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Heli Simola

Rebalancing of demand in China – illustrating possible effects with an input-output analysis

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Abstract

As it gets increasingly difficult for investors to find opportunities for productive investment, China's traditional investment-led growth model has lost steam. China now faces a rebalancing of domestic demand toward increased consumption and a paradigm of lower growth. Given that China is already the second-largest economy in the world, this shift will inevitably put adjustment pressures on the global economy. To illustrate these adjustment pressures, we consider global input-output tables. Our analysis suggests that China's development poses important adjustment pressures for the global economy in both sectoral and regional terms. As this shift is expected to take time, however, other countries should have time themselves to deal with the shift. There are many risks that could thwart a smooth rebalancing, of course, and they should not be underestimated. With the help of South Korean and Japanese benchmarks, we also illustrate how the Chinese economy could experience quite different development scenarios, depending on the path chosen.

Keywords: China, growth, demand rebalancing, structural change, input-output.

Introduction

China's GDP growth averaged a historically unprecedented pace of 10 % a year for over three decades. Since 2011, however, growth has gradually decelerated to an annual average below 8 %. It is widely expected that this gradual slowing will continue in coming years to around 5–6 % a year, although views on the pace of slowdown vary.[1]

China's economic slowdown partly reflects the gradual rebalancing of demand from fixed investment to consumption. China's traditional investment-led growth model is losing steam as investor opportunities for productive investment have become scarcer. The global financial crisis further reduced the opportunities as the government tried to soften its effects with massive public investment. On the other hand, Chinese people have become wealthier and many can afford to increase their consumption beyond necessities. Moreover, China's production structure continues to evolve from agriculture to industry and increasingly to services. Indeed, China's production structure is gradually coming to resemble that of a developed country.

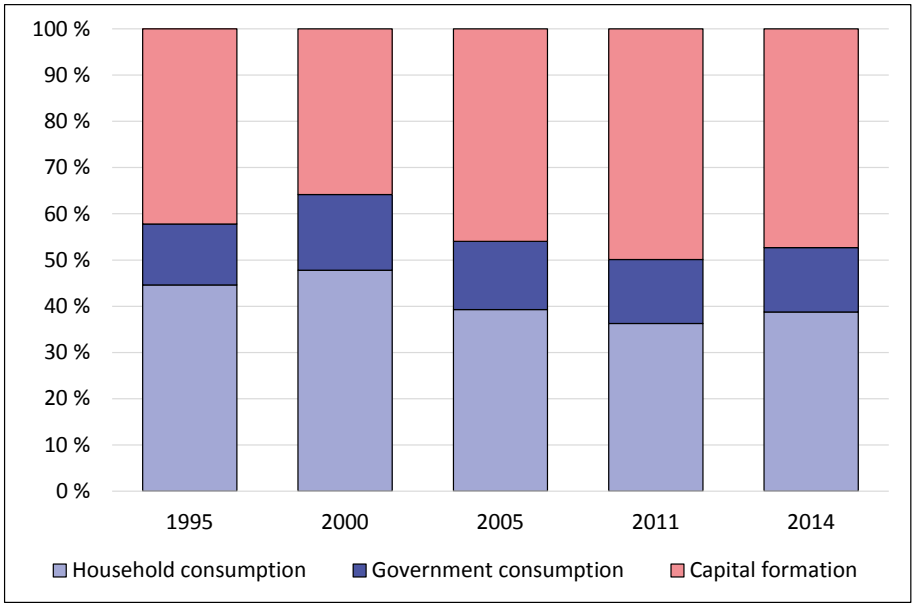
Given that China is the world's second largest economy and importer, the change in China's growth paradigm also has global implications. China plays a key role in global commodity markets. It is the world's largest importer of e.g. iron ore and copper, and the second largest importer of crude oil. Worries over China's slowing growth and rebalancing of demand already cause anxiety in global raw material and financial markets, so this issue is highly topical. Here, we try to quantitatively illustrate possible outcomes of China's growth slowdown and rebalancing of demand.

Growth slowdown and changing demand structure in China

China has relied on an investment-led growth strategy for decades, and it has long been clear to most observers that the country's growth strategy needed to change. In fact, the share of capital formation in China's domestic demand peaked at 50 % in 2011 (and fixed investment at 46 % of GDP) reflecting strong public support provided to the economy by the Chinese authorities to alleviate the effects of the global financial crisis (Fig. 1). On the supply side of the economy, this has been especially visible as strong increase in the share of construction in output. Also as expected, recent national accounts data show signs that the share of consumption has gradually started to increase in recent years.

[1] IMF (2015), World Bank (2015).

