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Food security policy options for China: lessons from other countries

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Food security policy options for China: lessons from other countries

Abstract

As China becomes more industrial and urbanized, it is likely to become more dependent over time on imports of (especially land-intensive) farm products, most notably livestock feedstuffs. If farmers are slow to adjust to their declining competitiveness, for example by obtaining off-farm employment, the farm-nonfarm household income gap may increase. A decline in food self-sufficiency may be perceived as undermining national food security, and a persistent farm-nonfarm income gap as contributing to social unrest. In these circumstances, what offsetting or compensating policy options should the government consider for ensuring adequate long-term food security and less income inequality? This paper evaluates China's historical record since 1980 and then projects China's economy to 2030, using the GTAP global economy-wide model. It draws on past policy experiences of both China and more-advanced economies to evaluate prospective interventions by government to address food security and income inequality concerns. The potential effects of some of those are estimated for 2030, again using the GTAP model. The paper concludes by suggesting alternative ways to achieve the fundamental objectives of national food security and less rural-urban income inequality, namely via generic social safety nets and improved rural infrastructure.

Keywords: China's economic growth; Food security; Farm productivity growth; Global economy-wide model projections

JEL codes: D58, F13, F15, F17, Q17

Food security policy options for China: lessons from other countries

As China becomes more industrial and urbanized, it will see declines in its farm sector's shares of GDP and employment and, because it is three times as densely populated as the rest of the world, in the international competitiveness of many of its farmers. Other things equal, that will lead to China becoming more dependent over time on imports of (especially land-intensive) farm products. If farmers are slow to adjust, for example by obtaining off-farm employment, the already-large gap between farm and nonfarm household incomes may increase further. Should a decline in food self-sufficiency be perceived as undermining national food security, and a persistent farm-nonfarm income gap as contributing to social unrest, what offsetting or compensating policy options should the government consider for ensuring adequate long-term food security[1] and a smaller farm-nonfarm household income gap?

This paper clarifies appropriate indicators of national food security (Section 1), briefly evaluates China's historical record since 1980 (section 2), and then projects those and related indicators for China over the period to 2030, using the GTAP global economy-wide model (Section 3). It then draws on past policy experiences of both China and more-advanced economies to evaluate various prospective interventions by government to address food security and income inequality concerns. The potential effects of some of those are estimated for 2030, again using the GTAP model (Section 4). The final section suggests ways of achieving more cost-effectively the fundamental objectives of national food security and less rural-urban income inequality.

1. Indicators of national food security

It is often thought that a populous country such as China could only be food-secure if it produces its own food. However, food security is not synonymous with food self-sufficiency.

[1] This paper does not deal with short-term food security concerns such as those associated with temporary spikes in international food prices. For analyses of the use of trade measures for dealing with that issue, see, for example, Martin and Anderson (2012), Anderson and Nelgen (2012), and Anderson, Ivanic and Martin (2014).

The UN's Food and Agriculture Organization defines food security as the ideal in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Improving food security thus requires improving the three interrelated elements of food availability, access and utilization. Availability can be met with imported as well as domestically produced food. How much access households have to the available food supply at any point in time depends heavily on their income or assets or other entitlements (e.g. transfers such as remittances). And how well they utilize the food that is accessible to them depends on their knowledge and willingness to ensure a healthy and nutritious diet for all household members. The latter in turn depends on the level of education of particularly female adults in the household, which again is closely related to household income and wealth or other entitlements.

Thus food insecurity is a consumption issue that is closely related to poverty and the price of food. From this perspective, policy initiatives that raise the real incomes or asset values of the poor could enhance food security. By contrast, policies that raise the consumer prices of foods purchased by poor households undermine food security, unless there is a larger number of poor net sellers of food whose income would be boosted by those propped-up prices. For example, protection from import competition boosts farm output by raising producer prices, but at the same time it raises consumer prices for net buyers of food and discourages imports such that both aggregate (local plus imported) food availability as well as economic access are reduced. Furthermore, by limiting imports, the potential range of foods available to consumers is shrunk, hence so too is the capacity to reach utilization goals. That is, all three elements of food security are compromised by import-restrictive policy measures, even though they raise food self-sufficiency (the ratio of domestic production to domestic consumption).

One way to capture the national impact of price changes on consumers' access to food is to measure national changes in household consumption of agricultural and food products per capita in real terms (that is, at constant prices). A recent study suggests this is also a very good proxy indicator of nutritional outcomes (Tiwari, Skoufais and Sherpa 2013), and hence of the utilization component of food security, at least at the aggregate macro level.

2. China's historical record since 1980

Despite its rapid industrialization and urbanization, China has managed to remain very close to self-sufficient in food until very recently. Indeed over the two decades to 2011, the share of farm products in China's total imports has declined rather than grown. The country's average annual agricultural and food self-sufficiency was never more than 1 point away from 100 percent in each of the decades of the 1960s, 1970s, 1980s and 1990s (Sandri et al. 2006). It was still 98 percent in 2000-04, and 97 percent in 2007 just prior to the recent food price spike period; but it has fallen a little more since then.

Part of the explanation as to why China's self sufficiency in farm products has undergone so little transformation is the productivity growth that has resulted from China's very substantial increase in investments in agricultural research. In the 1980s and 1990s China's public agricultural R&D expenditure amounted to just 0.37 percent of agricultural GDP (barely half the Asia-Pacific average), but that intensity ratio rose to 0.46 by 2002 and 0.50 by 2008, which was four-fifths of the Asia-Pacific average (ASTI 2013; Flaherty, Stads and Srinivasacharyulu 2013). That has contributed considerably to the growth in China's food production. It has also boosted national income growth, because the marginal returns from such levels of public investment in developing countries are extremely high (Fan and Hazell 2001; Rao, Hurley and Pardey 2012). The knowledge and technologies generated by those investments also would have lowered consumer prices of food insofar as there is an imperfect link between domestic and international prices (for example, because of imperfect substitution by consumers as between local and imported foods). That plus the raising of farmer returns means these investments in R&D almost certainly contributed to poverty alleviation in China and possibly also to greater equality between farm and non-farm household incomes (Zhang and Fan 2004; Fan and Qian 2005) – bearing in mind that a solid majority of the poor in China are in farm households and that the average farm household income has been well under half that of urban households (Ravallion and Chen 2007; Sicular et al. 2007).

In addition to productivity enhancing public R&D investment, there has been another key contributor to China's capacity to maintain agricultural self-sufficiency for so long despite rapid industrialization and urbanization. It has to do with changes in governmental distortions to price incentives, which have been dramatic since the country's reforms began in 1979. Agricultural production and exports were in effect taxed very heavily in China prior to the 1980s, while domestic consumers of farm products were effectively subsidized (Huang et al. 2009, pp. 119-24). However, during the 1980s and early 1990s those price-distorting

policies were gradually phased out, thereby encouraging farmers to expand food production (Huang et al. 2009, pp. 144-55).

