China's Import Demand for Agricultural Products: The Impact of the Phase One Trade Agreement

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April 27, 2020

Abstract

In December 2019 the United States and China reached a Phase One trade agreement, under which China committed to purchase more imports from the United States: $12.5 billion more agricultural imports in 2020 and $19.5 billion more in 2021, as compared to 2017. We show that the most efficient way for China to increase its imports from the United States is to mimic the effect of an import subsidy. If China's agricultural imports did not otherwise grow from their 2017 values, then the subsidies would need to be 42% and 59% to meet the 2020 and 2021 targets, respectively. These effective subsidies mean that China would divert agricultural imports away from other countries. We find that this trade diversion is especially strong for Australia and Canada, followed by Brazil, Indonesia, Malaysia, Thailand, and Vietnam.

Prepared for presentation at the NBER conference "Agricultural Markets and Trade Policy," April 30-May 1, 2020. This research was supported by the U.S. Department of Agriculture, Economic Research Service.

1. Introduction

Since joining the World Trade Organization (WTO) in 2001, China has become a major agricultural importer. In Figure 1 we report China's agricultural imports from the United States and from the rest of the world (ROW).[1] These values peaked in about 2014, and remained quite high in 2017: China's agricultural imports from the United States that year were $24.1 billion.[2] Since that time, however, U.S. agricultural exports to China fell to $13.2 billion in 2018 and $16.3 billion in 2019. That reduction in China's imports from the United States was due in part to the ongoing trade war, with China applying restrictions on agricultural imports and other goods in response to U.S. tariffs on imports from China (Carter and Steinbach, 2020).

In December 2019, the United States and China reached a Phase One agreement to end the trade war. Under this agreement, China committed to purchase more imports from the United States (Bown, 2020). While the coronavirus pandemic in 2020 may render this agreement moot, or at least delay its implementation, it is still worth asking whether it can ever be achieved. For agricultural goods, the agreement was that China would purchase $12.5 billion more imports from the United States in 2020 and $19.5 billion more imports in 2021 than it had in 2017. Compared with 2017 imports of $24.1 billion, the Phase One agreement creates targets of $36.6 billion in 2020 and $43.6 billion in 2021, as shown in Figure 1. Since these targets exceed the highest prior values of Chinese agricultural imports from the U.S., how can they be achieved?

We show in this paper that the *most efficient* way for China to import more from the United States is to mimic the effect of an import subsidy on U.S. imports. That is, the state

[1] In Figure 1 we report values up to 2017 from China Customs data, as discussed in the Appendix. The values for 2018 and 2019 for U.S. exports to China are for "agricultural and related products," and obtained from the U.S. Department of Agriculture (USDA); see the next footnote.

[2] The Chinese customs data gives imports from the United States of $24.2 billion, while the USDA value of U.S. exports to China are $24 billion, so we use $24.1 billion as the 2017 value.

agencies could instruct the importers of U.S. agricultural policies to act "as if" there was a subsidy on those goods. For example, if China's agricultural imports grew at the same annual rate from 2017 as during 2007-2017, then we find that the effective subsidies would need to be 12% and 23% to achieve the targets in 2020 and 2021, respectively. But if import growth was only one-half of that amount then the subsidies would need to be 18% and 41%; while if there was no growth from 2017 then the subsidies would need to be 42% and 59%. These subsidy rates on the United States are admittedly very high, and it would be challenging to achieve that increase in U.S. imports through state command.

To obtain these results, we estimate a non-homothetic demand system for agricultural imports into China. As described in section 2, Fajgelbaum and Khandelwal (2016) have developed a framework that combines an almost ideal demand system (AIDS) defined over products and exporting countries with a gravity equation in trade, so as to identify the demand from each importer for the products from each exporter. The data used to estimate the AIDS-gravity equation consist of imports by 30 Chinese provinces for 58 agricultural commodities from 78 major trading partners, over 1997-2017.

The results of the estimated AIDS-gravity equation are presented in section 3. We distinguish the elasticity of demand by commodity and country of origin with respect to price and income. Based on these key estimated parameters, we are able to forecast China's future import demand for U.S. agricultural products based on our assumptions about rising per-capita income. We consider three scenarios in section 4: that agricultural imports grow at the same annual rate from 2017 as during 2007-2017; that import growth was only one-half that amount; or that there is zero growth from 2017; and we also allow for various levels of the effective subsidy that China applies on imports from the United States.

In section 5, we solve for the effective subsidies needed to achieve the 2020 and 2021 import targets. While the effective subsidy increases China's purchases from the United States, it diverts its imports away from other countries. That diversion occurs for three reasons: (i) a conventional substitution effect *within* products, which depends on the number of competing countries selling each product in each province; (ii) an income effect that arises due to the effective subsidy, which can offset the substitution effect in part or in whole; (ii) a further substitution effect that can occur *across* products, particularly as some expenditure shares in the AIDS system reach zero so that there is a renormalization of all other demand shares. Countries experiencing a fall in their exports to China due to the effective subsidy on the United States would be justified in raising a complaint to the WTO. We find that this trade diversion is especially strong for Australia and Canada, followed by Brazil, Indonesia, Malaysia, Thailand, and Vietnam, and then Argentina, France, Germany, Netherlands and New Zealand. Section 6 concludes and the data sources and additional results are included in the Appendix.

2. AIDS and the Gravity Equation

We begin with the almost ideal demand system (AIDS) defined over products *n* and countries *i* importing from countries *j:*

$$S_{ij}^n = \frac{X_{ij}^n}{Y_i} = \alpha_{ij}^n + \sum_{n'} \sum_{j'} \gamma_{jj'}^{nn'} \ln p_{ij'}^{n'} \quad + \beta_j^n \mathrm{y}_i, \tag{1}$$

where $S_{ij}^n = \frac{X_{ij}^n}{Y_i}$ is the share of aggregate expenditure in country *i* allocated to product *n* from country *j*, and $\sum_n \sum_j S_{ij}^n = 1$ for each importer *i.* We follow Fajgelbaum and Khandelwal (2016) in referring to the importers *i* as countries, but later we specialize them to be China's provinces. On the right-hand side, α_{ij}^n is a parameter influencing the expenditure share, $p_{ij'}^{n'}$ are the prices of all the products n' imported from countries j', with substitution parameters $\gamma_{jj'}^{nn'}$,

while y_i denotes the "real income" of importer *i*, with parameters β_j^n indicating possibly non-homotheticity in demand for the product *n* purchased from country *j*. As is common in AIDS estimation, real income can be measured incorporating an income distribution across consumers, so that it becomes:

$$y_i=\left[\ln\left(\frac{\bar{x}_i}{a_i}\right)+IN_i\right], \tag{2}$$

where $\ln a_i = \sum_n \sum_j \alpha_{ij}^n \ln p_{ij}^n$ is the homothetic price index in country *i*, $\bar{x}_i$ is the mean of the income distribution, and IN_i is the Theil index of income inequality.