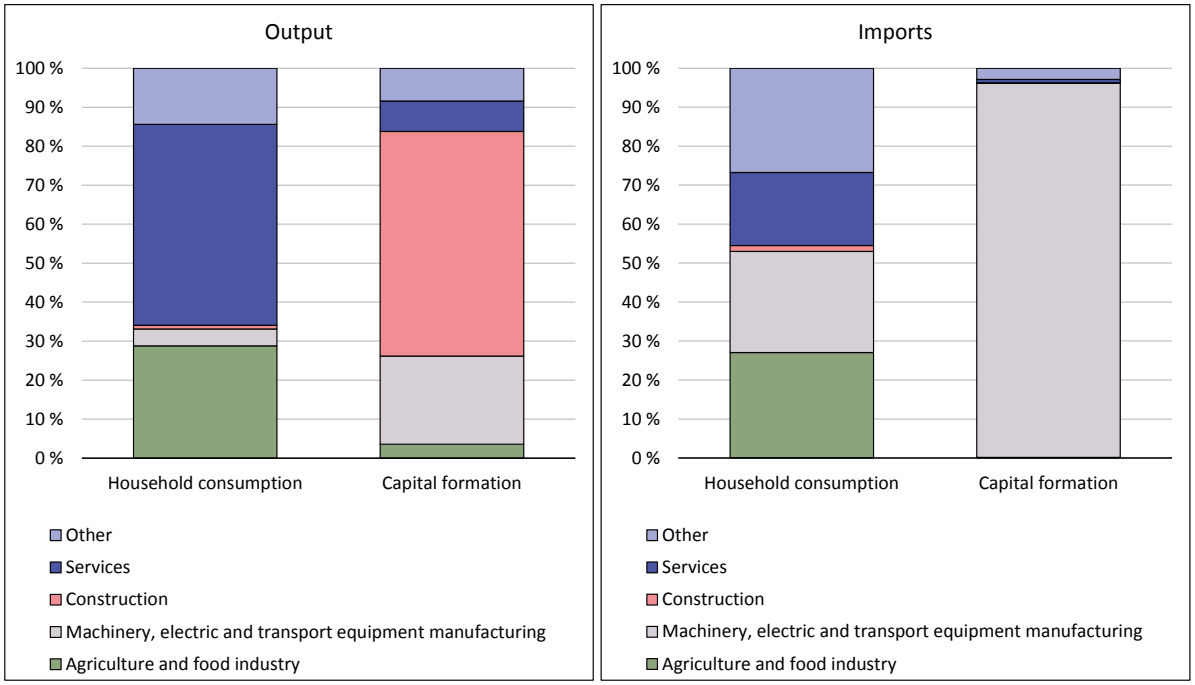
Figure 1 Structure of China's final domestic demand, 1995–2014



Source: WIOD, Macrobond.

This rebalancing of demand from investment to more consumption-led growth, combined with the slowdown in overall growth, could result in significant changes in the structure of Chinese output and imports, given that the demand structures of consumption and investment are quite different (Fig. 2). The Chinese supply for domestic household consumption is dominated by service and food product output, whereas investment demand is heavily directed toward construction. Import supply of final products is largely concentrated on machinery and equipment, especially in the case of investment demand, but their share is also significant in household consumption demand.

Figure 2 Sector shares in China's domestic output and import supply for domestic demand of final products in 2011, %



Source: WIOD, author's calculations.

The majority of Chinese output and imports consist of intermediate inputs, not final products. The largest share (nearly 30 % in 2011) of Chinese intermediate input imports have recently consisted of machinery and equipment production inputs, mainly for export production. Export production accounted for about 30 % of Chinese output in the years before the global financial crisis. Although this share declined to around 23 % by 2010–2011, export production still forms a significant part of the economy that is not directly affected by the rebalancing of China's domestic demand. Mining and quarrying products account for about a quarter of Chinese input imports. These commodities are used much more intensively in domestic production for investment than consumption demand, so their imports could be significantly affected by the change in the demand structure.

Illustrating the possible effects of China's demand rebalancing

We use a traditional input-output framework here to quantitatively evaluate possible effects from China's evolving demand structure. The input-output tables describe the structure of an economy by highlighting the interdependencies between sectors through inputs needed to produce the output in different sectors. Assuming constant technology, the input-output tables provide a means to evaluate e.g. the changes in the output of a country caused by changes in final demand. The input-output analysis takes into account the impact of the changes in final demand for the demand of different inputs in all sectors of the economy. However, as input-output analysis is static by nature, it does not incorporate adjustments in the economy that occur in response to changes in final demand. Hence, the effects should rather be viewed as depictions of adjustment pressures originating from changes in China rather than predictions of actual development.

We use global input-output tables from the WIOD project.[2] The data are annual and constructed for the years 1995–2011. They comply 40 countries and a rest-of-the-world (RoW) bloc. The WIOD tables combine data derived e.g. from national accounts and trade statistics and are complemented with estimated input. Since the structures of economies tend to change relatively slowly, we think that the data for 2011 also roughly describe the current state of the global economy and are thus useful in illustrating possible outcomes of Chinese development.