Past farm policies took numerous forms, but included export restrictions and requirements to deliver part of the crop to the government at below-market prices. Agriculture was also discouraged indirectly by manufacturing protection policies and an overvalued exchange rate. When taken together, it meant the price of farm relative to non-farm tradable products within China was only half what it was at the country's border in the 1980s. That is, the relative rate of assistance to agriculture (RRA) was around -0.5. Indeed it had been as low as -0.6 in the early 1980s (Table 1). Thanks to policy reforms since then, the RRA gradually approached zero between the late 1980s and the late 1990s. Effectively this meant a doubling of the ratio of the price of farm to non-farm tradable products domestically relative to that ratio internationally. The consumer subsidy equivalent on farm products also gradually diminished over that period.

Those policy changes in incentives had a major impact in terms of reducing the discouragement of farm production (and the encouragement of food consumption) and thus slowing the decline in agricultural self-sufficiency that otherwise would have occurred as industrialization proceeded. Those reforms also added to national economic growth and welfare, and reduced the extent to which growth in real incomes of urban households outpaced those of farm households.

During the past decade, however, China has gradually moved from effectively taxing to subsidizing farmers relative to manufacturers, by raising some domestic food prices above levels at the country's border. Indeed the nominal rate of assistance to Chinese farmers has converged on that for farmers in OECD countries, and the extent of taxing of food consumers in China via farm policies now exceeds the rate in OECD countries (Figure 1). That is, China's farm and food policies are going in the opposite direction to those of OECD countries, where the willingness to tolerate their high costs has waned over the past 25 years.

This recent price-distorting policy development in China is lowering the efficiency of resource use and thus national economic growth and welfare. It may have contributed to reducing the gap between farm and nonfarm household incomes, and to raising food self-sufficiency, but it has done so at the expense of national food security through lowering incomes and raising domestic food prices for consumers. In 2012 consumer food prices in China on average were 15 percent above those at the country's border, as were producer prices, according to OECD (2013). Even rice prices were one-sixth above what they would have been with open markets, and wheat prices were more than one-third above in 2012. This

directly affects the food security of the country's poor because on average for those living on less than $1.25 a day (2005 purchasing power parity) in China, 25 percent of their expenditure is on food *net* of their earnings from food sales (Anderson, Ivanic and Martin 2014, Table 1).

There are much more efficient and equitable ways to boost domestic food production and to deal with poverty and farm/nonfarm income inequality *without* raising consumer prices of food. Before turning to those, however, it is instructive to examine the prospects for China's food production, consumption and trade over the next decade or two, since that is the period of relevance for considering any new long-term policy developments.

3. Market and food security prospects for China to 2030

Given the importance of China's agricultural and food sector to both the national and global economies, projecting China's food markets can best be done with the help of a global, forward-looking economy-wide model. A national model would be inadequate as it would not take into account the impact of economic growth in the rest of the world on China. We employ the widely used and well-documented GTAP model of the global economy (Hertel 1997) and the latest available Version 8.1 of the GTAP database which is calibrated to 2007 levels of production, consumption, trade and protection (Narayanan, Aguiar and McDougall 2012). Having a base year of 2007 is ideal for projecting forward because it was a more-normal year that immediately precedes the recent period of temporary spikes in food and fuel prices and the global financial crisis and recession, the impacts of which are likely to have dissipated well before 2030. The GTAP database divides the world into 134 countries/country groups, and divides each economy into 57 sectors.

The 2007 baseline for the world economy is projected forward to provide two new baselines for 2030 by assuming initially the 2007 trade-related policies of each country do not change.[2] The first projection assumes that rapid growth in China and India continues (real GDP growth of 7.95 percent per year during 2007-30 for China), which seemed reasonable when we began this study. The second assumes growth in China and India is one-quarter slower over the projections period, which we assume slows the growth in primary sector productivity by one percentage point in all countries. This second set of growth assumptions

[2] Details of the baseline projections of the global economy are provided in Anderson and Strutt (2013a).

reflects the less-optimistic view of key international agencies in the light of a slowdown in those economies during 2013-14. Real international prices of agricultural and food products rise by just 3 percent on average in the first scenario, and by 9 percentage points more in the second case.[3]

Some pertinent recent and prospective indicators for China are summarized in Table 2. They show that in 2007 China accounted for about 4 percent of both the world's exports and its imports of agricultural and food products, and was 97 percent self-sufficient in farm goods (excluding highly processed foods). By 2030, China is projected to raise its import share seven-fold if its economy continues to grow rapidly, or nearly five-fold if its economic growth is slower as in the second scenario, while its share of exports of farm products is projected to dwindle. As a result, China's agricultural self-sufficiency rate is projected in both scenarios to fall about ten percentage points if its (and other countries') policies remain unchanged. The projected decline in China's food self-sufficiency is spread across many products, as can be seen by comparing columns 1 and 2 in Table 3.

However, because of huge projected increases in incomes and farm output in China over this period (China's per capita income rises from one-quarter to four-fifths of the world average and its share of global agricultural GDP doubles), real per capita consumption of agricultural and food products in China jumps enormously. This indicator, shown in the final row of Table 2, is an index of the quantity purchased per person, valued at constant (2007) prices. It thus accounts for food diet upgrading away from staples to higher-priced foods as well as quantity responses to domestic consumer price changes. Even in the slower-growth scenario, that index rises by three-quarters. That is, China will be far better fed in 2030 than it was in 2007 – even if its rate of agricultural self-sufficiency were to fall by about one-tenth as in these two scenarios.

4. **Food security policy implications for China**

The projected decline in China's food self-sufficiency may concern some groups in China, notwithstanding the fact that China's access to food is projected above to be far greater in

[3] Had the slower growth scenario not included the global slowdown in primary sector productivity growth, real international prices of agricultural and food products would have been 2 percentage points *less* than in the first scenario.

2030 than in 2007. One or more of the following policy responses, including market-distorting measures and research investment measures, may be triggered by that concern. We evaluate these in this section and find not all such policies would boost most households' economic access to food and hence national food security.

In examining these options, it is helpful to keep in mind that any market-distorting measure tends to reduce national income and hence the aggregate capacity to access food, in addition to having effects on real income distribution. Expanding public investments in areas where the marginal social rate of return is above the opportunity cost of funds, by contrast, not only raises the level of national income in the short-run but also can raise the long-run rate of economic growth because those investments enhance the nation's aggregate stock of capital. These two sets of policies are considered sequentially, before then turning to generic social protection measures as another way to assist the most food-insecure households.

4.1 Market-distorting measures

There are numerous market price-distorting measures used by governments in their attempts to ensure social stability through improving national food security and reducing farm-nonfarm income inequality and poverty. The most common are trade measures such as an import tariff, which is the equivalent of a production subsidy plus a consumption tax at the same rate as the tariff (as is also an export subsidy). Similarly, an export tax (or an import subsidy) is the equivalent of a production tax plus a consumption subsidy at the same rate as the trade measure. All such price-distorting trade measures tend to reduce national income, the extent of which depends on, among other things, the price elasticities of domestic demand and supply.

In theory, a measure that distorts just the production or consumption side of the domestic market at the same rate as a trade measure would reduce national income less than that trade measure. That is not always true in practice though. A case in point is the rice policy of Thailand's government that has been in place since October 2011. There the government buys rice from farmers at above the market price and stores it, pending a rise in the export price. However, because the international price did not rise, much of that stored rice was spoiled and the government has been disposing of some of the rest at a loss. Such production subsidies, when combined with inefficiently managed public storage activities, therefore may involve an even greater national loss than a trade measure. Moreover, that

government expenditure could have been used instead to invest in high-payoff rural public goods (see below).