To reduce the number of parameters that need to be estimated, Fajgelbaum and Khandelwal (2016) assume that the substitution parameters $\gamma_{jj'}^{nn'}$ are highly symmetric across goods *n* = 1,…,*N* and source countries, as follows: equation $\gamma_{jj'}^{nn'} = -(1-\frac{1}{N})\gamma^n$ for *n* = *n'* and *j* = *j'*; $\gamma_{jj'}^{nn'} = \gamma^n/N$ for *n* = *n'* and *j* ≠ *j'*; and $\gamma_{jj'}^{nn'} = 0$ for *n* ≠ *n'*. These assumptions greatly simplify the estimation because there will be a single substitution parameter γ^n for each good.

In order for the expenditures shares in (1) to sum to unity for each importing country *i,* we must have that $\sum_n \sum_j \alpha_{ij}^n = 1$, $\sum_n \sum_j \gamma_{jj'}^{nn'} = 0$ and $\sum_n \sum_j \beta_j^n = 0$, where the summations are taken over all *available* products *n* from countries *j*, selling in each country *i.* The above simplifying assumptions on the $\gamma_{jj'}^{nn'}$ parameters satisfy the condition that $\sum_n \sum_j \gamma_{jj'}^{nn'} = 0$, provided that *N* denotes the number of source countries selling a product in each importer, that is, N_i^n source countries *j*. Likewise, α_{ij}^n and β_j^n need to be adjusted to sum to unity and zero, respectively, over the *available* products in each importing country. These adjustments will become important in our counterfactual exercises later in the paper, as certain regions no longer import some goods. Rather than make this adjustment to the α_{ij}^n and β_j^n parameters explicit in

the theory, as a shortcut, we always adjust the *shares to sum to unity* in our counterfactual exercises presented later in the paper.

Under the symmetry assumptions on the $\gamma_{jj'}^{nn'}$ parameters, demand in effect becomes a two-tier system with substitution between goods at the upper level, and substitution between source countries at the lower level, as follows. At the upper level, we can sum equation (1) across all exporters *j* to obtain:

$$S_i^n = \sum_j S_{ij}^n = \overline{\alpha}_i^n + \bar{\beta}^n y_i \qquad (3)$$

where $\overline{\alpha}_i^n = \sum_j \alpha_{ij}^n$, and $\bar{\beta}^n = \sum_j \beta_j^n$. The prices at this aggregate level of total expenditure on good *n* by importer *i* do not appear because we have assumed that the substitution parameters are symmetric and $\gamma_{jj'}^{nn'} = 0$ if for $n \neq n'$: that is, demand has constant shares with respect to prices, but the shares still depend on real income. This equation shows how the share of spending on product *n* in each country *i* depends on its real income.

Fajgelbaum and Khandelwal (2016) further aim to eliminate prices at the lower level of aggregation, when there is substitution across supplying countries, for two reasons. First, products imported from different source countries vary by quality, and price reflects quality. Second, trade price data is usually calculated as unit value of trade, which is not actually a reliable indicator of commodity prices. To eliminate prices, they make an assumption that is common in the international trade literature: namely, the international prices p_{ij}^n reflect domestic prices in the exporter p_{jj}^n adjusted for "iceberg" costs of trade, whereby the amount $\tau_{ij}^n \geq 1$ of good *n* must be shipped from country *j* in order for one unit to arrive in country *i*. Formally, this assumption means,

$$p_{ij}^n = p_{jj}^n \tau_{ij}^n . \qquad (4)$$

Making the various substitutions defined above into (1), we are able to solve for the country *j's* domestic prices using the fact that the income of each exporter in sector *n* equals the sales to all countries (including itself) of that product. Using this market clearing condition, we arrive at the following lower-level AIDS system, there is substitution between exporting countries *j* selling to each importer *i*,

$$\frac{x_{ij}^n}{Y_i} = A_{ij}^n + \frac{Y_j^n}{Y_W} - \gamma^n T_{ij}^n + \beta_j^n \Omega_i, \tag{5}$$

where: a) the parameters A_{ij}^n capture cross-country differences in tastes across sectors and exporters are related to α_{ij}^n by:

$$A_{ij}^n = \alpha_{ij}^n - \sum_{i'} \left(\frac{Y_{i'}}{Y_W}\right) \alpha_{ij}^n. \tag{6}$$

b) $\frac{Y_j^n}{Y_W}$ measures the supply capacity of exporter *j*, which is the share of country *j*'s output of product *n* to the world's supply of all products Y_W.

c) T_{ij}^n stands for trade costs, with,

$$T_{ij}^n = \ln\left(\frac{\tau_{ij}^n}{\bar{\tau}_i^n}\right) - \sum_{i'} \left(\frac{Y_{i'}}{Y_W}\right) \ln\left(\frac{\tau_{i'j}^n}{\bar{\tau}_i^n}\right) \text{ and } \bar{\tau}_i^n = \exp[\textstyle\sum_j \ln(\tau_{ij}^n)/N]. \tag{7}$$

d) the term Ω_i again reflects real income adjusted for the Theil index, defined by,

$$\Omega_i = y_i - \sum_{i'=1}^N \left(\frac{Y_{i'}}{Y_W}\right) y_{i'}$$

$$= \left[\ln\left(\frac{\bar{x}_i}{a_i}\right) + IN_i\right] - \sum_{i'=1}^N \left(\frac{Y_{i'}}{Y_W}\right) \left[\ln\left(\frac{\bar{x}_{i'}}{a_{i'}}\right) + IN_{i'}\right] \tag{8}$$

Equation (5) combines features of a AIDS equation and of a gravity equation in trade. The gravity interpretation comes because we have trade costs on the right-hand side. Below we shall assume that trade costs depend on distance. In much the same way as the force of gravity is inversely related to the distance between objects, it is well-established that the amount of trade

between countries is inversely related to the distance between them. The AIDS interpretation of this equation come from the non-homothetic component $\beta_j^n \Omega_i$. This component measures the abilities of destination market *i* to purchase imports from various sources, depending on the average real income distribution adjusted by income inequality in the importing country i.

The term Ω_i measures the adjusted real income the importer *i* is relative to the rest of the world. For income-elastic or luxury goods ($\beta_j^n > 0$), higher adjusted real income means that the country sources a higher share of good *n* from country *j.* For income-inelastic goods or necessities ($\beta_j^n < 0$), higher adjusted real income means that the country sources a lower share of good *n* from country *j.* What is new in this AIDS-gravity equation is that the income elasticities *differ by the selling country.* The richer is importer *i* (higher $\bar{x}_i$) or the more unequal it is (higher IN), the larger its expenditure share on *countries* for which it has an income elasticity greater than unity for that good ($\beta_j^n > 0$), and conversely the smaller its expenditure share on countries for which it has an income elasticity less than unity for that good ($\beta_j^n < 0$).