To illustrate the effects of China's demand rebalancing, we calculate the outcomes for Chinese output and imports, as well as for the output of other countries under two scenarios.

Our *hard landing scenario* assumes zero growth in Chinese domestic demand while the share of consumption in China's final domestic demand increases by five percentage points (thereby lowering the share of capital formation). Such a large immediate change in demand structure would be implausible in reality, but serves well for illustrative purposes. In addition, this scenario envisages the unlikely sudden cessation of Chinese growth.

We also calculate a milder and more probable *gradual rebalancing scenario*. Here, final domestic demand grows by 5 % and the share of consumption increases by only 1 percentage point. We use the technical coefficients derived from the global input-output table for 2011 and compare the outcomes with the realized figures from 2011. To highlight the effect of changing demand structure, we assume that Chinese exports remain unchanged.

[2] A comprehensive description of the data is provided in Timmer & al. (2014).

Table 1 Assumptions in the scenarios and their actual values in 2011

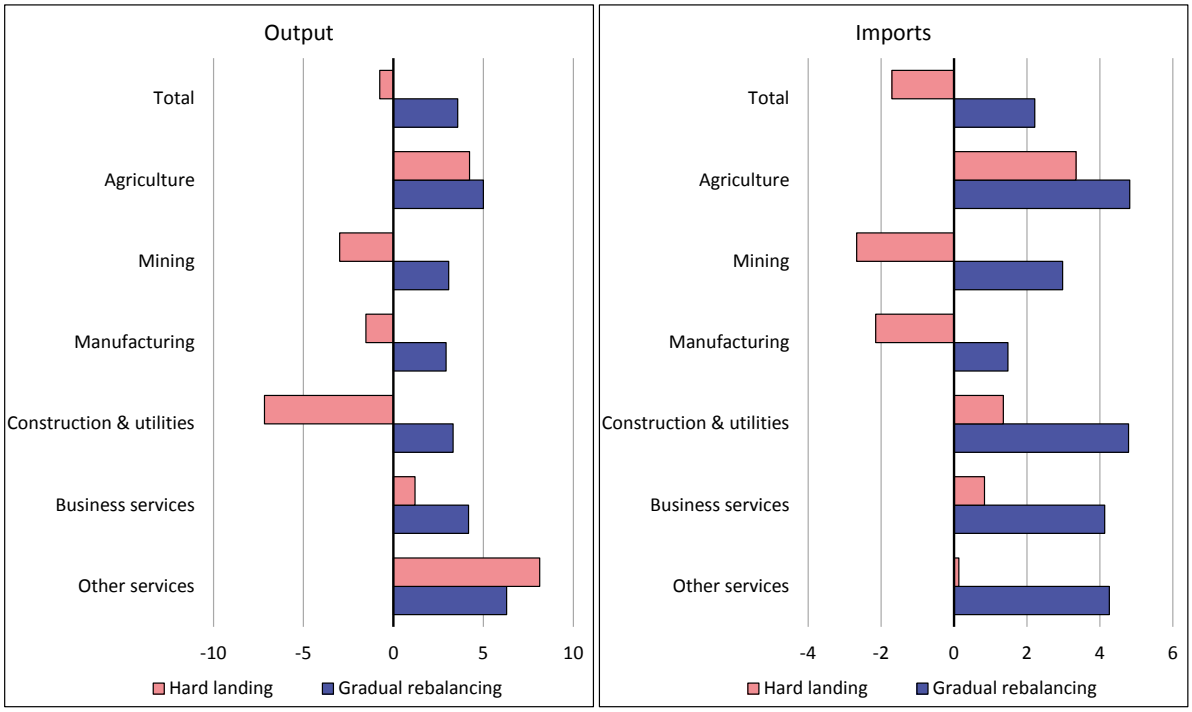
	Actual 2011	Hard landing	Gradual rebalancing
Growth in final domestic demand	8 %	0 %	5 %
Share of consumption in final domestic demand	50 %	55 %	51 %

Continuing growth softens the impact of demand rebalancing on different sectors

Overall, a higher consumption share leads to an increase in the significance of the agricultural and service sectors (Fig. 3) as expected for both domestic production and imports. In the hard landing scenario, construction output declines significantly, while mining and quarrying, as well as manufacturing output and imports, also fall. Imports overall decline slightly more than output as the more consumer-oriented aggregate sectors (i.e. agriculture and services) continue to rely heavily on domestic supply in China. As the construction sector also draws mainly on domestic supply, decreasing construction cuts domestic supply and offsets the positive effect from increased production for consumption, resulting in a slight overall decline in output.

In the gradual rebalancing scenario, the negative impacts vanish in the aggregate sector level. Here, growth of output and imports continues in all sectors, although faster in agriculture and services.

