From taxing to subsidizing farmers in China post-1978
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Abstract

Purpose – The purpose of this paper is to document the pace and extent to which China’s policy regime has transitioned over the past four decades from explicitly and implicitly taxing to subsidizing its farmers relative to its producers of other tradable goods; to present projections of the world economy to 2030 that suggest China will continue to become more food import-dependent under current policies and productivity growth rates; and to explore alternative policy instruments for remaining food secure and ensuring that farmers are not losers from economic growth.

Design/methodology/approach – The data used to estimate the extent of distortions to producer incentives come from freely available World Bank and OECD sources that allow direct comparisons of China’s policy developments with those of more- and less-advanced economies.

Findings – The estimates of nominal and relative rates of assistance to farmers reveal that China has made the transition from negative to positive assistance to farmers far faster than an average developing country, and almost as fast as its Northeast Asian neighbors did in earlier decades at similar levels of real per capita incomes. That helped to ensure China remained food self-sufficient during the first two decades of reform; but self-sufficiency is now declining and is projected to continue to do so over the next decade under current policies.

Research limitations/implications – Preventing food self-sufficiency from declining further by increasing agricultural protection would be very costly, and is now unnecessary, thanks to the information and communication technology revolution that enables the government to directly support the well-being of poor farm households with conditional cash transfers.

Originality/value – This review of indicators of distortions to agricultural incentives in China is based on estimates of nominal and relative rates of assistance and consumer tax equivalents that are in the public domain. Its originality is in presenting the estimates for China in a comparative perspective, showing how they have evolved over time and as real per capita incomes have grown, and relating that to developments in China’s self-sufficiency in agricultural and food products. The paper also points to more-efficient ways of achieving societal objectives than using policy instruments that distort producer and consumer prices.

Keywords Agricultural support policies, China’s economic growth, Food security, Multiple exchange rates

Paper type General review

When China began its economic reform program at the end of 1978, agriculture was among the highest priorities. A striking feature of the reform period is that China managed to stay within one percentage point of being 100 percent self-sufficient in food and agricultural products in each of the decades of the 1980s and 1990s, just as in the 1960s and 1970s – despite massive industrialization that caused the shares of agriculture in China’s economy to plummet during 1980-2015, from above 40 percent to below 10 percent for GDP and exports, and from more than 70 percent to less than 30 percent for employment. Such a trade outcome is virtually unprecedented for a rapidly industrializing, relatively densely populated market economy.

Certainly, institutional and technological innovations contributed greatly to China being able to maintain food self-sufficiency. The initial institutional innovation of gradually replacing collective farming with the household responsibility system, together with the provision of technological innovations, accounted for the majority of China’s massive farm output growth during 1978-1984 (Lin, 1991, 1992). But price, trade and foreign exchange rate policy reforms also contributed. Farmers had been extremely heavily taxed up to the 1980s. Those disincentives were gradually removed as part of the policy reforms. That was
sufficient to encourage farm production to keep pace with domestic consumption growth through to the turn of the century. Since then, however, import dependence has grown. China’s self-sufficiency slipped to 98 percent in 2000-2004, and its trade specialization index (net exports divided by exports plus imports of farm products) fell from +0.1 in both the 1980s and the 1990s to −0.3 during 2000-2016 (Sandri et al., 2006; WTO, 2017). This growing import dependence has prompted the Chinese Government to increasingly assist its farmers during the past two decades.

The purpose of this paper is threefold: to summarize the evidence on this policy transition in China, from taxing to subsidizing farmers and from subsidizing to taxing food consumers; to present projections of the world economy to 2030 that suggest China will continue to become more food import-dependent under current policies and productivity growth rates; and to make the case that it is no longer necessary to use price and trade policy instruments to achieve the objectives of remaining food secure and ensuring that farmers are not losers from economic growth.