For trade costs, we make the standard assumption in the trade literature that they depend on distance between the countries:

$$\ln \tau_{ij}^n = \rho^n \ln d_{ij} + u_{ij}^n, \tag{9}$$

where u_{ij}^n is an error term. Substituting this into (5) and (7) we obtain,

$$\frac{X_{ij}^n}{Y_i} = A_{ij}^n + \frac{Y_j^n}{Y_W} - (\gamma^n \rho^n) D_{ij} + \beta_j^n \Omega_i + \varepsilon_{ij}^n \tag{10}$$

where D_{ij} measures the bilateral trade costs between exporter *j* and importer *i* in sector *n*, and is obtained in the same manner as (7) but replacing τ with *d.* Likewise, the error term ε_{ij}^n is obtained from u_{ij}^n in (9).

The final step is to indicate how the terms $\overline{\alpha}_i^n$ and A_{ij}^n in the upper-level and lower-levels equations (3) and (10) are determined. We assume that the coefficients $\overline{\alpha}_i^n = \sum_j \alpha_{ij}^n$ are obtained from

$$\alpha_{ij}^n = \alpha_j(\alpha^n + \varepsilon_i^n), \tag{11}$$

where ε_i^n is an error term. With the assumption that $\sum_j \alpha_j = 1$, we obtain from (3) the upper-level equation:

$$S_i^n = \alpha^n + \bar{\beta}^n y_i + \varepsilon_i^n. \tag{12}$$

This upper-level equation slightly simplifies (3), and again, it captures how the share of spending on product *n* in each country *i* depends on its real income.

Using (11) and (12) combined with (6), we can solve for $A_{ij}^n = \alpha_j(S_i^n - S_W^n - \bar{\beta}^n \Omega_i)$. Substituting this into (10), we obtain our lower-level estimating equation,

$$\frac{X_{ij}^n}{Y_i} = \frac{Y_j^n}{Y_W} + \alpha_j(S_i^n - S_W^n) - (\gamma^n \rho^n) D_{ij} + (\beta_j^n - \alpha_j \bar{\beta}^n)\Omega_i + \varepsilon_{ij}^n . \tag{13}$$

Where X_{ij}^n is the value of exports from exporter j to importer i in sector n, and Y_i is the total income of importer i, Y_j^n is total sales of exporter j in sector n, Y_W is world total output of all agricultural products, S_i^n is the share of sector n in the total expenditure of country i, S_W^n is the share of sector n in world expenditures, D_{ij} is a measure of the bilateral country distance.[3] Equations (12) and (13) is the final version of the upper-level and lower-level AIDS-gravity equations that we use for estimation. The first term on the right reflects export supply capacity

[3] In addition to distance D_{ij}, Fajgelbaum and Khandelwal (2016) allow for bilateral border and language barriers between exporter *j* and importer *i* in sector *n* to influence the amount of trade. Using such indicator variables is quite standard in gravity equation estimation, but we do not include them here because our focus will be on a single importing country, China, comprised of 30 provinces. Within China, all provinces will have the same principal language (Mandarin) and nearly all will have the same lack of land borders with neighboring suppliers. So our focus will be on *distance* as the measure of trade costs.

and is included in place of exporter fixed effects, while we also included importer (province) fixed effects in the estimation.

3. Estimation

While Fajgelbaum and Khandelwal (2016) apply their method to trade between all countries in all goods, our focus here will be on agricultural products only. We focus on the 30 provinces of China, purchasing agricultural imports from 78 major exporting countries of the world. So we have i= 30 importers, j=78 countries, and n=58 agricultural goods. The agricultural commodities that we focus on in the paper consist of the 58 products as defined by the United States Department of Agriculture, which classifies agricultural products into *bulk*, *intermediate*, *consumer* oriented, and *othe*r agricultural related goods (hence the acronym BICO), based on the value or level of processing. In the Appendix we summarize the sources of our data.

Table 1 reports estimates of the $\bar{\beta}^n$ coefficient from the upper-level of aggregation in equation (12). At the upper-level of aggregation, the income elasticities are,

$$\frac{dlnX_i^n}{dlnY_i} = \frac{dln(S_i^n Y_i\ )}{dlnY_i} = 1 + \frac{dlnS_i^n}{dlnY_i} = 1 + \frac{dS_i^n}{dlnY_i}\frac{1}{S_{ij}^n} = \ 1 + \bar{\beta}^n / S_i^n, \qquad (14)$$

where S_i^n is the share of commodity *n* in the imports of province *i* from all sources. When $\bar{\beta}^n > (<)0$, then the income elasticity for that product is greater (less) than unity. Products with an income elasticity greater (less) than unity are traditionally called luxuries (necessities), indicating that the share of expenditure on these products rises (falls) as income grows.

The upper-level elasticities in Table 1 are all between +0.03 and -0.03, so provided that a given product has an import share of at least 3% in a province, then its income elasticity in that province lies between 2 (for $\bar{\beta}^n = 0.03$) and zero (for $\bar{\beta}^n = -0.03$). Of course, if the share of import expenditure is greater than 3%, and the upper-level income elasticity is correspondingly

closer to unity. To give just one example, the commodity with the highest value of $\bar{\beta}^n = 0.03$ in Table 3 is soybeans, and the share of provincial imports devoted to soybeans in 2017 ranges from a high of 82% in Shaanxi to a low of 1% in Beijing (except for six provinces that do not import soybeans at all). Based on the upper-level estimates, therefore, the income elasticity of soybeans across provinces ranges from 1+(0.03/0.82) = 1.037 to 1+(0.03/0.01) = 4.

Table 2 reports estimates of the lower-level, product-exporter specific β_j^n estimates for the top 19 countries and 14 products from equation (13). The new feature of our non-homothetic system is that each country exporting to China faces its own income elasticity for each product. The income elasticity from (13) is,

$$\frac{dlnX_{ij}^n}{dlnY_i} = \frac{dln(S_{ij}^n Y_i\ )}{dlnY_i} = 1 + \frac{dlnS_{ij}^n}{dlnY_i} = 1 + \frac{dS_{ij}^n}{dlnY_i}\frac{1}{S_{ij}^n} = \ 1 + \beta_j^n / S_{ij}^n\ . \qquad (15)$$

Therefore, when $\beta_j^n > (<) 0$, then the income elasticity for the products from country *j* is greater (less) than unity. We might think of exporting countries with an income elasticity greater (less) than unity as selling high (low) quality versions of that product, which are therefore treated as luxuries (necessities) by the purchasing province.

In Table 2 we list the products by the rank order of their importance in Chinese imports, with soybeans being the most important import. Surprisingly, we see that the United States has a substantial negative estimate of $\beta_j^n = -0.047$, suggesting that it is selling low-quality soybeans that is a necessity in demand. Other countries (Argentina, Brazil, Uruguay and Russia) likewise have significant negative estimates, while some have significant positive estimates. What is the source of these conflicting results for the estimated β_j^n parameter?