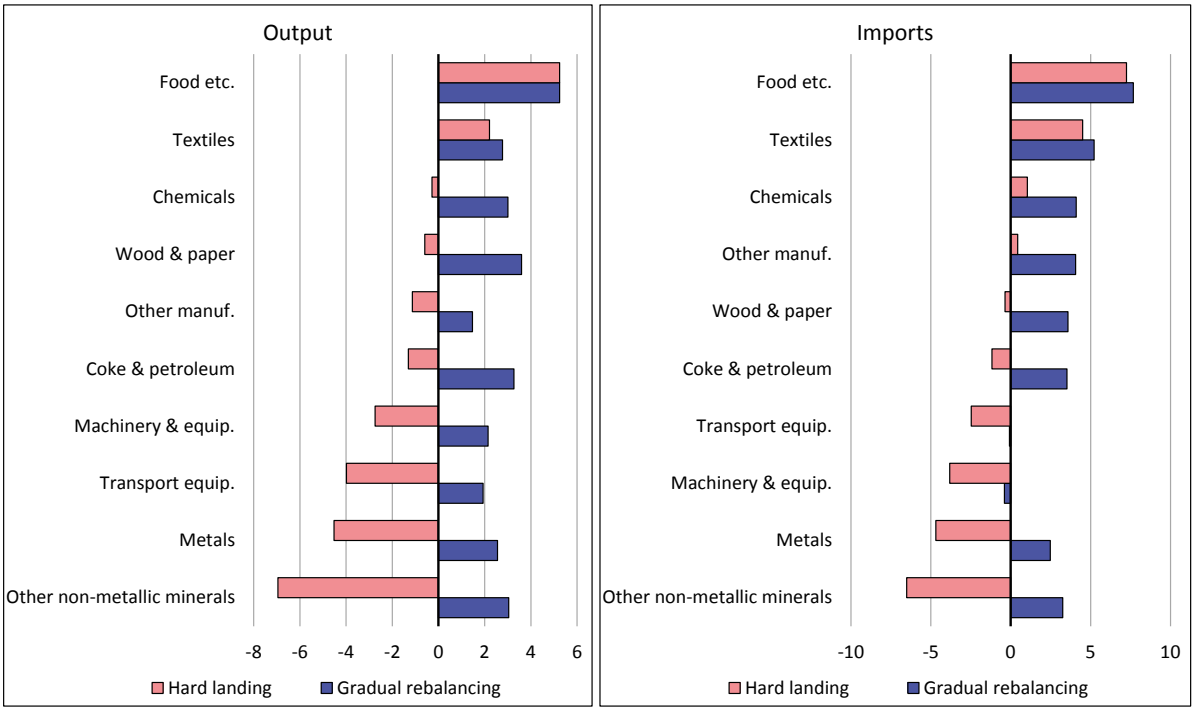
Figure 3 China's output and imports by aggregate sector in "hard landing" and "gradual rebalancing" scenarios, %-change compared to actual 2011



Source: WIOD, author's calculations.

Taking a closer look at manufacturing, we see variations by sector (Fig. 4). As expected, consumption-led sectors such as food and textiles experience an increase both in output and imports. With stronger demand rebalancing, the sectors experiencing the strongest decreases would be those where the demand comes largely from the construction sector, e.g. metals and other non-metallic minerals (including goods like concrete, cement and glassware).

Figure 4 China's manufacturing output and imports by sector in scenarios of hard landing and gradual rebalancing, %-change compared to actual 2011



Source: WIOD, author's calculations.

Demand rebalancing causes global adjustment pressures that vary by region

We also compare effects regionally to see which regions face the strongest adjustment pressures from China's changing demand structure. Assuming a constant production structure in the global economy, the effects can be readily calculated from the global input-output table. Countries that would suffer least from China's demand rebalancing include those that provide China mostly with final consumption goods or inputs for consumer-oriented sectors such as agriculture and food production (Fig. 5). These countries include India, which exports for China's final demand consist largely of miscellaneous manufactured consumer goods, as well as Brazil, which provides China's final demand largely with agricultural products (but also inputs from the mining and quarrying sector). The exports of some European countries (e.g. Netherlands, Denmark and Spain) that serve China's final demand mostly involve food and textiles. These, too, would be less affected by a change in China's demand structure.