India's government also buys grain from farmers at above-market prices when the latter fall below a threshold level, and has similar wastage problems to Thailand. India subsidizes also the farmers' purchase of key inputs such as fertilizer, electricity, fuel, credit and seeds. During the past decade these input subsidies have amounted to around 10 percent of the value of farm production (Pursell, Gulati and Gupta 2009, p.361; Hoda and Gulati 2013, p. 1). They are more wasteful than an equivalent transfer to farmers via an output subsidy, because in addition to over-encouraging output they also distort the mix of inputs used in production. Moreover, when many of those subsidized inputs are provided by inefficient government agencies, as is the case in India (Hoda and Gulati 2013, p. 2; Jha et al. 2013), this adds further to their wastefulness.

Similarly, food consumer subsidies can be much more wasteful in practice than in theory. India is again a case in point, as it is in the process of broadening its rice and wheat consumer subsidy scheme so as to extend discounts to two-thirds of India's households from 2013 (involving an annual payment of more than US$20 billion, see Kishore, Joshi and Hoddinott 2014). Apart from the wasteful corruption and losses by the public procurement and distribution system associated with such schemes,[4] recent studies in both India and China demonstrate that such consumer subsidies do almost nothing to boost nutrition, as consumers tend to eat the same amount of nutrients but do so by switching, for example, from less-preferred coarse grains to subsidized rice and wheat (Jensen and Miller 2011; Kaushal and Muchomba 2013).

To avoid the budgetary outlays that producer or consumer subsidies involve, some other food-importing countries in a situation similar to what China's will be by 2030 have imposed import restrictions on at least their key food grains (e.g., Japan, Korea, and Indonesia for rice – see Anderson 2009a,b). In the interest of boosting farm incomes to reduce the urban-rural income gap, Japan and Korea have imposed import restrictions also on meat and milk products – but not on coarse grains and oilseed products required for animal feedstuffs, which means that sub-sector would still not be self-reliant insofar as it continues to depend on imported ingredients for feed.

According to our GTAP modelling, such a trade policy response by China would alter projected self-sufficiency rates in 2030 as shown in column 3 of Table 3: as resources move

[4] Hoda and Gulati (2013, p. 3) suggest that two-fifths of those foodgrain stocks leak away.

toward rice, wheat and livestock production, self-sufficiency would fall further for crops that provide inputs into animal feedstuffs, and also for other crops.

The tariff equivalents of such import restrictions would range from 114 percent for wheat to 255 percent for red meats. These are well above China's bound out-of-quota tariffs (compare the last two columns in Table 4) and so very clearly would be inconsistent with China's WTO commitments under international law.

Moreover, such a policy response would impose a burden on households that are net buyers of those grain, meat and milk products, because domestic consumer prices for those products would increase along with the producer price hike. The extent of the consequent reductions in the volume of various foods consumed by households in China, as a result of this simulated policy response, is shown in Figure 2. It ranges from 3-6 percent for livestock products, 0-3 percent for grains, and 2-3 percent even for vegetable oils and horticultural products. The fall for the latter goods is despite no change in their import restrictions. It is due to the fall in real national income resulting from this policy (estimated to be 0.9 percent of China's GDP), as well as the rise in their prices due to productive resources being withdrawn from those industries to boost resources in the now-more-protected farm industries. In short, such a policy response to declining food self-sufficiency undermines national food security by reducing the vast majority of households' economic access to food.

4.2 Growth-enhancing investment measures

In contrast to price-distorting measures, which re-distribute well-being between farmers, food consumers and taxpayers but at the expense of overall national welfare, investment in rural public goods can raise national income, boost economic growth and, in some cases, enhance the food security of both farm and nonfarm households.

Public agricultural research and development (R&D) investments

As mentioned earlier, China's public agricultural R&D expenditure has risen considerably in recent decades but was still only four-fifths of the Asia-Pacific average in 2008. It has been shown in general that the marginal returns from boosting such levels of public investment in most developing countries are extremely high (Rao, Hurley and Pardey 2012; FAO 2012). The evidence from Brazil is particularly compelling: during the 1980s and 1990s Brazil invested more than four times as intensely as China in public agricultural R&D as a percent of national agricultural GDP. It is therefore not surprising that Brazil's outputs of both crop

and livestock products have more than doubled since the early 1990s, and its food self-sufficiency has been boosted commensurately. And by biasing that research toward labor-saving technologies, that investment also helped farmers adjust to rising rural wages – something that is becoming more pressing also in China as the supply of under-employed labor in rural areas shrinks (Zhang, Yang and Wang 2011).

Raising agricultural R&D spending is clearly something China can choose to do if it wishes to reduce its food self-sufficiency decline. In addition to also boosting national income growth, such investments would tend to lower domestic consumer prices for some foods and so would benefit not only farmers but also net buyers of those foods, thereby contributing to both the availability and access dimensions of food security. This contrasts with food import restrictions, which raise domestic prices and thus benefit net sellers of food *but at the expense of net buyers of food*. More people will be harmed than helped by such a policy measure now more than half of China's workers are employed in urban areas and barely one-quarter still work on farms (World Bank 2012), and Chinese households below the $1.25 international poverty line are net buyers of food on average (Anderson, Ivanic and Martin 2014, Table 1).

To illustrate this point, we have modelled increases in total factor productivity that would be required in Chinese agriculture for the country (a) to achieve the same overall self-sufficiency rate in 2030 as with the above import restrictions (94 percent) and, even more ambitiously, (b) to return to the same overall agricultural self-sufficiency as in 2007, namely 97 percent.

To achieve the overall agricultural self-sufficiency rate of 94 percent as in the above import-restricting scenario, a cumulative 33 percent improvement in agricultural TFP for China over the period to 2030 is simulated. Results in column 4 of Table 3 indicate that some of the products, particularly meats, would not achieve 100 percent self-sufficiency as when protected by the high import restrictions of the previous scenario, but self-sufficiency rates for oilseeds, sugar and other crops would be higher in this scenario than the previous one.

To achieve the more ambitious target of returning China's overall agricultural self-sufficiency rate to its 2007 level, a 59 percent cumulative improvement in agricultural TFP over the period to 2030 is modelled. This magnitude of productivity increase slightly over-achieves self-sufficiency in cereals and fully achieves it for meat and milk products, with other sectors also seeing increased self-sufficiency rates (final column of Table 3). Since it generates higher incomes it leads to higher volumes of various foods consumed by

households in China, as shown in Figure 2. That is, this indicator of national food security is boosted, in contrast to its deterioration in the import protection scenario.

While these cumulative increases in agricultural TFP of 33 or 59 percent may seem high, recall that they are spread over our 23-year projection period. The annual rates required would be only a little over 1 or 2 percent more than in the conservative growth scenario. These are not excessive by historical standards – see, for example, Alston, Babcock and Pardey (2010) and Fuglie, Wang and Ball (2012).