To understand the source of these estimates, in Figure 2 we show the provincial expenditure shares on soybean imports from the United State versus the total provincial imports

of all agricultural commodities. The upper-left point in Figure 2 is for Shaanxi, where fully 43% of its imports in 2017 are devoted to U.S. soybeans. Shaanxi has small overall imports and is a relatively poor province, so we can expect that its soybean imports are either used for processing into soybean oil or are used as feed for raising livestock.[4] It is apparent that these soybean imports are not used for household *consumption,* but rather, are used for agricultural *production.* A similar set of circumstances likely apply to other *bulk and intermediate* goods listed in Tables 1 and 2: the provincial imports are *inputs* into production rather than being used for household consumption.

One way to deal with this issue would be to use an input-output table to transform the provincial imports of bulk and intermediate inputs into outputs of final food products into each province where they are ultimately sold. We do not have an input-output table at this very fine level of aggregation, however. A much simpler solution to this issue is to use the *upper-level* elasticities shown in Table 1 for all *bulk and intermediate* goods, while we use the *lower-level* elasticities shown in Table 2 for all *consumer and other* goods. We will take this approach as we forecast Chinese demand for agriculture goods, in the next section.

4. Forecasting Chinese Import Demand for Agricultural Products

Using the estimated AIDS-gravity system, we now forecast Chinese import demand for agricultural products. To achieve that goal, we go back to equation (1) of our system. We hold prices fixed so that our forecast purely reflects Chinese import demand. We consider three

[4] Nearly all of the soybeans China imports are used to produce high-protein meals consumed by Chinese livestock and edible oil for Chinese consumers. According to China Ministry of Agriculture and Rural Affairs (2018), soybean processing capacity expanded from 20 to 160 million metric tons between 2001 and 2016. Shaanxi grows soybeans and processes them for edible oil, and it may have added capacity during this period. China's domestically produced soybeans are used mainly to produce foods such as tofu, soybean milk, soy sauce, and nutritional supplements. (Gale, Valdes, and Ash, 2019).

different scenarios for projecting Chinese import demand for agricultural products over one year. In the first scenario, we will assume that the growth in real income and the change in income inequality by province are exactly the same as the *annual average* of their change over 2007 – 2017. That is, we just replicate the change in real income and the change in income inequality over one future year as the annual average over the decade before:

$$\Delta y_i = (y_{i2017} - y_{i2007})/10. \quad (16)$$

This growth in real income – now adjusted for the changes in income inequality – is multiplied by the non-homothetic coefficients β_j^n in (10) to obtain the change in the share of import purchases coming from each source country. The second and third scenarios is that import growth in China from 2017 is only one-half of the annual average during 2007-2017, or that imports do not grow at all from 2017.

Targets for Chinese Imports from the United States

In addition to the differing scenarios concerning growth of import demand, we also allow suppose that China faces a target on the minimum imports of agricultural goods that it purchases from the United States, which we denote by country 1. This constraint is written as:

$$\sum_{n=1}^{N} \sum_i \; p_{i1}^n q_{i1}^n \geq Y_1. \quad (17)$$

We will assume that China desires to achieve this constraint at a minimum loss of utility. That is, we will assume that China adopts the policy to maximize the utility of an aggregate consumer who faces the constraint in (17) along with a budget constraint over all agricultural goods, written as $\sum_{n=1}^{N} \sum_j \sum_i \; p_{ij}^n q_{ij}^n \leq Y$, where Y is China's *total* import purchases of agricultural goods which is held fixed.

We denote the quantity of agricultural good *n* that country *j* sends to province *i* in China by q_{ij}^n, and the vector of all purchases of good *n* across provinces and supplying countries by $\mathbf{q}^n$. Then the Lagrangian to maximize utility subject to the constraints is,

$$L = U(\mathbf{q^1}, ..., \mathbf{q^N}) + \lambda(Y - \sum_{n=1}^{N} \sum_j \sum_i \; p_{ij}^n q_{ij}^n) + \mu(\sum_{n=1}^{N} \sum_i \; p_{i1}^n q_{i1}^n - Y_1). \tag{18}$$

The marginal utility of income is $\lambda > 0$. In addition, the Lagrange multiplier μ can be interpreted as $\partial L / \partial Y_1 = -\mu < 0$, where this sign is established provided that Y_1 exceeds the amount of U.S. imports that China would normally choose to purchase, so that any increase in that target *lowers* welfare. It follows that $\mu > 0$, and we further assume that $\mu < \lambda$.

The first-order conditions for problem (18) are:

$$\frac{\partial U}{\partial q_{ij}^n} = \lambda p_{ij}^n, \qquad \text{for } j \neq 1 \tag{19}$$

$$\frac{\partial U}{\partial q_{i1}^n} = (\lambda - \mu) p_{i1}^n = \lambda \left(1 - \frac{\mu}{\lambda}\right) p_{i1}^n \equiv \lambda \delta p_{i1}^n, \quad \text{for } j = 1 \tag{20}$$

where $\delta \equiv [1 - (\mu / \lambda)] < 1$. It follows that the optimal policy for China to achieve the import target is to act "as if" there is an *ad valorem* subsidy on U.S. prices, lowering them by $\delta < 1$. Importantly, this "effective" subsidy is the *same* across all agricultural imports.

Substitution and Income Effects

In order to calculate the impact of this effective subsidy on China's imports from various countries, we use the AIDS demand equations in (1). Changing our notation from (14), we now let ΔS_{ijt}^n denote the change in the share of China's imports from each country that it purchases due to the effective subsidy. Noting that the log of U.S. effective prices fall by $ln\delta$ from (21), then from (1) we obtain:

$$\Delta S_{ijt}^n = \frac{1}{N} \gamma^n \, ln \, \delta + \; \beta_j^n \Delta y_i \quad \text{for } j \neq 1, \tag{22}$$

$$\Delta S_{i1t}^{n} = -(1-\tfrac{1}{N})\gamma^{n}\, ln\, \delta + \beta_1^n \Delta y_i \quad \text{for } j = 1. \tag{23}$$

where we have made use of the normalizations just below (2) that $\gamma_{jj'}^{nn'} = -(1-\frac{1}{N})\gamma^{n}$ for $n = n'$ and $j = j'$; $\gamma_{jj'}^{nn'} = \gamma^{n}/N$ for $n = n'$ and $j \neq j'$; and $\gamma_{jj'}^{nn'} = 0$ for $n \neq n'$.

The first terms appearing in (22) and (23) is a conventional substitution effect, which always increases China's imports from the United States and decreases China's imports from other countries. We note that the magnitude of the substitution effect depends on the number of countries competing with the United States. We have referred to that number as N in the above equations, but as noted in section 2, it actually measures the numbers of source countries for each product and province, and should therefore be properly written as N_i^n. The *larger* is N_i^n, then the greater is the substitution effect $-\left(1-\frac{1}{N_i^n}\right)\gamma^{n}\, ln\, \delta > 0$ towards U.S. exports, but the smaller (in absolute magnitude) is the substitution effect $\frac{1}{N_i^n}\gamma^{n}\, ln\, \delta < 0$ away from other countries.