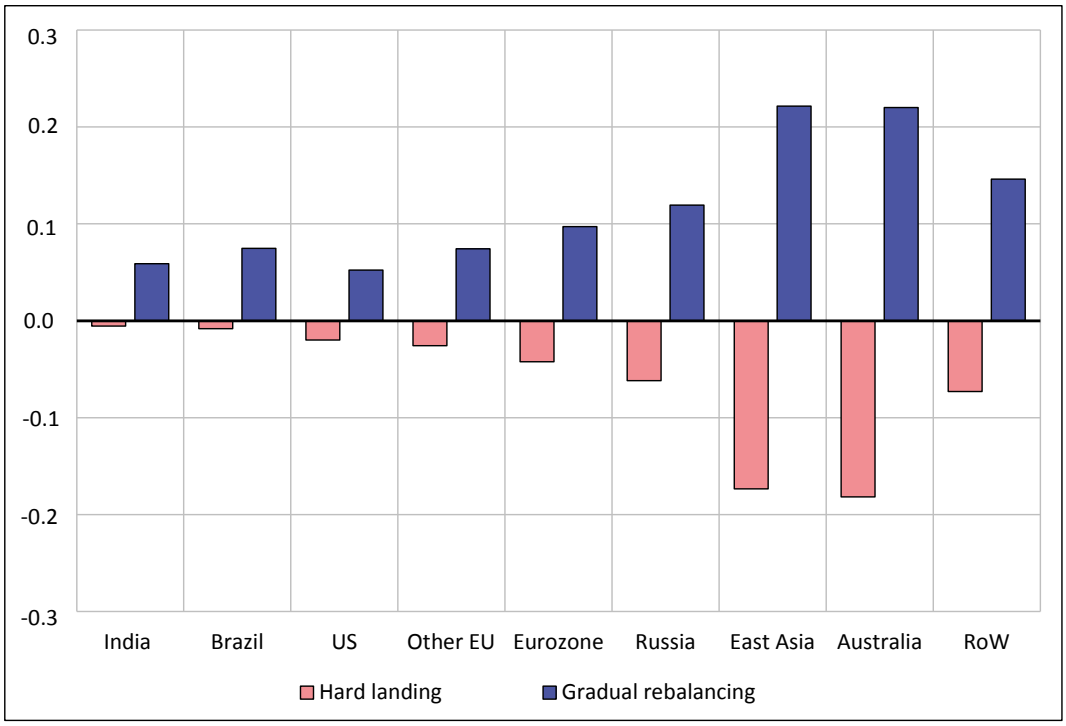
In contrast, the regions that would face the sharpest adjustment pressures from a strong demand rebalancing would be East Asia and countries specialized in mining and quarrying exports such as Australia and Russia. The strong effect on East Asian countries reflects relatively strong regional integration. Although most Chinese imports from East Asian countries go to export production, they also supply considerable amount of e.g. machinery and equipment for Chinese domestic investment

demand. Taiwan and South Korea face the strongest pressures among regions, as they are more dependent on Chinese demand than other countries in the sample.

The decline in Chinese imports of mining and quarrying products that occurs under the hard landing scenario could cause serious pressures for countries such as Australia,[3] which exports about 30 % of its mining and quarrying output to China. Indonesia and Russia, which also send about 10 % of their mining and quarrying output to China, would also be affected. Such basic commodity outputs are also used as inputs in other countries producing investment goods for China. This slightly amplifies the quantitative effect for commodity producers. It should be noted that the change in Chinese demand would likely have significant implications for global commodity prices and could cause additional problems for commodity producers. On the other hand, for the commodity consumers lower prices should rather support growth. However, price effects cannot be taken into account in the input-output framework.

In the more-likely scenario of gradual rebalancing, however, Chinese imports from nearly all countries continue to grow, supporting output growth especially in East Asia and other Asian-Pacific countries (reflected in the RoW bloc).[4] Even for the remaining countries in the sample, global spillover effects compensate for the slight decline they face in Chinese import demand.

Figure 5 Change in the output of different regions in "hard landing" and "gradual rebalancing" scenarios, %-change compared to actual 2011



Source: WIOD, author's calculations.

[3] Using a similar methodology, Kelly (2014) estimates that a ten percentage-point increase in the share of consumption in China would reduce Australian GDP by 0.5 %.