The paper begins by defining the indicators used to reveal the extent to which a sector is taxed or subsidized. It then reports annual estimates of those indicators from 1981 to 2015. Estimated consequences of continuing those distortions to 2030, or of raising them enough to retain self-sufficiency on key foodstuffs, are then provided from recent GTAP model simulations. The final section summarizes the findings and suggests ways of achieving more cost effectively the fundamental objectives of national food security and less rural-urban income inequality.

Indicators of national distortions to farmer incentives and consumer prices

A common indicator of government interventions in agricultural markets, used in a comprehensive World Bank project (Anderson 2009), is the Nominal Rate of Assistance (NRA). The NRA for each farm product is defined as the percentage by which government policies have directly raised gross returns to farmers above what they would be without the government’s intervention (or lowered them, if NRA < 0)[1]. These individual product estimates can then be used to estimate a weighted average NRA for all products, using the value of production at undistorted prices as weights (unlike the producer support estimate and single commodity transfers computed by OECD (2017), which are expressed as a percentage of the distorted value of output).

Also computed for that World Bank project is a production-weighted average NRA for non-agricultural tradables, for comparison with that for agricultural tradables via the calculation of a percentage relative rate of assistance (RRA), defined as $\text{RRA} = 100 \times \frac{(100 + \text{NRAag}^t)/(100 + \text{NRAnonag}^t) - 1}{1}$, where \text{NRAag}^t and \text{NRAnonag}^t are the percentage NRAs for the tradable parts of the agricultural and non-agricultural sectors, respectively[2]. Since the NRA cannot be less than −100 percent, if producers are to earn anything, neither can the RRA. And if both of those sectors are equally assisted, the RRA is 0. This measure is useful in that if it is below (above) 0, it provides an internationally comparable indication of the extent to which a country’s sectoral policy regime has an anti- (pro-) agricultural bias.

In calculating the NRAs for each sector of the economy, the methodology outlined in Anderson et al. (2008) also includes the implicit trade tax distortions generated by dual exchange rates, drawing on the methodology of Dervis et al. (1981). China adopted a dual exchange rate system in 1979, whereby earners of foreign exchange were required to convert a portion of it at the overvalued official exchange rate but were able to retain the rest for converting at a legal secondary market rate that was always more attractive to them than the official rate. This system created distortions analogous to an import tariff and an export tax at a rate that was higher, the smaller the retention ratio and the larger the gap between the two rates. The retention ratio was gradually raised over the 1980s and...
early 1990s, which drew the two rates together. By 1994, the scheme was replaced by a single foreign exchange rate. Details of how this policy contributed to distortions to prices of tradables in China during 1981-1993 are available in Huang et al. (2009).

Empirical estimates of distortions to farmer incentives in China
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. 119-124). Past farm policies took numerous forms, including export restrictions and requirements to deliver part of the crop to the government at below-market prices (Sicular, 1988; Shea, 2010), all of which are reflected in estimated NRAs that are negative. For some import-competing industries, though, restrictions on imports meant they enjoyed positive NRAs. Examples include milk and sugar. The resulting NRAs are shown for key farm industries and for all of agriculture in Table I. China’s NRA for the sector as a whole averaged −40 percent in the 1980s, −6 percent in the 1990s, 8 percent in the first decade of this century and above 15 percent in the current decade.

Agriculture was also discouraged indirectly last century, by manufacturing protection policies and exchange rate overvaluation. When taken together, it meant the price of farm relative to non-farm tradable products within China in the 1980s was only half what it was at the country’s border. That is, the RRA to agriculture was around −50 percent. Indeed, it had been as low as −61 percent in 1981-1984 (Table I). Thanks to policy reforms since then, the RRA gradually approached 0 by 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. During those first two decades of reform, about one-sixth of the estimated RRA was due to the dual exchange rate system.