The second terms appearing in (22) and (23) are the income effects associated with an effective subsidy on the United States. To solve for the change in real income, we use the log of the homothetic price index $\ln a_i = \sum_n \sum_j \alpha_{ij}^n \ln p_{ij}^n$ appearing in (2) to obtain:

$$\Delta y_i = -\ln a_i = -\alpha_{i1}^n ln\, \delta\ . \tag{24}$$

With $\ln \delta < 0$, the effective subsidy on U.S. goods acts like a rise in real income. Substituting this into (22), we obtain the change in the provincial share of good n imported from countries other than the United States,

$$\Delta S_{ijt}^{n} = (\frac{\gamma^{n}}{N_i^n} - \alpha_{i1}^n \beta_j^n) \ln \delta \quad \text{for } j \neq 1. \tag{25}$$

For imported products from country j that have income elasticities less than or equal to unity, so that $\beta_j^n \leq 0$, the effective subsidy on the United States combined with the effective rise in real

income will lead to a reduced share of purchases from that country. On the other hand, if purchases from country *j* are sufficiently luxuries ($\beta_j^n > 0$) so that $\alpha_{i1}^n \beta_j^n > \gamma^n / N_i^n$, then there would be an *increased* import share because purchases from country *j* are complementary with those from the United States. We will find that this complementary relationship holds for some countries exporting soybeans to China, for example.

We can also substitute (24) into (23), to obtain:

$$\Delta S_{ijt}^n = -\left[\left(1 - \frac{1}{N_i^n}\right)\gamma^n + \alpha_{i1}^n \beta_1^n\right] \ln \delta \quad \text{for } j = 1. \tag{26}$$

Recalling again that $\ln \delta < 0$, then with $\alpha_{i1}^n \beta_j^n > -\left(1 - \frac{1}{N_i^n}\right)\gamma^n$ there will be an increased share of U.S. purchases. This condition rules out a backward-bending demand curve, and is always satisfied in our data. Having a luxury good ($\beta_1^n > 0$) means that the positive income effect adds to the substitution effect in raising imports from the United States.

The effective subsidies therefore create both substitution effects – which occur *within* the same products that the U.S. is exporting to China – and income effects, which can possibly create complementarity between U.S. exports and those of other countries. There is a final effect which we must consider, and that is substitution effect *across* products. That was ruled out in the initial estimation of our parameters, because we assumed that $\gamma_{jj'}^{nn'} = 0$ for $n \neq n'$. But cross-product substitution can still enter into our results, for a subtle reason we mentioned in section 2. Specifically, as the effective subsidy increases on U.S. products, then it is entirely possible that the drop in the share of China purchases from other countries – ΔS_{ijt}^n in (25) – *exceeds* the initial purchases from that country, so that the share should be zero. That involves an adjustment to all the parameters of the AIDS equation (1), as discussed just below that equation, so that the sum of shares over all products and source countries for each province continues to be unity. We have

implemented that adjustment by first replacing the (hypothetical) negative share with zero, in which case the sum of shares exceeds unity. Then we *subtract* the same, small amount needed from all the (positive) shares in that province so that the sum of shares is again unity. This procedure, which can be justified theoretically,[5] leads to a slight reduction in import shares of all products and source countries in a province, even for products that the United States *does not* export. In other words, there is a cross-product substitution created by the effective subsidies.

To summarize, equations (25) and (26) will be used to mimic the effect of an import subsidy on U.S. purchases, where we will change the size of the effective subsidy in order to meet the Phase One targets for 2020 and 2021. We have held fixed China's *total* import purchases of agricultural imports, denoted by *Y*. It follows that the increase in China's imports of agriculture goods from the United States will equal the reduction in total imports from other countries. If our estimation of the AIDS-gravity equation had included additional goods beyond agricultural imports (such as home-produced or nonagricultural goods) then total agricultural imports *Y* could have changed endogenously in response to the effective subsidy, thereby allowing imports from other countries to fall by more or less than the rise in imports from the United States. But results of that type are beyond the scope of this paper.

Calibration

As explained in the previous section, for *bulk and intermediate* goods we replace the lower-level parameters β_j^n with their upper-level values $\bar{\beta}^n$ for each product. The other two parameters appearing in (25) and (26) are α_{i1}^n and γ^n. For the former we use the share of U.S. imports S_{i1}^n in each province and product in 2017. The parameter γ^n should have been estimated

[5] Feenstra and Weinstein (2017) show how the parameters of a translog system must be adjusted when there are new or disappearing goods, implying an adjustment of the expenditure shares. Those results can be extended to the AIDS system.

from the coefficient of the distance term in the AIDS-gravity equation (13). The distance term D_{ij} measures the bilateral trade costs between exporter *j* and importer *i* in sector *n*, and is obtained in the same manner as (7) but replacing τ with *d.* As can be seen from (7), the distance term actually measures the *cross-provincial differences* in the distance to trading partners. While we attempted to capture such cross-provincial differences using their distances to the nearest Chinese ports, we were not successful in obtaining reliable estimate of γ^n .

Accordingly, we shall calibrate this parameter using the estimates from Fajgelbaum and Khandelwal (2016). They report an estimate on distance in their AIDS-gravity equation estimated over agricultural products of 0.0011, and varying between 0.0013 and 0.0009 in their Appendix. We shall use an average value of 0.0010 to calibrate that distance parameter, which equals the combined parameters $\gamma^n\rho^n$ in (13). Following Fajgelbaum and Khandelwal again, we also use a calibrated value of $\rho^n = 0.177,$ so that we obtain $\gamma^n = 0.0010/0.177 = 0.00565.$ This value for γ^n is used in all our calculations.

5. Forecast Results

In Table 3 we report China's demand for agricultural imports from the United States under our three growth scenarios: when the annual change in real income from 2017 is equal to the average growth over 2007-2017, or one-half that amount, or zero growth from 2017. In the first case, with demand from 2017 rising by the annual average growth over 2007-2017, then China's import demand increases by roughly 10% per year. Still, we see from Table 3 that China's imports from the United States fall short of the Phase One targets in both 2020 and 2021: import demand from the United States is $33.6 billion in 2020 as compared with the target of $36.6 billion, and import demand is $37.5 billion in 2020 as compared with the target of $43.6 billion. To reach these targets in 2020 and 202, it would require an effective subsidy from China

of 12% and 23%, respectively. These subsidies would lead to increases in U.S. imports of $2.9 and $6.3 billion in 2020 and 2021, respectively, or percentage increases of 8.6% and 16.9%.