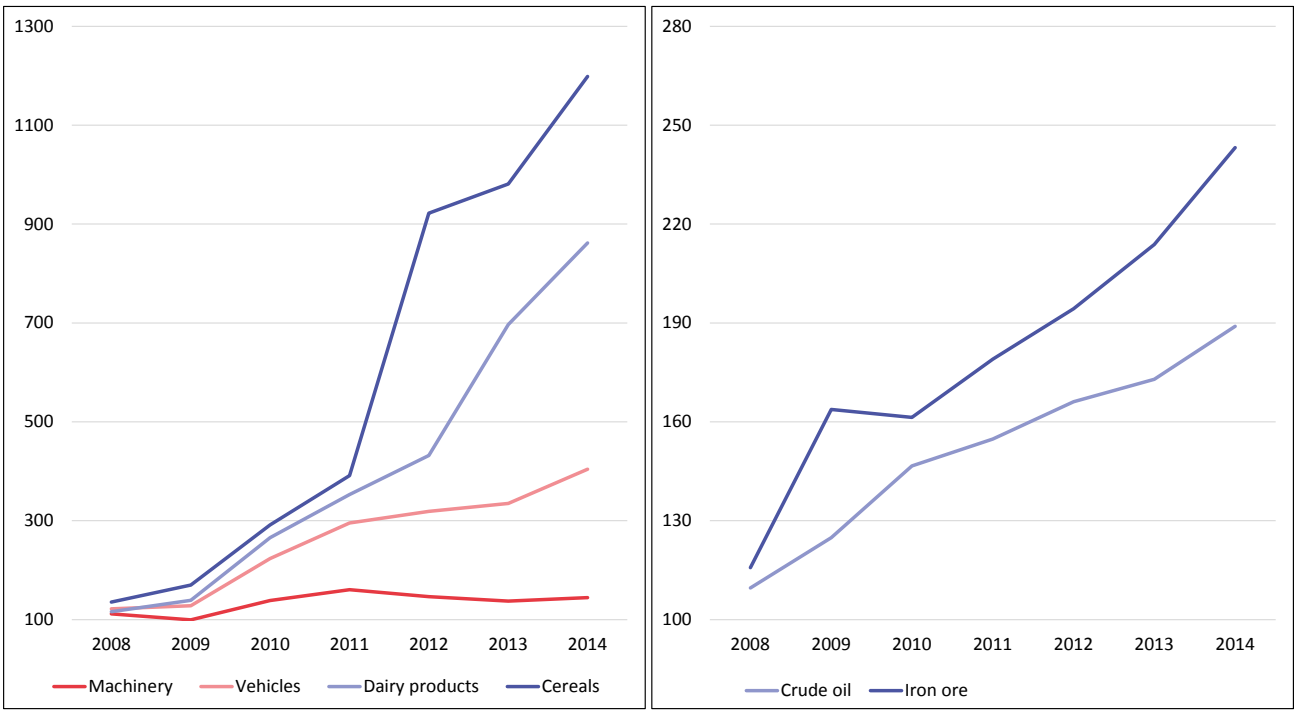
[4] These findings are roughly in line with those of the IMF (2011).

Actual change relatively slow

The shift in China's demand structure has proceeded very gradually. China's national account statistics show that the share of consumption in final domestic demand increased by only one percentage point in the period 2011–2013. Most of the increase was recorded in 2012 and was accompanied by a slight acceleration in the growth of agricultural production and slowdown in the growth of industry and construction production in line with the above results. In 2014, the share of consumption increased again by nearly 1.5 percentage points.

Chinese import statistics also provide some support for our analysis outcomes. Among China's largest import product groups, growth of imports of many food products has increased substantially since 2011, while import growth has slowed visibly for vehicles and even imports of machinery declined (Fig. 6). Further, growth of certain mining and quarrying products such as iron ore and oil continued in line with the above calculations. However, there are many uncertainties related to interpretation of import development due to China's important role in international supply chains and the exceptional time period after global financial crisis.

Figure 6 Value of Chinese imports of select manufacturing products (left) and volume of Chinese imports of select mining and quarrying products (right), 100=2007