<table>
<thead>
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<tbody>
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<td>2</td>
<td>22</td>
<td>11</td>
<td>1</td>
<td>14</td>
<td>39</td>
<td>33</td>
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<td>−13</td>
<td>9</td>
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<td>45</td>
<td>12</td>
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<td>23</td>
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<td>5</td>
<td>15</td>
<td>64</td>
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<td>104</td>
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<td>0</td>
<td>−2</td>
<td>5</td>
<td>14</td>
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<td>16</td>
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<td>na</td>
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<td>0</td>
<td>−2</td>
<td>5</td>
<td>15</td>
<td>15</td>
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<tr>
<td>Milk</td>
<td>129</td>
<td>58</td>
<td>47</td>
<td>117</td>
<td>43</td>
<td>−5</td>
<td>33</td>
<td>82</td>
</tr>
<tr>
<td>NRA all agric.</td>
<td>−45</td>
<td>−36</td>
<td>−14</td>
<td>2</td>
<td>6</td>
<td>10</td>
<td>15</td>
<td>18</td>
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<tr>
<td>NRA non-agric.</td>
<td>42</td>
<td>28</td>
<td>25</td>
<td>10</td>
<td>5</td>
<td>4</td>
<td>4</td>
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<td>RRA</td>
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<td>−50</td>
<td>−31</td>
<td>−8</td>
<td>1</td>
<td>6</td>
<td>11</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes: The nominal rate of assistance (NRA) is defined as the percentage by which government policies have raised producer returns above what they would be without the government’s direct intervention in that industry or sector (or the percentage by which government policies have directly lowered returns, if the NRA is less than 0). The relative rate of assistance (RRA) is defined as 100 ×[(100 + NRAag)/(100 + NRAnonag) − 1], where NRAag and NRAnonag are the percentage nominal rates of assistance for the tradable parts of the agricultural and non-agricultural sectors, respectively. The NRAnonag after 2005 is assumed to be the same as in 2005. Almost one-third of the NRA, and one-sixth of the RRA, was due to foreign exchange rate distortions during 1981-1994 before the dual exchange rate system ended in 1994. See Anderson et al. (2008). *Weighted average of NRAs for all agricultural industries (including ones not shown), using production valued at undistorted price as weights

Sources: Compiled from Anderson and Nelgen (2013), which draws on estimates for China reported in Huang et al. (2009) for 1981-1994, and from producer single commodity transfers and aggregate nominal assistance coefficients in OECD (2017) for 1995-2016

Table I.
Nominal and relative rates of assistance (NRA and RRA) to agriculture, by product, China, 1981-2016
Other developing countries also reduced their disincentives toward agriculture over the past half century, but the pace of reform has been far faster for China than for an average developing country; China transitioned to positive RRAs from the start of the new millennium, whereas the average RRA for other developing countries as a group remains just below 0 (Figure 1).

Another comparison of interest is with East Asia’s other industrialized economies, which Anderson, Hayami and Others (1986) showed three decades ago to have also transitioned from negative to positive assistance to their farmers. Figure 2 shows China taxed its farmers far more than either South Korea or Taiwan at similar real income levels in earlier decades. It also reveals that in contrast to the less-advanced developing countries included in Figure 1, their transition to protection was even more rapid than was China’s.

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 in China. The reforms in the final two decades of the twentieth century also added to national economic growth and welfare by reducing inter-sectoral resource misallocation; and they reduced the extent to which growth in real incomes of urban households outpaced those of farm households.

Of concern, though, is China’s transition during the past two decades to subsidizing farmers relative to manufacturers. Indeed, the NRA to Chinese farmers is now almost as high as that for farmers in OECD countries (Figure 3). Total support for agriculture in 2014-2016 was 2.4 percent of GDP in China, which is four times higher than in OECD countries (OECD, 2017). China’s RRA is converging on the declining RRAs of its more-industrialized neighbors in Northeast Asia. That is, China’s farm and food policies are going in the opposite direction to those of OECD countries, where the willingness to tolerate the high costs of agricultural protection has waned over the past three decades.

![Figure 1.](image-url)

From taxing to subsidizing farmers

**Notes:** Weighted average RRA for 38 developing countries not including China, Korea, Taiwan or the transition economies of Eastern Europe and the former Soviet Union. The gross values of national agricultural production valued at undistorted prices are used as weights (see Anderson et al., 2008). The first period of estimates for China is 1981-1984, and the last period shown for other developing countries is 2010-2011.