Not surprisingly, all of the above policies would reduce the relative importance of agricultural imports in China's total import bundle. In 2030, agricultural imports account for 13 percent of total imports in the main simulation, but this reduces to 10 percent with the high import restrictions scenario, and to 6 and 4 percent in the two higher agricultural productivity growth scenarios (final row of Table 4).

In contrast to the agricultural protection scenario, increases in agricultural productivity offer the opportunity not only to improve agricultural self-sufficiency rates but also to raise overall levels of both farm production and national economic welfare. While the increases in import restrictions are estimated to reduce real GDP by 0.9 percent, an increase in agricultural TFP of 33 (or 59) percent raises estimated real GDP by 4.5 (or 7) percent.[5]

Investments in rural infrastructure and human capital

Poor infrastructure such as rural roads adds to the cost of farm inputs, and also to the gap between the farm-gate and market prices of outputs. It thereby depresses farmer incentives and reduces consumers' economic access to food. So too do poor-quality telecommunications in rural areas, through raising the costs of such things as price information in distant markets and e-banking and farm credit. Better rural infrastructure also improves the opportunities for farm household members to earn part-time incomes off the farm by lowering commuting costs (Fan and Zhang 2004). Experiences in other Asian countries show that part-time off-farm earning opportunities for farm household members can reduce rural poverty and the farm-nonfarm income gap – and without reducing farm production greatly, thanks to the capacity to move to labor-saving techniques as rural wages rise (Otsuka, Estudillo and Sawada 2009).

China has been investing vast sums in infrastructure in recent decades, but whether there have been sufficient investments flowing into rural areas to ensure its marginal rate of

[5] In these faster TFP scenarios, we have ignored the cost of the research that might be required to boost farm productivity, but past experience suggests that cost would be small relative to the national gains.

return is driven down to that from further urban infrastructure investment is a moot point. Fan and Chan-Kang (2008), for example, examine returns from investments in local as compared with national roads in China. Their study suggests the benefit-cost ratio for local roads are four times greater than for highways. That does not mean rural people would not benefit from major highway networks though: Roberts et al. (2012) estimate that such investments could boost Chinese real incomes by 6 percent in the short run without increasing rural-urban income inequality. Even so, highway networks between pairs of major cities are found to benefit the larger city more (Faber 2012). The allocation of infrastructure investment funds even among rural areas may be less than optimal. Fan and Zhang (2004) found that the lower productivity in China's western regions could be explained by the lower levels there of rural infrastructure, education, and science and technology. They concluded that improving both the level and efficiency of public capital in the west would be essential to narrow the productivity difference between it and other regions of China.

As for education and health investments, they tend to be lower in quality as well as quantity in rural versus urban areas. This means the productivity of future farm workers and managers will be lower than is socially optimal, and farm production will be less. But it also means those wishing to work part- or full-time in nonfarm jobs will be less successful in finding and thriving in such positions and thus in repatriating earnings back to their relatives still working the farm. Both outcomes lower national economic growth and contribute to the farm-nonfarm household income gap (Rozelle et al. 2005).

4.3 Freeing up factor markets

Factor markets are still far from free of restrictions in China, which means productive factors are used inefficiently. Making it easier for rural workers to access urban jobs (relaxing the *Hukou* household registration system) would go a long way to reducing the rural-urban income gap (Zhao 1999; Lin, Wang and Zhao 2004; Hertel and Zhai 2006),[6] and would increase the payoff from boosting the above-mentioned under-investments in rural education, health and infrastructure.

Current regulations that prohibit the sale of farm land are also a constraint. As wages rise there is plenty of scope for mechanization to improve labor productivity, but far more so

[6] A recent study of Russia for the period 1995-2010, found that when barriers that hindered internal labor migration in the 1990s were eliminated, the economies of the poorer Russian regions grew out of their poverty trap and their income levels converged toward those in more-affluent Russian regions in the first decade of this century (Guriev and Vakulenko 2013).

where economies of farm land size can be exploited. That is, farm land consolidation is required to allow more efficient use of farm machinery. True, land rental markets have developed to alter the operational size of some farms, but least so in areas where tenure security is weakest.

Markets in China for water use in farming are even less developed than markets for land use. Whenever farmers are paying less than the true cost of irrigation water, they will be over-using it and thereby making less available for urban households and industries. Once water markets are developed with well-defined access, they provide greater certainty and hence more asset security for farmers (and other users).

The absence of tight land and water tenure rights makes it more difficult for farmers to access credit on reasonable terms requiring collateral. This adds to the cost of food production in China. Again farmers have found innovative ways around their credit constraints, such as renting rather than buying farm machinery (Christiaensen 2013), but freeing up capital markets so that more rural micro-credit institutions could develop would reduce this constraint on growth outside urban areas.

Improving the efficiency of markets for all key factors of agricultural production – capital, labor, land and water – and for intermediate inputs such as fertilizer are important ways to improve not only current farm incomes but also the pathways for farm households to accumulate wealth. Without that security, farmers will be less inclined to support the government's other economic reform efforts (Morrow and Carter 2013).

4.4 Reversing the growth in distortions to farm product markets

As mentioned above in Section 2, the reforms to market-distorting policies that China undertook in the 1980s and 1990s to reduce the discouragement of farm production have contributed to national economic growth and welfare in addition to boosting rural incomes. However, the switching since then to increasingly positive assistance to farming, and to raising some food prices above levels at the country's border, is lowering national economic growth and welfare and reducing economic access to food for all but those farm households that are net sellers of foods that are protected from import competition. True, higher-income countries in decades past followed a similar agricultural protection growth path (Anderson 2009b); but they have since come to realize that this path is not very effective in closing the farm-nonfarm income gap. Moreover, reversing that process has proven to be very painful politically for the governments of those countries – which is all the more reason not to follow

that policy path in the first place. Yet policy reversals have happened, and they have been sustained. For the OECD membership as a whole, their average rate of assistance to farmers is now less than half what it was a generation ago, and in several countries it is below China's. Indeed in a few cases price-distorting assistance to farmers is now close to zero (Figure 3).[7]

A reluctance to abandon the use of trade-restricting measures sometimes stems from concerns about the reliability of import suppliers. China has already begun to address this by contracting foreign farmers to supply Chinese markets with specific products. An example is the involvement of Heilongjiang Province's Beidahuang Land Cultivation Group in southern Argentina. Reportedly the company will invest US$1.5 billion over 20 years to develop over 230,000 hectares of arable land, using a 3000 hectare experimental farm there to develop more-efficient technologies and corn and soybean crop varieties for the region's local farmers (Cardenal and Araújo 2013). More such investments in land-abundant countries in Latin America, Africa and elsewhere can further enhance the security of supplies at lower cost than by protecting Chinese farmers from import competition for such land- and water-intensive crops.

5. In search of more-efficient and more-equitable food security measures: a role for generic social protection instruments?