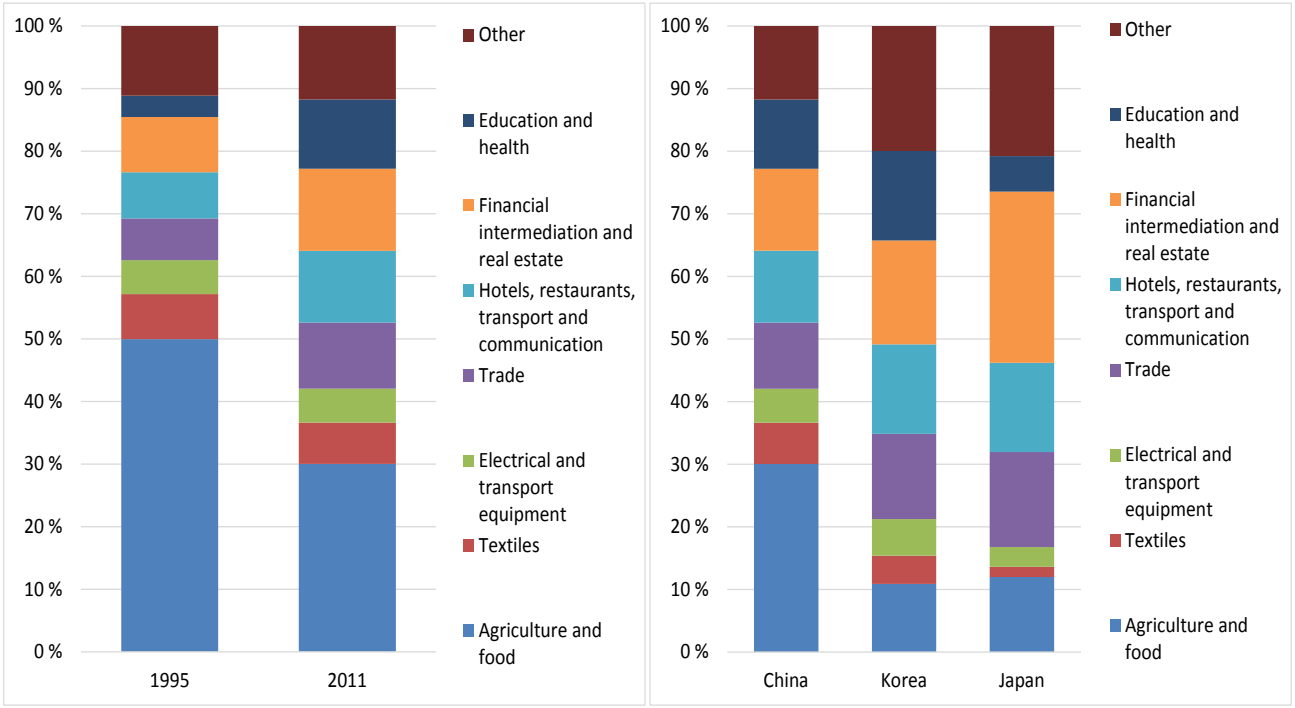


Sources: UN Comtrade, Macrobond.

Choice of growth model affects longer-term changes

Rising incomes reshape consumption and investment structures. China already displays a distinct change in consumption patterns from past decades with the share of agricultural products and food declining substantially and the share of services increasing correspondingly (Fig. 7). However, the structure of Chinese consumption is still quite different from developed economies such as South Korea and Japan.

Figure 7 Structure of final consumption demand in China in 1995 and 2011 (left) and structure of final consumption demand in China, South Korea and Japan in 2011 (right)

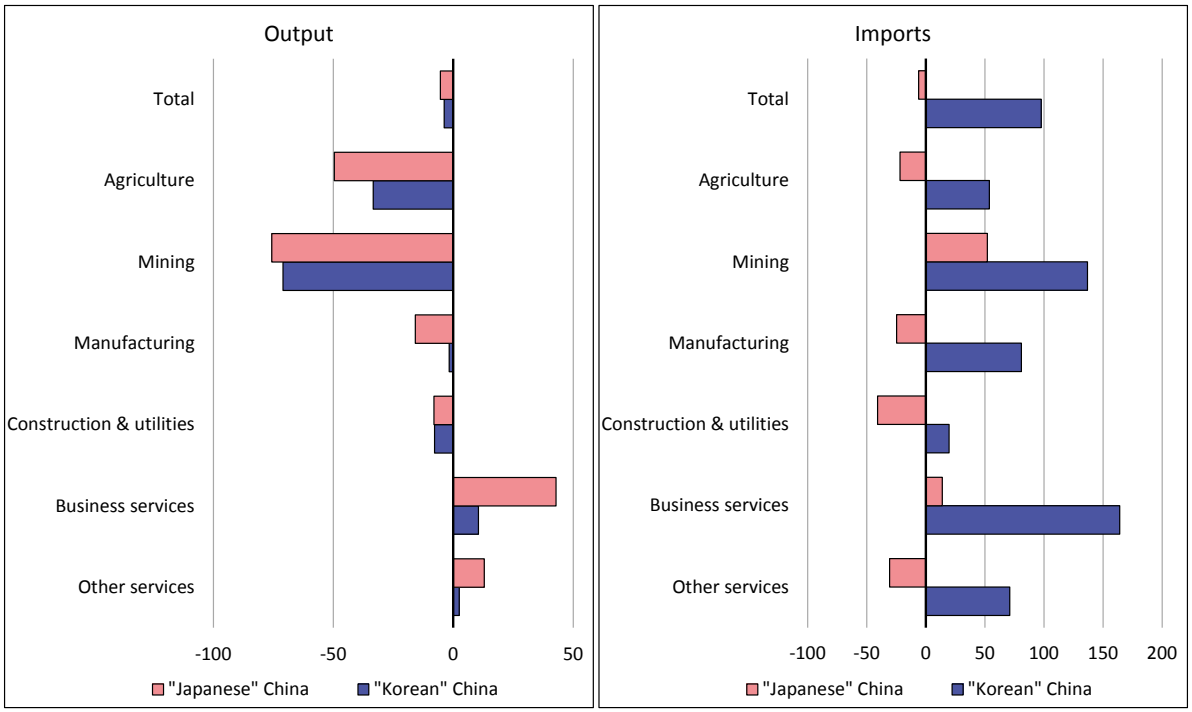


Source: WIOD, author's calculations.