**Sources:** Author’s compilation from Anderson and Nelgen (2013) for estimates to 2011, updated for China from OECD (2017).
This recent transition to positive RRAs in China is lowering the efficiency of resource use and thus national economic growth and welfare. This is for the opposite reason to the welfare loss from China’s twentieth century policies: instead of too few, there are now too many resources being retained in the farm sector. It is true that this transition may have contributed to reducing the gap between farm and non-farm household incomes, and to raising food self-sufficiency, but it has done so at the expense of national food security through lowering real incomes and raising domestic food prices for consumers. In 2014-2016, consumer food prices in China on average were 13 percent above those at the country’s border, with grain consumer prices more than 40 percent above and milk and sugar prices more than 80 percent above what they would have been with open markets (Figure 4). This directly affects the food security of the country’s poor because, on average for those living on less than $1.25 a day in China in recent years, 25 percent of their
expenditure has been on food net of their earnings from food sales (Anderson et al., 2014, Table I). Moreover, there is a costly misallocation of the resources employed within the agricultural sector as well, because of the wide variation in NRAs between farm industries (see Table I); and the main forms of support are tied to, rather than decoupled from, current farm production (Figure 5).

Today, there are much more efficient and more equitable ways to boost domestic food production and to deal with poverty and farm/non-farm income inequality without raising consumer prices of food. Before turning to those, however, it is instructive to reflect on prospects for China’s food production, consumption and trade over the next decade under current or alternative price-distorting policy regimes.

**Market prospects for China in 2030 under alternative farmer support policies**

Projecting China’s food markets can best be done with the help of a global, forward-looking economy-wide model. Anderson and Strutt (2014) employed the widely used and well-documented GTAP model of the global economy (Hertel, 1997). Its 2007 baseline for the world economy was projected forward to provide two new baselines for 2030 by assuming...
initially the 2007 trade-related policies of each country do not change. The baseline projection assumes that real GDP growth in China is 6 percent per year during 2007-2030. Real international prices of agricultural and food products are 9 percentage points more in 2030 than in 2007 in this baseline scenario, and so well below their peak levels in 2008-2012.

In 2007, China accounted for 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’s share of global imports of farm goods is projected in the baseline to be one-fifth with no change in policies, while its share of exports is projected to dwindle. As a result, China’s agricultural self-sufficiency rate is projected to fall nine percentage points, again assuming 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 II.

<table>
<thead>
<tr>
<th>2007, actual</th>
<th>2030 projected baseline scenario</th>
<th>2030 plus 2% p.a. extra agricultural TFP growth</th>
<th>2030 plus selected China food import bans</th>
<th>2030 tariff rates, China, with no policy change</th>
<th>2030 tariff rates, China, with selected import bans</th>
<th>China’s legally bound out-of-quota tariff at WTO</th>
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</thead>
<tbody>
<tr>
<td>Ricea</td>
<td>101</td>
<td>95</td>
<td>103</td>
<td>100</td>
<td>2</td>
<td>196</td>
</tr>
<tr>
<td>Wheata</td>
<td>103</td>
<td>97</td>
<td>107</td>
<td>100</td>
<td>2</td>
<td>114</td>
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<tr>
<td>Coarse grains</td>
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<td>98</td>
<td>103</td>
<td>98</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Fruit and veg</td>
<td>102</td>
<td>96</td>
<td>102</td>
<td>95</td>
<td>7</td>
<td>8</td>
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<td>Vegetable oils</td>
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<td>61</td>
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<td>55</td>
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<tr>
<td>Sugar</td>
<td>96</td>
<td>79</td>
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<tr>
<td>Cotton</td>
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<td>66</td>
<td>78</td>
<td>64</td>
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<tr>
<td>Other crops</td>
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<td>45</td>
<td>123</td>
<td>40</td>
<td>8</td>
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<tr>
<td>Beef and sheepmeata</td>
<td>94</td>
<td>89</td>
<td>100</td>
<td>100</td>
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<td>255</td>
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<td>Other meatsa</td>
<td>101</td>
<td>37</td>
<td>99</td>
<td>100</td>
<td>8</td>
<td>164</td>
</tr>
<tr>
<td>Dairy productsa</td>
<td>97</td>
<td>75</td>
<td>101</td>
<td>100</td>
<td>8</td>
<td>159</td>
</tr>
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Table II.
China’s self-sufficiency in farm products without and with faster farm productivity growth and import bans on rice, wheat, meats and milk products, and agricultural tariff rates for China, 2030