Fortunately for China, there are politically feasible alternative policy instruments to market-distorting policies that are more efficient and effective in improving national food security, reducing the gap between farm and nonfarm household incomes, and reducing extreme poverty. The information and communication technology (ICT) revolution recently has made it far cheaper and easier than in the past to target income supplements, as and when needed, to the poorest and hence most food-insecure households, whether they be urban or rural. Such payments were unaffordable in developing countries in the past because of the fiscal outlay involved and the high cost of administering small handouts. However, the ICT revolution has made it possible for conditional cash transfers to be provided electronically as direct assistance to even remote households who have access to electronic banking.

[7] On when and how Australia and New Zealand moved to farming without subsidies or protection, see Anderson, Lloyd and MacLaren (2007, 2009).

Evidence of the practical workability of such social safety net programs in developing countries is growing rapidly. Hoddinott and Wiesman (2010) explore such programs in Mexico, Honduras and Nicaragua, and conclude that exposure to these programs raised both the quantity of calories consumed and the quality of the recipients' diets – and the benefits were most pronounced among the poorest households. Adado and Bassett (2012) assess programs in six southern African countries, and they too find substantial improvements in the quantity and quality of food consumed by recipients in poor households there. They also note that the benefits could be even greater with complementary activities such as nutrition counselling and micro-nutrient supplements. Following a survey of results on consumption from a wide range of Latin American countries, Fiszbein and Schady (2009, Ch. 4) conclude that conditional cash transfers have had substantial positive impacts on consumption and on poverty alleviation. Prospective offsetting effects that were a source of concern when such programs were created do not appear to have been sufficiently large as to offset the benefits of the transfer. For example, the schemes do not seem to reduce the labour supply of adults or to crowd out private transfers; and some programs increase productive investment, which boosts and sustains the impact on poverty. The latter is further supported by evidence from Mexico reported in Gertler, Martinez and Rubio-Codina (2012), who find that one-quarter of cash transfers were invested in productive activities, thereby ensuring sustained higher living standards even after such programs end. While the political challenge of switching from market-distorting trade measures to domestic policy instruments for addressing non-trade domestic concerns is evidently non-trivial, this emergence in a wide range of developing countries of new, lower-cost social protection mechanisms involving conditional cash e-transfers is encouraging.

China is more capable than most developing countries in being able to effectively deliver social protection payments electronically to its rural households. Huang, Wang and Rozelle (2013) point out that the government has set up a special account for each household in a local bank, and an annual allocation is made just prior to the planting season to each account from the Agricultural Financial Subsidy Fund. This provides China a way to avoid going any further down the agricultural protection growth path and thereby repeating the economically costly mistakes of higher-income countries,[8] or going as far down the producer and consumer subsidy pathway that India has taken – and then having to reverse either of

[8] Other developing countries also are taking this expensive path. Indonesia, for example, introduced a new Food Law in late 2012 that broadens its food self-sufficiency beyond rice to several other key foods, the cost of which could be huge if it is fully implemented (Anderson and Strutt 2013b).

those processes, the political cost of which would be larger the longer such programs are in place. Moreover, such cash transfers would have an even more favourable national food security impact if combined with an increase in agricultural R&D investment.

References

Adato, M. and L. Bassett (2012), 'Cash Transfers, Food Consumption, and Nutrition', Ch. 8 in their *Social Protection and Cash Transfers to Strengthen Families Affected by HIV and AIDS*, Washington DC: International Food Policy Research Institute.

Alston, J.M., B.A. Babcock and P.G. Pardey (eds.) (2010), *The Shifting Patterns of Agricultural Production and Productivity Worldwide*, Midwest Agribusiness Trade Research and Information Center, Iowa State University, Ames IA.

Anderson, K. (2009a), 'Distorted Agricultural Incentives and Economic Development: Asia's Experience', *The World Economy* 32(3): 351-84, March.

Anderson, K. (ed.) (2009b), *Distortions to Agricultural Incentives: A Global Perspective, 1955–2007*, London: Palgrave Macmillan and Washington DC: World Bank.

Anderson, K., M. Ivanic and W. Martin (2014), 'Food Price Spikes, Price Insulation, and Poverty', in *The Economics of Food Price Volatility***,** edited by J.-P. Chavas, D. Hummels and B. Wright, Chicago and London: University of Chicago Press for NBER (forthcoming).

Anderson, K., M. Kurzweil, W. Martin, D. Sandri and E. Valenzuela (2008), 'Measuring Distortions to Agricultural Incentives, Revisited', *World Trade Review* 7(4): 1-30, October.

Anderson, K., P.J. Lloyd and D. MacLaren (2007), 'Distortions to Agricultural Incentives in Australia Since World War II', *The Economic Record* 83(263): 461-82, December.

Anderson, K., P.J. Lloyd and D. MacLaren (2009), 'Australia and New Zealand', Ch. 5 in *Distortions to Agricultural Incentives: A Global Perspective, 1955–2007*, edited by K. Anderson, London: Palgrave Macmillan and Washington DC: World Bank.

Anderson, K. and S. Nelgen (2012), 'Trade Barrier Volatility and Agricultural Price Stabilization', *World Development* 40(1): 36-48, January.

Anderson, K. and S. Nelgen (2013), *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011*, data spreadsheet at www.worldbank.org/agdistortions

Anderson, K. and A. Strutt (2013a), 'Emerging Economies, Productivity Growth, and Trade with Resource-Rich Economies by 2030', ANU Working Paper in Trade and Development 2013/17, Canberra, November.

Anderson, K. and A. Strutt (2013b), 'Asia's Growth to 2030: Implications for Indonesia', paper presented at the 16th Annual Conference on Global Economic Analysis, Shanghai, 12-14 June.

Anderson, K. and E. Valenzuela (2008), *Global Estimates of Distortions to Agricultural Incentives, 1955 to 2005*, data spreadsheet at www.worldbank.org/agdistortions

ASTI (Agricultural Science and Technology Indicators) (2013), *ASTI Database*, Washington, D.C.: International Food Policy Research Institute. http://www.asti.cgiar.org/data

Cardenal, J. and H. Araújo (2013), *China's Silent Army*, New York: Crown.

Christiaensen, L. (2013), 'When China Runs Out of Farmers', Ch. 17 in *Food or Consequences: Food Security and Global Stability***,** edited by C.B. Barrett, London

and New York: Oxford University Press.Faber, B. (2012), 'Trade Integration, Market Size and Industrialization: Evidence from China's National Trunk Highway System', CEP Discussion Paper, London School of Economics, London.

Fan, S., and C. Chan-Kang (2008), 'Regional Road Development, Rural and Urban Poverty: Evidence from China', *Transport Policy* 15(5): 305-14.

Fan, S., and P. Hazell (2001), 'Returns to Public Investments in the Less-Favored Areas of India and China', *American Journal of Agricultural Economics* 83(5): 1217-22.

Fan, S. and K. Qian (eds.) (2005), *Agricultural R&D and Poverty Reduction in China*, Beijing: China Agricultural Publishing House [in Chinese].

Fan, S. and X. Zhang (2004), 'Infrastructure and Regional Economic Development in Rural China', *China Economic Review* 15(2): 203-14.

FAO (2012), *The State of Food and Agriculture: Investing in Agriculture for a Better Future*, Rome: FAO.

Fiszbein, A. and N. Schady (with F.H.G. Ferreira, M. Grosh, N. Kelleher, P. Olinto and E. Skoufias) (2009), *Conditional Cash Transfers: Reducing Present and Future Poverty*, Policy Research Report, Washington DC: World Bank.