In illustrating how Chinese output and imports might look over a longer-term horizon and evolution closer to a developed-country economic structure, we note that most countries follow similar general trends when they develop. However, the outcome naturally depends largely also on economy-specific factors such as natural resources and economic openness. As Chinese development has followed the paths of South Korea and Japan in many respects, we use these countries as benchmarks for illustrating possible development of the structure of the Chinese economy in the longer term. We calculate values for the output and imports of China using the final domestic demand structures and technical coefficients of South Korea and Japan in 2011.

The outcomes, which are quite different depending on whether we use the economic structures of South Korea or Japan (Fig. 8), are largely explained by the openness of these economies. South Korea is an open economy with high levels of imports and exports, whereas Japanese domestic demand relies more on domestic production and less on imports. Currently, China is positioned in between the two in terms of openness, but as this example illustrates, the outcome might be quite different depending on the development path China follows in the future.

Figure 8 Changes in Chinese output and import calculated with South Korean and Japanese economic structure coefficients in 2011, %-change compared to actual 2011



Source: WIOD, author's calculations.

Both long-run scenarios share the result that imports of mining and quarrying sector commodities increase substantially. This largely reflects the fact that South Korea and Japan lack mining and quarrying resources. China has more abundant mineral resources compared to both and currently relies much less on imports of mining and quarrying products. On the other hand, Chinese energy production is still largely based on domestic coal. Given the seriousness of China's environmental problems, the country is trying to move away from this highly polluting energy source to cleaner and more environmentally friendly energy solutions. Hence, the direction of development for China, at least, seems possible, despite differences in initial conditions compared to South Korea or Japan.

The other common feature is that the significance of service sector (especially business services such as trade, financial intermediation and real estate services) would further increase sharply. The difference is that the increase would be largely covered by import supply in the "Korean alternative", whereas there would be a more sizeable increase in domestic output of services in the "Japanese alternative." This is also more generally the most striking difference between the scenarios, i.e. we see huge increases in imports in the Korean alternative, but a decline of imports in the Japanese alternative. In the Korean alternative, imports of almost all sectors increase notably, with the largest gains in business services. In both alternatives, imports for raw materials-oriented or low-tech industries increase as both South Korea and Japan are specialized in high-tech sectors and lack natural resources. This is also reflected in the feature of especially the Japanese alternative that the sectors which would suffer most from lower import demand are machinery, electrical equipment and transport equipment.

Conclusions

Over the past few decades, China has emerged as one of the largest economies in the world and the largest contributor to global growth. The Chinese economy and income levels have seen an unprecedented rise over the past three decades, as well as a shift from a poor agrarian economy to a global manufacturing superpower and an upper-middle-income economy.

China now faces further structural changes in its economy as its investment- and export-led growth model loses steam. Recent years have seen clear signs emerge of a slowdown and rebalancing of growth that have caused worries about impacts on global growth, as well as increased uncertainty in commodity and financial markets (especially at a time when China is liberalizing its capital markets).

This discussion provided a brief outline of some of the general effects that China's slowing and rebalancing growth may have for China and other economies. To put our intuitive expectation on a sounder footing, we used traditional input-output analysis for evaluating possible implications. Although there are many caveats related to this analysis, the general findings should be helpful in assessing the consequences of China's slowing and rebalancing growth.

The change in China's demand structure will inevitably affect the structures of the global economy. An increased share of consumption would support both domestic and import demand of especially agricultural and food products, as well as many services. A declining investment share, in contrast, would lead to cooling in construction and demand in related industries such as metals, mining and quarrying. Regionally, East Asia and certain mining and quarrying commodity producers would face the strongest adjustment pressures. However, most affected countries should have time to adjust given the combined gradualness of the structural shift and lower growth.

Over the longer term, the Chinese economy could turn out quite different depending on the development path it follows. If it follows the highly open economy approach of South Korea, Chinese imports would increase substantially. Under a more self-sufficient Japanese approach, domestic output (especially business services) would expand considerably. Both alternatives point to further increases in mining and quarrying import demand despite a more consumption-oriented economy. This could also happen in the Chinese case; the country has an immediate need to move away from highly polluting domestically produced coal to cleaner imported energy raw materials.

The expected slowdown and related shift in China's demand structure seem to be making gradual headway. The shift will impact the Chinese economy as well as global production and trade. But the process should take time, giving other countries an opportunity to adjust accordingly.

There are obviously many risks that might prevent such smooth development that should not be underestimated. Worth mention are China's high level of indebtedness and ongoing capital market liberalization. In addition, the Chinese economy is quite dependent on exports, so the trend in exports remains important for China. Moreover, slowing growth and rebalancing of demand in China should not be overdramatized; their consequences should presumably materialize only gradually. Finally, China's lower growth is necessary to keep the Chinese economy on a sustainable basis and avoid sudden deterioration. Moderating growth for China is also better for other countries.

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