome profit both in relatively small protected markets and in large competitive markets – and of course even more profits in large and protected markets. Trade is relevant to R&D insofar as it determines the size of the market. When the domestic market is of small to medium size, trade policy involves a trade-off between large margins and small volumes, in other words a more protectionist

policy, or it involves small margins and large volumes, that is, a more open approach. To put it another way, trade leads to lower margins, but higher volumes.

The optimal policy probably depends on the strength of intellectual property protection, with higher margins where intellectual property rights are protected. Here again, there may be a trade-off, this time between protection of intellectual property rights and technology diffusion. If intellectual property protection is weak, then technology that exploits an innovation will spread more quickly, boosting growth. At the same time, weak protection reduces the incentive to spend money on R&D.

History provides some interesting examples to fuel the debate on the ideal level of intellectual property protection. One of the most quoted ones is the light bulb. Joseph Swan patented a carbon filament lamp in England in 1878, and Thomas Edison patented essentially the same thing a year later in the US. At that time, there were no patent laws in the Netherlands, so in 1891 Royal Philips Electronics, as Philips was known at the time, could simply take the invention and turn it into the money spinner that would finance the firm's expansion and inventions of its own. Ericsson did something similar in 1876 – it reverse-engineered Bell's telephone, which he hadn't patented in Sweden.

The optimal balance between intellectual property protection and technology diffusion may shift in the direction of intellectual property protection if efficient markets for innovations are developed. In that case the innovator can realise the market value of the innovation directly through licensing. Trade in innovations enables innovation to be separated from production and allows the division of labour between R&D firms and manufacturers across countries, and R&D becomes a traded service.

Apart from lowering margins, trade is also likely to increase the number of competitors who imitate an innovation, thereby discouraging private investment in R&D. On the other hand, trade provides a larger market from which to recoup R&D expenditure and opens up a large market for licenses, encouraging R&D if, as we said, intellectual property is adequately protected. If the latter effect dominates, trade may contribute to a rising share of R&D in countries relatively abundant in human capital, both in OECD and emerging economies.

Spillovers

So far we've mainly discussed the impact on firms that invest in new technology. But there are also linkages between trade and productivity growth through technological spillovers to other firms in the same sector. Even nation-level productivity can improve because the average stock of knowledge of the sector or of the economy increases. Knowledge spillovers can be described through three learning effects that can increase productivity:

Learning-by-doing effects are a by-product of ordinary production and refer to the role of experience in increasing productivity. These effects were often quoted as justifying a policy of import substitution, that is to say encouraging local production rather than depending on foreign suppliers. In fact, learning-by doing effects are usually stronger in an open economy because of the higher degree of specialisation resulting from trade. If, as a consequence of trade liberalisation, a country specialises in sectors where there are more economies of scale, there will be also more opportunities to learn. Trade increases the

size of markets and the scale of specialization. There is also a potential impact from trade on the composition of production, as specialization switches from sectors with low technological spillovers to sectors with important learning-by-doing effects.

Learning-by-importing effects occur when domestic producers have indirect access to the foreign stock of knowledge (without having to invest in R&D) and can draw on this stock to increase their productivity. This type of learning is linked in particular to the import of intermediate goods, since these goods generally incorporate the latest technology and are used by domestic companies in their production process. The role of trade is to bring foreign technologies to the domestic economy or to let domestic firms improve their own technologies or products through reverse engineering and imitation. These effects can result from trade in services as well. Multinational corporations often have office systems and other technologies that local firms can emulate.

Learning-by-exporting effects refer to a situation where exporting firms learn from their foreign clients and are in contact with clients and competitors using more advanced technologies in foreign markets. Trade encourages exporters to become as efficient as their competitors, and in fact they may be forced to learn if they want to stay in the market – for example, a market with higher quality standards than domestic ones.

These three types of learning all boost the level of productivity. We can also add a fourth type: "learning-to-learn". Contact with foreign products or foreign clients means that firms can learn how to further increase their productivity not only by using the available technology but also by improving their own technologies at a faster rate than before. Firms also have incentives to use better inputs and to adopt foreign technologies more rapidly. Trade could then have an impact not only on the level of productivity, but also on how quickly productivity grows.