In the remaining rows of Table 3 we summarize the results for a growth rate of one-half of that which occurred during 2007-2017, or zero growth in agricultural imports from 2017. In the former case, the needed effective subsidies on U.S. imports to reach the Phase One targets in 2020 and 2021 are 18% and 41%, respectively, and in the latter case with zero-growth, the needed subsidies are 42% and 59%, respectively. These subsidy rates on the United States are high, and show that it would be challenging to achieve the increase in imports needed to achieve the Phase One targets through state command.

In Table 4 we report the increase in imports from the United States that would occur in specific agricultural products, focusing on those products with U.S. exports to China in 2017 of greater than $500 million.[6] The top selling U.S. export is soybeans, followed by forest products, cotton, coarse grains, hides & skins, fish products, pork, and dairy products. We show the impact of the effective subsidies on the United States needed to reach the Phase One targets in 2020 and 2021. For brevity, in each of those years we report only the relevant subsidy that reaches the Phase One target under the zero-growth scenario, where China's import demand for each agricultural product is the same as in 2017. With the effective subsidy of 42% in 2020, forest products have the greatest increase in exports to China of $359 million (or 17.3%), while soybean exports grow by $289 million (only 2.1%, from a very high base of $13.9 billion). The effective subsidy of 59% in 2021 leads to even higher exports of $559 million (or 26.9%) for forest products and $530 million (or 3.8%) for soybeans.

Results for Other Countries

[6] The change in U.S. exports to China for the complete list of products is in Appendix Table A11.

By assumption in our framework, China's imports from other countries would fall by the *same amount* in total as the increase in imports from the United States. However, we are especially interested in how that diversion of imports is spread across other countries. In Table 5, we report the decrease in imports from the rest of the world (ROW) in 2020 and 2021, and for individual supplying countries. Once again, we report only the impact of the subsidies under the zero-growth scenario. For example, in the first row of Table 5, we report that the ROW would sell $12.5 billion less to China under a 42% subsidy in 2020, and $19.5 billion less to China under a 59% subsidy in 2021. These dollar amounts equal the dollar increase in China's imports from the United States under zero growth, but the *percentage* decrease for the ROW is smaller because China's agricultural imports from the United States are only about one-quarter as large as for the ROW. The percentage reduction in China's imports from the ROW to achieve the Phase One targets are 11.8% and 18.4% (Table 5, first row).

For individual supplying countries, the percentage reduction in China's purchase of their imports can be higher or lower than that for the ROW, while the *average* over all non-U.S. supplying countries will equal the percentage reduction for ROW in total. In Table 5 we list the individual countries by their exports to China in 2017. The top supplier after the United States is Brazil. It suffers a loss in exports to China of 2.5% and 4.0% in 2020 and 2021, respectively, which is much less that for the ROW overall (which is a decline of 11.8% and 18.4%). The modest impact on Brazil occurs because – like the United States – it is a principal supplier of soybeans to China, and in that commodity there is weaker substitution (and sometimes a complementary relationship) between U.S. imports and those from some other countries, as we will explain below.

The next largest exporter to China is Australia, and it suffers the largest dollar drop in

exports to China of all countries, with a percentage drop nearly equal to the ROW overall. Canada is the only country among the top-five exporters to China that has a percentage drop in exports that *exceeds* the ROW overall. These two country – Australia and Canada – experience trade diversion of close $1 billion in 2020 and exceeding $1 billion in 2021. Following those two countries, the next largest drop in exports to China occur for Brazil, Malaysia, Indonesia, Thailand, and Vietnam, with trade diversion of close to $0.5 billion in 2020, and between $0.75 and $1.0 billion in 2021. Next, a group of countries including Argentina, France, Germany, the Netherlands, and New Zealand, experience trade diversion of between $0.33 and $0.5 billion in 2021 and $0.5 to $0.75 in 2021. Spain and South Korea have declines in exports that are close to those lower amounts, followed by Chile and Japan. It is evident that the ranking of countries by their exports to China (Brazil is at the top after the U.S.) and by their *loss* in exports (Australia and Canada are highest) are not the same, and we can turn to individual products to understand this difference.

Results for Specific Products

To understand in more detail the sources of these export declines by country, we report results for specific agricultural products. We begin with the second-largest U.S. agricultural export to China: forest products. In Table 6 we report the change in China's import from the United States, the ROW in total, and each country individually, provided that it has sales over $100 million.[7] We report only the impact of the subsidies under the zero-growth scenario. China's imports from the United States grow by about $360 million in 2020 and $560 million in 2021, under the effective subsidies of 42% and 59% needed to achieve the Phase One targets. The reductions in imports from the ROW are much larger: $1 billion in 2020 and $1.8 billion in

[7] The complete list of countries exporting forest products to China in 2017, with sales over $50,000, is reported in Appendix Table A5. There are 67 of these countries besides the United States.

2021. So we see that for this commodity, the import reduction from the ROW *exceeds* the U.S. gain. This difference between the U.S. import gain and ROW loss occurs because of the income effects, which are the second terms included in (25) and (26). [8]

Forest products are included as "other" in the BICO classification, so we have used the source-country-specific parameters β_j^n, as reported in Table 2. There we see that forest products from the United States are luxury goods (with $\beta_j^n = 0.013$), and forest products from a number of other countries – including Argentina, Brazil, Russia, Vietnam – are necessities (with $\beta_j^n < 0$ and significant). The sum over all source countries of the β_j^n parameters gives the upper-level value $\bar{\beta}^n = -0.009$ in Table 1, so forest products are a necessity overall, with income elasticity less than unity. Such necessities have a *negative* income effect in (26), in which case both the substitution and income effects lead to reduced imports from those countries, which explains why China's imports from the ROW fall by more than the rise in U.S. imports. As a result, China's total imports for this product fall.

Different results are found for soybeans, which is a major export from both the United States and Brazil.[9] Since this product is listed as "bulk" under the BICO classification, we have used the upper-level value $\bar{\beta}^n = 0.030$ from Table 1, so that soybeans are a luxury good with income elasticity greater than unity. In Table 7, the effective subsidy on the United States of 42% in 2020 and 59% in 2021 increase the U.S. exports of soybeans in those years by roughly $300 million and $500 million, respectively. One the other hand, declines of nearly $100 million in

[8] It is readily shown from (25) and (26) that the substitution effects (which are the first terms included in each equation), when summed over the $N_i^n - 1$ countries other than the U.S. in (25) and added to the U.S. effect in (26), equal zero on a crop-by-crop basis.

[9] The United States and Brazil together supply over 80% of global exports, and Argentina is the third-largest world exporter. China was the destination for 61% of U.S. soybean exports and 77% of Brazil's exports in 2017.

each year, are experienced by Brazil and Argentina, with a very slight decline by Uruguay. The remaining countries shown in Table 7 – including Canada, Russia, Ukraine and small suppliers – all have *increases* in their exports to China. Indeed, the *total* reductions in China's ROW imports are modest, at about $150 million in 2020 and only $37 million in 2021, much less than the rise in U.S. imports. So for this product, China's total imports *rise* with the effective subsidy.