Note: aIndicates sectors assumed to become subject to the import bans for achieving selected food self-sufficiency
Source: Compiled from Anderson and Strutt (2014)
However, because of the projected increases in incomes and farm output in China over this period, real per capita consumption of agricultural and food products in China is projected to be 75 percent higher in 2030 than in 2007. This indicator 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. 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 from 97 to 88 percent.

Such a decline in food self-sufficiency may well be perceived as unacceptable politically, in which case it is worth considering alternative policy options. Tightening restrictions on imports is an obvious one, but it needs to be kept in mind that such market-distorting measures reduce national income and raise the price of food and hence the aggregate capacity for most citizens to access food.

An alternative set of options involve expanding public rural investments in areas where the marginal social rate of return is above the opportunity cost of funds. By contrast to price-distorting measures, these not only raise the level of national income in the short run but also raise the long-run rate of economic growth and of food self-sufficiency. Moreover, in some cases, they can simultaneously enhance the food security of both farm and non-farm households. One such case is public agricultural R&D expenditure. While that has risen considerably in China in recent decades, it was still only four-fifths of the Asia-Pacific average in 2008 (Flaherty et al., 2013). Marginal returns from boosting such levels of public investment in most developing countries are extremely high (Rao et al., 2017).

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 percentage 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. 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 underemployed labor in rural areas shrinks (Zhang et al., 2011). And insofar as such investments lower domestic consumer food prices, they 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 would be harmed than helped by such a policy measure, now that more than half of China’s workers are employed in urban areas and barely one-quarter still work on farms.

Anderson and Strutt (2014) modeled increases in total factor productivity in Chinese agriculture that would be required for the country to be at the same overall rate of agricultural self-sufficiency as in 2007, namely, 97 percent[3]. To achieve that, a 60 percent cumulative improvement in agricultural TFP over the period 2007-2030 is required (an extra 2 percent per year). This magnitude of productivity increase would slightly overachieve self-sufficiency in cereals and fully achieve it for meat and milk products, with other sectors also seeing increased self-sufficiency rates (third column of Table II). Since it generates 7 percent higher incomes on average, it would lead to higher volumes of various foods consumed by households in China. It would also reduce the relative importance of agricultural and food imports in China’s total import bundle in 2030, from 13 percent of total imports in the baseline simulation to just 4 percent in the higher agricultural productivity growth scenario.

The alternative approach to achieving self-sufficiency of using a trade measure such as a food import restriction, which is the equivalent of a production subsidy plus a consumption tax, is sometimes chosen because it avoids the budgetary outlays that direct producer or consumer subsidies involve. In the interest of boosting farm incomes to reduce

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the urban-rural income gap, Japan and Korea have imposed import restrictions on meat and milk products in addition to staple foodgrains – but not on coarse grains and oilseed products required for animal feedstuffs. If China were to ban such imports so as to be self-sufficient in them by 2030, the resources that would move toward rice, wheat and livestock production would, in turn, cause a reduction in self-sufficiency in crops that provide inputs into animal feedstuffs, and also for other crops. According to Anderson and Strutt (2014), 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 II) and so would be inconsistent with China’s WTO legal commitments.