FDI, vertical specialization and outsourcing

The relationship between trade and technology transfer doesn't just depend on what happens in the firm or country adopting the new technology. It also depends on foreign direct investment and multinational corporations. Foreign direct investment is an important channel of international technology diffusion, placing technologies in the host economy where they can be studied, where domestic workers can learn from them and where they can be used as inputs for domestic production. The foreign firm itself uses FDI to provide the technology needed to improve the supply of its inputs or to create a market for its products.

Linkages with domestic suppliers are called backward linkages; those with firms further down the production chain are called forward linkages. A firm can also have linkages with competitors (horizontal linkages). This might sound odd, but can make sense when a firm is trying to create a market for final products or for suppliers in order to reach the appropriate scale economies and the firm is too small to do so alone – which is often the case in global markets. Large companies, for example, may co-operate to create and impose standards, while small companies may form associations to negotiate better prices on bulk products they all use.

Multinationals are important in technological spillovers from trade and FDI for three reasons:

- Their more advanced production methods and technology.
- Their network of international suppliers, customers and contracting firms, involving contacts with skilled people all over the world with knowledge-sharing and international training programs.
- Their intangible assets that are the source of their value creation, such as management and marketing skills.

The influence of multinationals is seen in the dramatic changes in production processes over the past 20 years. The reduction in transport and communication costs and trade barriers has made it possible to fragment production across many countries, each specializing in a particular stage of the production sequence. Each part of the sequence trades with the next in a vertical trading chain, and today vertical specialization explains 21% of world trade. It has increased FDI flows and intra-firm trade in a complementary relationship and has encouraged many of the interactions that characterize the global economy.

The second phenomenon that has changed world trade and has encouraged the diffusion of technologies through trade is the development of international outsourcing. This is closely related to vertical specialisation and the emergence of global value chains. The difference is that international outsourcing creates trade flows instead of FDI flows. It generates services trade when the outsourced activity is performed by another company in another country. There is, however, a relationship between trade, FDI and outsourcing, as most of the companies that provide outsourced services are subsidiaries of multinationals or domestic firms that have benefited from the technological spillovers. Business-process outsourcing services in India, for example, developed through FDI by foreign information technology firms. Outsourcing has significantly contributed to the increase in the growth of trade in intermediate inputs and thus to the potential technological spillovers from this type of trade.

As with the impact of trade on productivity, empirical studies on FDI and technology diffusion have to take account of the fact that FDI is generally attracted to sectors where productivity is already the highest and productivity growth strong. Firms invest in sectors with the most promising growth rate and in the best companies. The impact on domestic firms of the entry of foreign companies is twofold. On the one hand, domestic firms can expect productivity gains through technological spillovers. On the other hand, the increased competition from foreign firms may diminish the production of domestic firms and take market share from them. The net impact of FDI on the productivity of domestic firms can thus be either positive or negative, depending on the firm involved.

Empirical studies only analyse the manufacturing sector, whereas services are the main sector in many countries and are more and more open to trade. Bearing these limitations in mind, the question is to know under what circumstances FDI has been found to generate technology transfer and under which circumstances it has not. Some general conclusions emerge:

- Spillovers are more likely in joint-ventures or companies whose capital is shared between domestic and foreign investors.
- Technological spillovers will only occur if there are interactions between local and foreign producers or workers.
- Export-oriented FDI or FDI to improve efficiency is more often associated with positive spillovers than FDI that merely seeks to jump tariff barriers and exploit protected local markets.
- The productivity difference between domestic and foreign firms should not be too wide.
- The host country needs to have a certain absorptive capability. This depends on a number of factors, ranging from social and human capital and information networks to the number of students studying abroad.
- There seems to be a "threshold effect," where the benefits of FDI can materialise only after a certain amount of foreign capital has been accumulated.

Conclusion

Trade, as we stress throughout this book, fuels domestic growth, opens doors to global markets and improves access to goods and services. As the example of the medieval merchants described in Chapter 2 shows, it also promotes specialisation and the division of economic activities into separate functions. Specialisation, trade, good infrastructures and a skilled workforce are typical characteristics of prosperous, growing economies with high standards of living.

So while trade is necessary for growth, it is not sufficient in itself. There's no point in importing a new technology if there's nobody to carry out maintenance work, for instance. Access to international agricultural markets means nothing if the products cannot be stored and transported correctly.

It is not always easy to decide whether trade is a cause of growth, an effect or both in any given situation. What we do know is that when a new idea, product or way of doing things appears, trade helps to spread it. In the following chapter, we'll look more closely at the links between trade and the different types of innovation.

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