Soybeans illustrates the potential for a complementary relationship between China's imports from the United States, which occurs because we are treating soybeans as a luxury good and the expenditure share on the United States is high in many provinces. That combination of parameters creates a strong positive income effect, $\alpha_{i1}^{n}\bar{\beta}^{n}$, as appears in (25) and (26), which is multiplied by $-\ln\delta > 0$ to create an especially strong income effect in 2021. Soybeans is the only product that we have found a complementary relationship between China's imports from the U.S. and from other countries.[10] The fact that China's total imports from the U.S. and ROW are rising for soybeans means that they must be falling for other imported products, because we have held its total imports fixed at *Y* in our theoretical model and at their 2017 level in our zero-growth scenario. We have already seen that China reduces its ROW imports of forest products by more than the increase in U.S. imports, due to the negative income effect, and the same pattern will arise for other inferior goods. But it is worth asking if there are any other features at work in our AIDS model than can contribute to reduced ROW imports?

To answer this question, let us consider China's imports from Canada. As already noted (Table 5), Canada has the greatest percentage loss among the top-five countries exporting to China. But Canada's loss in forest products (Table 6) is not that great, and as we have just seen

[10] In Appendix Tables A6-A9, we report the change in China's imports for the products cotton, corn, pork, and beef, and the fall China's ROW imports for all of these products exceed the rise in U.S. imports. But for soybean oil in Table A10, the reverse is true. None of these products display complementarity, as we have found for soybeans.

(Table 7), it actually gains in soybean exports to China. So where does the large loss in Canada's exports occur? In fact, the top agricultural export from Canada to China is rapeseed, and that is also the product where Canada experiences the greatest drop in exports.[11] We report China's imports of rapeseed in Table 8. China buys from only four countries, but nearly all imports come from Canada, which were $2 billion in 2017. Those imports fall by about $250 million in 2020 and $340 million in 2021 due to the effective subsidy on the United States.

This result is surprising because the United States *did not export* rapeseed to China in 2017, and so there is no effective subsidy on that product in our analysis. Nevertheless, we are finding that China's rapeseed imports from Canada fall. That decline occurs because of the cross-product substitution that we referred to in the previous section. Specifically, each province importing rapeseed will experience a decline in the price of other imports from the U.S. with the effective subsidy. Due to substitution (and negative income effects if they occur), the province ROW imports of those products will fall. But in many cases, the expenditure share S_{ij}^{n} on imports from a particular country *j* can fall to zero, and as the U.S. subsidy is raised, it cannot fall further. The import share on the United States, S_{i1}^{n}, continues to rise with the subsidy, but if the share of competing countries cannot fall past zero, then all shares in each province must be adjusted so that their sum in each province still equals unity. That adjustment is done by subtracting the same, small value from all (positive) shares in a province so that they sum to unity.

This procedure creates a *cross-product* substitution in our analysis, as illustrated by the reduction in Canada's exports of rapeseed. To express this substitution pattern in less technical language, we can think of the subsidy on soybeans – used, for example, to create soybean oil for

[11] In Appendix Tables A11-A17, we show the change in China's imports in products imported from a number of individual countries, including Canada in Table A15 and Argentina in Table A17. Argentina experiences trade diversion over a wide range of products, starting with coarse grains.

consumers – as implemented by command or by fiscal incentives to processing factories in China. Their increased imports from the U.S. would lower the price of soybean oil for consumers, leading to increased demand. That consumer decision would incorporate a positive income effect on soybean purchases. In addition, there can be cross-product substitution effect away from other products, and in particular, away from canola oil that is processed from rapeseed. In this way, the effective subsidy on U.S. soybean imports provided to processing plants in China can result in reduce imports from Canada of rapeseed, as we have found.

6. Conclusions

The administration of President Trump has engaged in numerous trade policy actions with China. In December 2019, the countries reached a Phase One agreement, under which China committed to purchase more imports from the United States in 2020 and 2021. While this agreement may be modified because of the coronavirus pandemic in 2020, it is still worth asking how China would be able to achieve the targets, particularly for agricultural imports.

We have shown that the *most efficient* way for China to import more from the United States is to mimic the effect of an import subsidy on U.S. imports. The magnitude of these "effective" subsidies on the United States depend on the assumptions of how much China's imports would have grown since 2017, and we have considered three scenarios. In the first, if China's agricultural imports grew at the same annual rate from 2017 as during 2007-2017, then we find that the effective subsidies would need to be 12% and 23% to achieve the targets in 2020 and 2021, respectively. But if import growth was only one-half of that amount then the subsidies would need to be 18% and 41%; while if there was zero growth from 2017 then the subsidies would need to be 42% and 59%. In fact, China agricultural imports from the United States *fell* from 2017 to 2019, so we focus on the zero-growth scenario in most of our calculations.

These subsidy rates on the United States are admittedly very high. We are agnostic on whether such an import subsidy is actually put into place, or whether it is achieved via state command. In either case, it can be expected that the increased imports from the United States will result in trade diversion away from the ROW. In our analysis, we have assumed that import increase from the U.S. and decrease from the ROW are just equal when calculated over *all agricultural imports.* But that does not mean that they are equal on product-by-product basis. On the contrary, we have shown that both substitution and income effects influence the importing decisions in China under the effective subsidies on the U.S. The income effects depend on whether goods are inferior or luxuries: that is, whether China's income elasticities for imports from particular source countries are less than or greater than unity.

In our results, we find some products where the increase in China's imports from the United States are *less than* the decrease in imports from the ROW, so that total imports fall. That case occurs for necessity goods, in particular, such as forest products (with income elasticities less than unity for some countries). We have also found products where the decrease in imports from the ROW is *less than the* increase in China's imports from the United States, so that total imports rise. That case occur for soybean imports, which are a luxury good, and in this case the income effect is so strong that China's imports from some countries are complementary with those from the United States, and therefore rise rather than fall with the Phase One targets. Finally, we have also found products – rapeseed, in particular – where China's imports from ROW countries (principally Canada) fall *despite* the fact that the United State does not export this product to China, so there is no effective subsidy on the U.S. This case illustrates the potential for *cross-product* substitution in our AIDS-gravity equation. These results show a rich pattern of trade diversion across source countries due to the Phase One targets.

References

Bown, Chad, 2020. "Unappreciated Hazards of the Phase One Deal," *Trade and Investment Policy Watch*, Peterson Institute for International Economics, January 21. Available at: https://www.piie.com/blogs/trade-and-investment-policy-watch/unappreciated-hazards-us-china-phase-one-deal .

Carter, Colin A. and Sandro Steinbach, 2020. "The Impact of Retaliatory Tariffs on Agricultural and Food Trade," University of California, Davis and University of Connecticut.