Flaherty, K., G.-J. Stads and A. Srinivasacharyulu (2013), 'Benchmarking Agricultural Research Indicators Across Asia–Pacific', Washington DC: International Food Policy Research Institute.

Fuglie, K.O., S.L. Wang and V.E. Ball (eds.) (2012), *Productivity Growth in Agriculture: An International Perspective*, London: CABI.

Gertler, P., S. Martinez and M. Rubio-Codina (2012), 'Investing Cash Transfers to Raise Long-Term Living Standards', *American Economic Journal: Applied Economics* 4(1): 164-92.

Guriev, S. and E. Vakulenko (2013), 'Breaking Out of Poverty Traps: Internal Migration and Interregional Convergence in Russia', CEPR Discussion Paper 9675, London, October.

Hertel, T.W. (ed.) (1997), *Global Trade Analysis: Modeling and Applications*, Cambridge and New York: Cambridge University Press.

Hertel, T.W. and F. Zhai (2006), 'Labor Market Distortions, Rural-Urban Inequality and the Opening of China's Economy', *Economic Modelling* 23: 76-109.

Hoda, A. and A. Gulati (2013), 'India's Agricultural Trade Policy and Sustainable Development', ICTSD Issue Paper 49, Geneva: International Centre for Trade and Sustainable Development, September.

Hoddinott, J. and D. Wiesmann (2010), 'The Impact of Conditional Cash Transfer Programs on Food Consumption', Ch. 11 in M. Adato and J. Hoddinott (eds.), *Conditional Cash Transfers in Latin America*, Baltimore MD: Johns Hopkins University Press for IFPRI.

Huang, J., S. Rozelle, W. Martin and Y. Liu (2009), 'China', Ch. 3 in *Distortions to Agricultural Incentives in Asia***,** edited by K. Anderson and W. Martin, Washington DC: World Bank.

Huang, J., X. Wang and S. Rozelle (2013), 'The Subsidization of Farming Households in China's Agriculture', *Food Policy* 41: 124-32.

Jensen, R.T. and N.H. Miller (2011), 'Do Consumer Price Subsidies Really Improve Nutrition?', *Review of Economics and Statistics* 93(4): 1205-23.

Jha, R., R. Gaiha, M.K. Pandey and N. Kaiker (2013), 'Food Subsidy, Income Transfer and the Poor: Comparative Analysis of the Public Distribution System in India's States', *Journal of Policy Modeling* 35: 887-908.

Kaushal, N. and F. Muchomba (2013), 'How Consumer Price Subsidies Affect Nutrition', NBER Working Paper 19404, Cambridge MA, September.

Kishore, A., P.K. Joshi and J. Hoddinott (2014), 'India's Right to Food Act: A Novel Approach to Food Security', Ch. 3 in IFPRI's *Global Food Policy Report 2013*, Washington DC: International Food Policy Research Institute.

Lin, J.Y., G. Wang and Y. Zhao (2004), 'Regional Inequality and Labor Migration in China', *Economic Development and Cultural Change* 52(3): 587-604, April.

Martin, W. and K. Anderson (2012), 'Export Restrictions and Price Insulation During Commodity Price Booms', *American Journal of Agricultural Economics* 94(2): 422-27, January.

Morrow, J. and M. Carter (2013), 'Left, Right, Left: Income, Learning, and Political Dynamics', NBER Working Paper 19498, Cambridge MA, October.

Narayanan, B.G., A. Aguiar and R.A. McDougall (eds.) (2012), *Global Trade, Assistance, and Production: The GTAP 8 Data Base*, West Lafayette: Center for Global Trade Analysis, Purdue University. www.gtap.agecon.purdue.edu/databases/v8/v8_doco.asp

OECD (2013), *Producer and Consumer Support Estimates* Database, www.oecd.org (annually for 1986–2012).

Otsuka, K., J.P. Estudillo and Y. Sawada (eds.) (2009), *Rural Poverty and Income Dynamics in Asia and Africa,* London and New York: Routledge.

Pursell, G. A. Gulati and K. Gupta (2009), 'India', Ch. 10 in *Distortions to Agricultural Incentives in Asia***,** edited by K. Anderson and W. Martin, Washington DC: World Bank.

Rao, X., T.M. Hurley and P.G. Pardey (2012), 'Recalibrating the Reported Rates of Return to Food and Agricultural R&D', Staff Paper P12-8, Department of Applied Economics, University of Minnesota, St. Paul, September.

Ravallion, M. and S. Chen (2007), 'China's (Uneven) Progress Against Poverty', *Journal of Development Economics* 82: 1-42.

Roberts, M., U. Deichmann, B. Fingleton and T. Shi (2012), 'Evaluating China's Road to Prosperity: A New Economic Geography Approach', *Regional Science and Urban Economics* 42: 580-94.

Rozelle, S., Q. Li, L. Zhang and A. de Brauw (2005), 'Labor Market Emergence and Returns to Education in Rural China', *Review of Agricultural Economics* 27(3): 418-24.

Sandri, D., E. Valenzuela and K. Anderson (2006), 'Compendium of National Economic and Trade Indicators by Region, 1960 to 2004', Agricultural Distortions Research Project Working Paper 01, World Bank, Washington DC, October. Posted at www.worldbank.org/agdistortions

Sicular, T., Y. Ximing, B. Gustafsson, and S. Li (2007), 'The Urban-Rural Income Gap and Inequality in China', *Review of Income and Wealth* 53(1): 93–126.

Tiwari, S., E. Skoufais and M. Sherpa (2013), 'Shorter, Cheaper, Quicker, Better: Linking Measures of Household Food Security to Nutritional Outcomes', Policy Research Working Paper 6584, World Bank, Washington DC, August.

World Bank (2012), *World Development Report 2013: Jobs,* Washington DC: World Bank.

Zhao, Y. (1999), 'Labor Migration and Earnings Differences: The Case of Rural China', *Economic Development and Cultural Change* 47(4): 767-82.

Zhang, X. and S. Fan (2004), 'Public Investment and Regional Inequality in Rural China' *Agricultural Economics* 30(2): 89-100.

Zhang, X., J. Yang and S. Wang (2011), 'China Has Reached the Lewis Turning Point', *China Economic Review* 22(4): 542-54.

Table 1: Nominal and relative rates of assistance (NRA and RRA) to agriculture,[a] China, 1981 to 2012

(percent)

	1981-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-12
NRA ag. tradables	-45	-36	-14	7	6	6	18
NRA non-ag.	42	28	25	10	5	4	4
RRA	**-61**	**-50**	**-31**	**-3**	**1**	**2**	**14**

[a] The RRA is defined by Anderson et al. (2008) as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage nominal rates of assistance for the tradables parts of the agricultural and non-agricultural sectors, respectively (where the NRA is the percentage by which producer gross returns have been raised by market-distorting government policies such as import restrictions).

Source: Calculated from Anderson and Valenzuela (2008), which draws on estimates for China reported in Huang et al. (2009), and updated using Anderson and Nelgen (2013), which draws on OECD (2013).