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 hikes. The extent of the consequent reductions in the volume of various foods consumed by households in China would range from 3 to 6 percent for livestock products, 0 to 3 percent for grains and 2 to 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. Clearly, such a policy response to declining food self-sufficiency undermines national food security by reducing economic access to food for the vast majority of households.

**Conclusion:** more-efficient instruments for achieving key policy objectives

The reforms to market-distorting policies that China undertook in the 1980s and 1990s were truly transformational: by reducing to zero the discouragement of farm production, they contributed non-trivially to national economic growth and welfare, helped reduce the income gap between farm and non-farm households, lowered hugely the extent of rural poverty and helped to expand food production as domestic consumption grew, thereby maintaining food self-sufficiency.

However, the transition during the past two decades to increasingly assist farming, including by 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 the foods that are protected from import competition. The experiences of Japan and Korea strongly suggest this path will turn out to be very costly, and not very effective in closing the farm-non-farm income gap. Moreover, more-advanced economies have found by bitter experience that reversing an agricultural protection growth path is very painful, which is all the more reason not to follow that policy path in the first place. Yet policy reversals have happened, and 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 is nearly down to China’s rising rate (Figure 3).

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. More such investments in land-abundant countries in Latin America, Africa, Australia 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.

Fortunately for China, there are politically feasible alternative policy instruments to market-distorting policies. China has begun to re-instrument some agricultural supports, but most forms are still coupled to current farm production (Figure 5). More efficient and effective ways to improve national food security, reduce the gap between farm and non-farm household incomes, and reduce extreme poverty are available though. Many past empirical
studies have shown that further public investments in rural infrastructure, in agricultural research[4] and in rural primary education and health would have high payoffs in China, as in numerous other developing countries.

Moreover, thanks to the information and communication technology revolution, there are now cheaper and easier means than price supports to provide 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, cash transfers can now be provided electronically as direct assistance to even remote households because the vast majority of them now or soon will have access to electronic banking (World Bank, 2015). If such payments to rural households were made conditional on meeting basic health and education targets for their children, they could reduce the huge gap between childhood development in rural vs urban areas (see Li et al., 2017).

China is more capable than most developing countries in being able to effectively deliver social protection payments electronically to its rural households. Huang et al. point out that already the government has set up a special account for each household in a local bank, into which a timely deposit can be made electronically to each account. This provides China a way to avoid going any further down the agricultural protection growth path and then having to reverse, the political cost of which would be larger the longer such programs are in place. Needless to say, such cash transfers would have an even more favorable national food security impact if combined with an increase in agricultural research investment and in infrastructure that lowered costs along the food value chains.

Notes
1. See Anderson et al. (2008). By comparing domestic with border prices, the NRA takes into account not only trade taxes-cum-subsidies but also non-tariff measures (NTMs) that alter prices. Of course, some of those NTMs, including domestic regulations and standards, may be introduced to overcome externalities and thus may raise rather than lower national economic welfare (Beghin et al., 2015). In such cases, the NRA is an imperfect indicator of welfare-reducing distortions, but these cases are expected to have only a very minor influence on the empirical trends reported below. On the basic theory of the national welfare cost of price-distorting policies, see Bhagwati (1971) and Corden (1997). Both the positive and the negative NRAs for China may be slightly overestimated in so far as an alteration in China’s trade policies would affect international prices of farm products (but it is impossible to adjust for that without a global economy-wide model calibrated to each year’s data).

2. Farmers are affected not just by prices of their own products but also by the incentives non-agricultural producers face. That is, it is relative prices and hence relative rates of government assistance that affect producer incentives. More than 80 years ago, Lerner (1936) provided his symmetry theorem that proved that in a two-sector economy, an import tax has the same effect as an export tax.

3. In addition to agricultural R&D, investments in rural infrastructure and in basic rural education and health also would have the effect of raising farm productivity growth, as would a freeing up of factor markets. See, for example, Fan and Zhang (2004) and Rozelle et al. (2005).

4. As of 2014-2016, only 1.8 percent of China’s total support to agriculture was in the form of agricultural R&D expenditure, according to OECD (2017).

References


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