Table 2: Agricultural and food indicators for China, 2007 and the baseline and alternative growth projection scenarios for 2030

(percent)

	2007	2030 baseline with faster China/India growth	2030 baseline with slower China/India growth
Share of world ag+food exports (%)	3.9	0.4	0.4
Share of world ag+food imports (%)	4.3	28.6	20.2
Agricultural[a] self-sufficiency (%)	97	87	88
Real per capita cons'm index[b]	100	250	176

[a]Agricultural self-sufficiency ratio is the percentage by which domestic production exceeds consumption.

[b] Real food and agricultural consumption refers to the quantity purchased, valued at constant (2007) prices, and so accounts for food diet upgrading away from staples to higher-priced foods as well as quantity responses to domestic consumer relative price changes.

Source: Authors' model results.

Table 3: China's self-sufficiency in farm products, 2007 and 2030 without and with import bans on rice, wheat, meats and milk products and faster farm productivity growth

(percent)

	2007	2030 with slower China/India and global primary product TFP growth	2030 with slower China/India growth plus selected China food import bans	2030 with slower China/India growth plus 33% extra agricultural TFP growth	2030 with slower China/India growth plus 59% extra agricultural TFP growth
***Rice**	101	95	100	99	103
***Wheat**	103	97	100	101	107
Coarse grains	105	98	98	101	103
Fruit & veg	102	96	95	99	102
Oilseeds	56	35	32	48	56
Vegetable oils	88	61	55	82	92
Sugar	96	79	74	93	98
Cotton	74	66	64	75	78
Other crops	132	45	40	79	123
***Beef & sheepmeat**	94	89	100	94	100
***Other meats**	101	37	100	88	99
***Dairy products**	97	75	100	94	101

* Indicates sectors subject to the self-sufficiency policy.

Source: Authors' model results.

Table 4: Agricultural import shares and agricultural tariff rates for China, 2030 including slower China and India and primary product TFP growth, and 2030 after policy changes

(percent)

	Share of agr. imports, 2030 with slower China/India growth	**Share of agr. imports, 2030 with slower growth plus selected food import bans**	**Share of agr. imports, 2030 with slower growth plus 33% higher agric. TFP growth**	**Share of agr. imports, 2030 with slower growth plus 59% higher agric. TFP growth**	**2030 tariff rates, China, with no policy change**	**2030 tariff rates, China with selected import bans**	***China's out-of-quota bound tariff at WTO***
***Rice**	1	0	0	0	2	196	*65*
***Wheat**	0	0	0	0	2	114	*65*
Coarse grains	0	1	0	0	2	2	*65*
Fruit & veg	8	16	5	3	7	8	*11*
Oilseeds	11	15	24	35	2	2	*3*
Vegetable oils	18	30	18	14	2	2	*3*
Sugar	1	2	1	1	0	0	*50*
Cotton	3	4	5	8	4	4	*40*
Other crops	2	2	2	3	8	8	*na*
***Beef & sheepmeat**	1	0	1	1	11	255	*12*
***Other meats**	26	0	12	4	8	164	*12*
***Dairy products**	4	0	2	1	8	159	*11*
Other+processed food	25	30	28	30			
TOTAL	100	100	100	100			
Share of imports of all products	13	10	6	4			

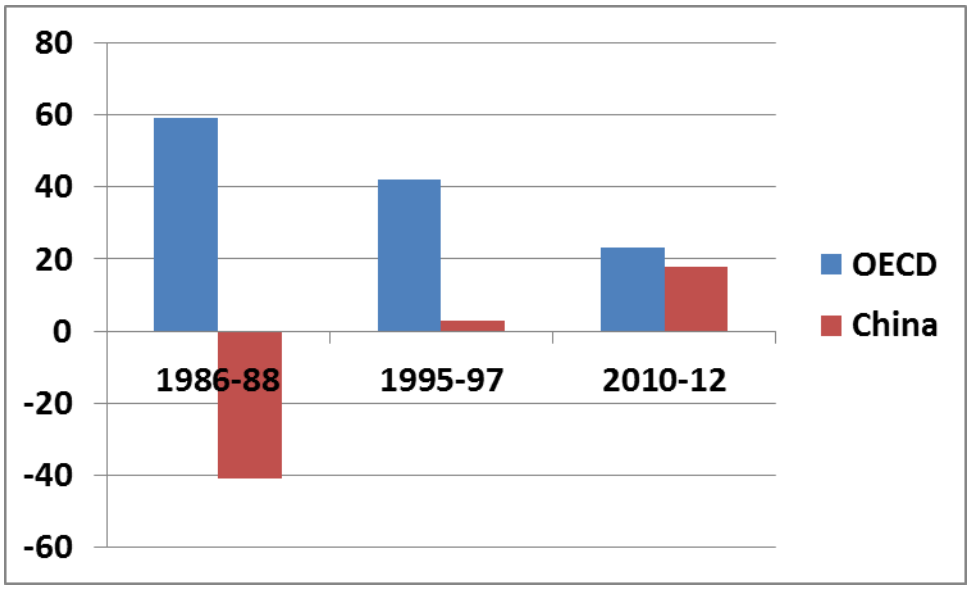
* Indicates sectors subject to the self-sufficiency policy.

Source: Authors' model results.

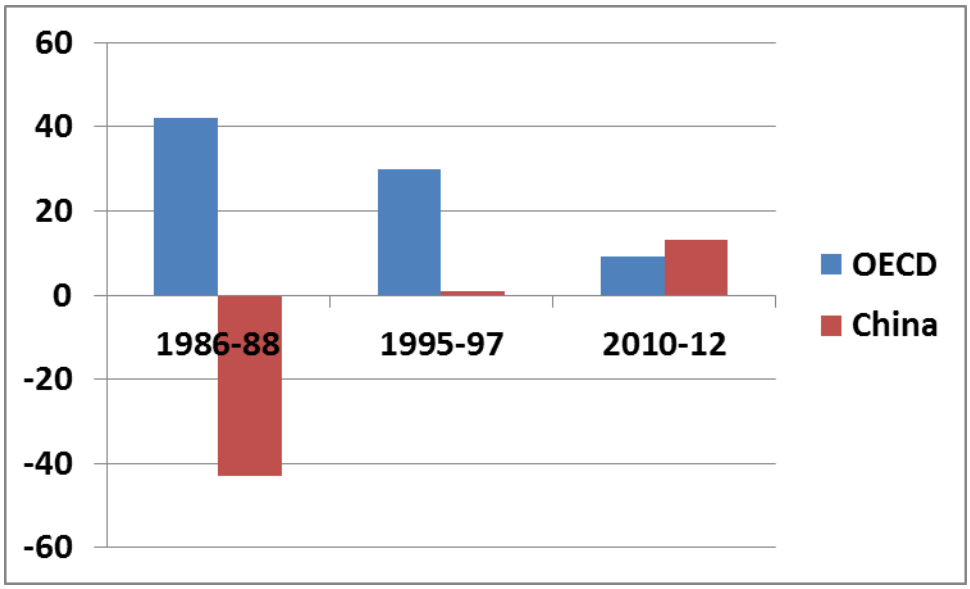
Figure 1: Nominal rate of assistance to agriculture and consumer tax equivalent on farm products, China and OECD countries, 1986 to 2012

(percent)

(a) Nominal rate of assistance to agriculture



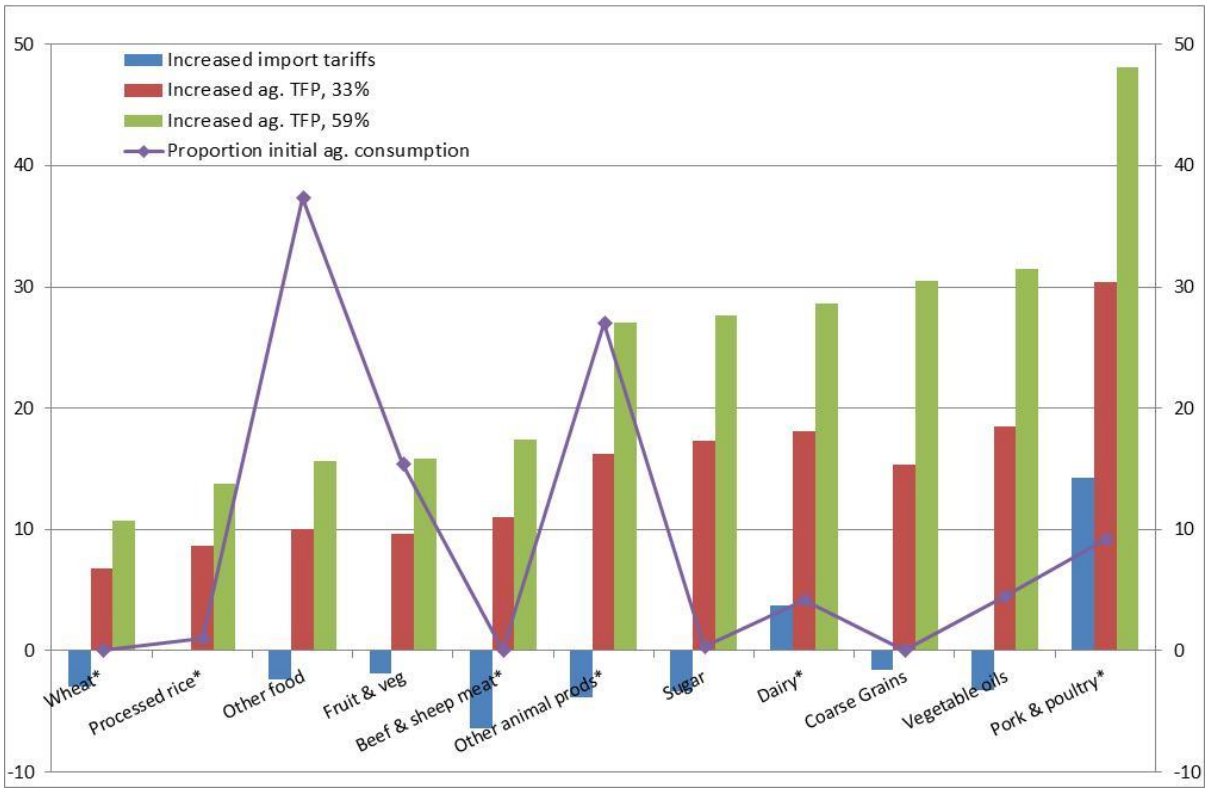
(b) Consumer tax equivalent on farm products



Source: Calculated from Anderson and Valenzuela (2008) for 1986-88 and from OECD (2013) for more-recent numbers.

Figure 2: Extra changes in real household consumption of farm products per capita in China in response to selected food import bans or increased agricultural TFP growth, 2030

(percent)

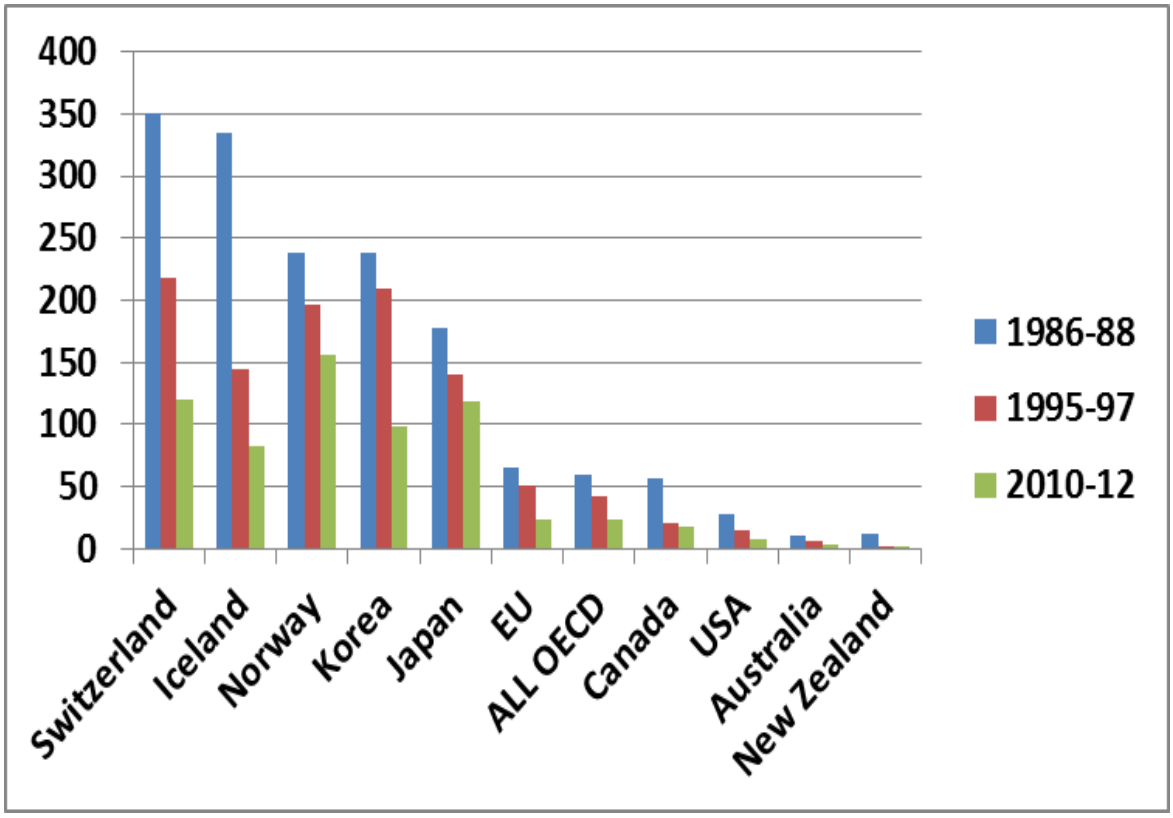


* Indicates sectors subject to the self-sufficiency policy.

Source: Authors' model results.

Figure 3: Nominal rate of assistance to agriculture[a] in major OECD countries, 1986 to 2012

(percent)



[a] NRA = 100(NAC - 1), where NAC is the OECD's nominal assistance coefficient estimate

Source: OECD (2013)

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