China Ministry of Agriculture and Rural Affairs. 2018. *China Agricultural Outlook (2018–2027)*. Beijing: China Agricultural Science and Technology Press.

Fajgelbaum, Pablo D. and Amit K. Khandelwal, 2016. "Measuring the Unequal Gains from Trade," *The Quarterly Journal of Economics*, 131 (3): 1113-1180.

Feenstra, Robert C. and David Weinstein, 2017. "Globalization, Markups, and U.S. Welfare," *Journal of Political Economy*, 125(4), August, 1041-1074.

Gale, Fred, Constanza Valdes, and Mark Ash, 2019. "Interdependence of China, United States, and Brazil in Soybean Trade," *Oil Crops Outlook No. (OCS-19F-01),* U.S. Department of Agriculture, Economic Research Service, June.

Tian, Weimin, 2012. "Provincial Level GINI Indexes and Their Changing Pattern", *Economic Science*, 2, 48-59.

Figure 1: China Agricultural Imports ($ bill) from USA and ROW, 1997-2019

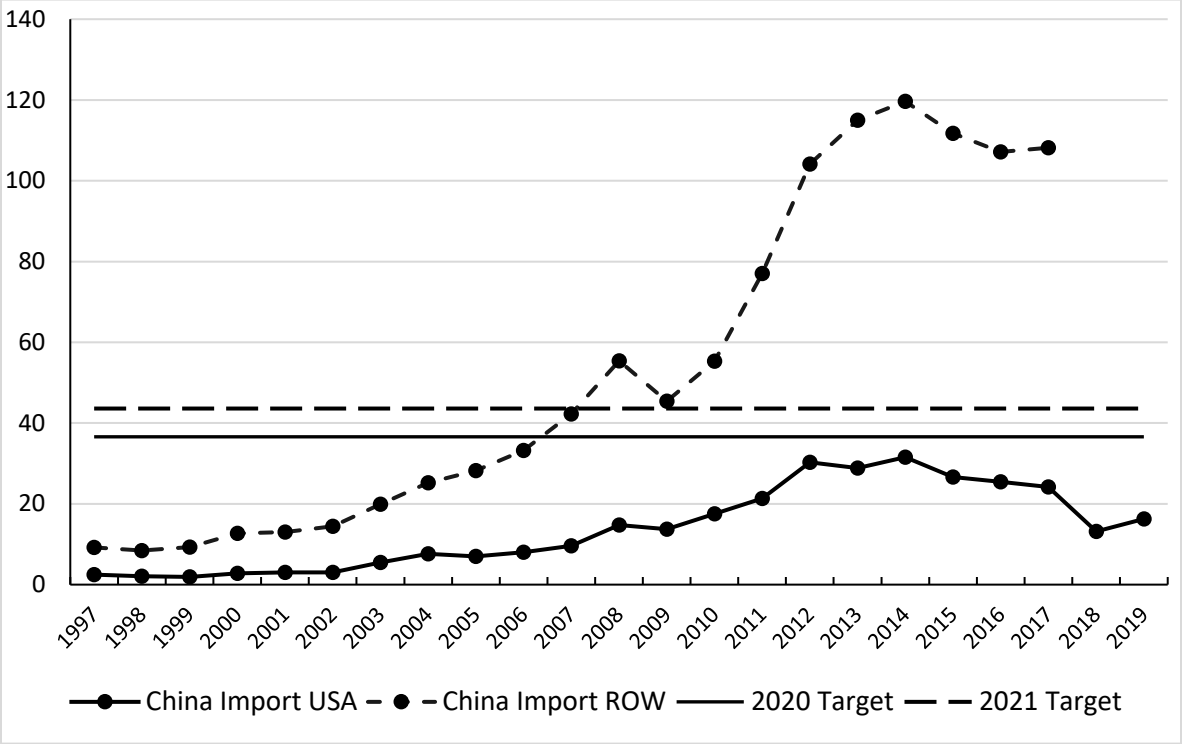
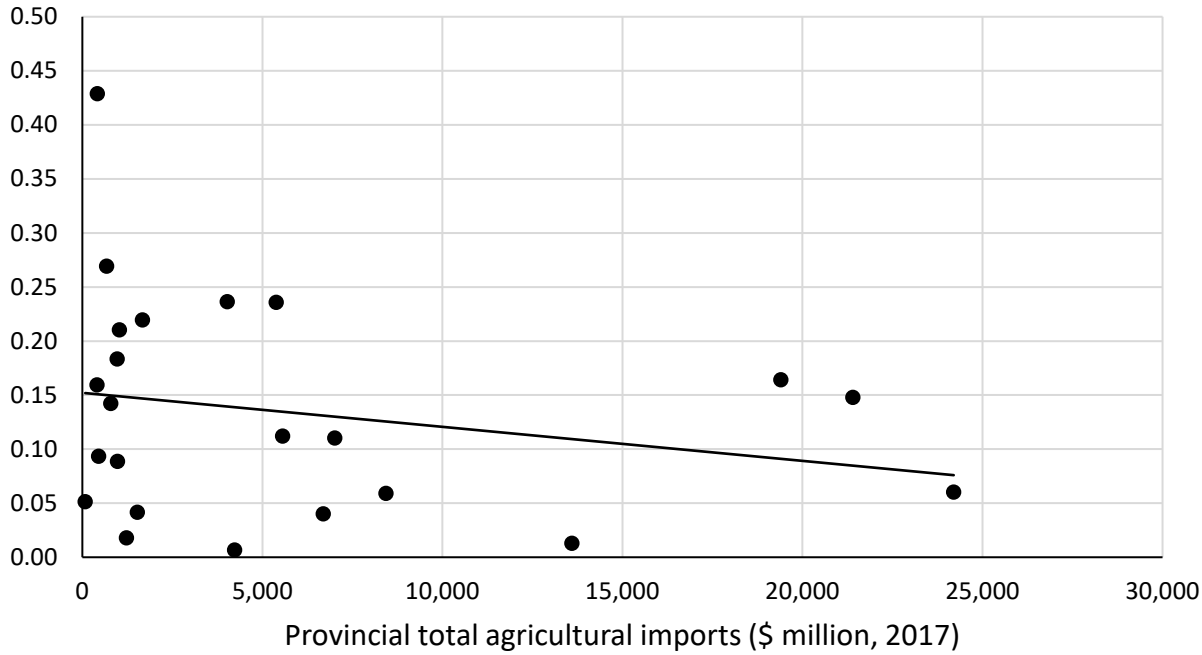


Figure 2: China's Import Share of Soybeans from the USA, 2017 by Province



Sources: China Customs Trade Data, and USDA for 2018 and 2019.

Table 1: Estimates of $\bar{\beta}^n$ Coefficient from Equation (12)

BICO Category	Agricultural Products	$\bar{\beta}^n$ Estimate	Std. Error
Bulk	Wheat	-0.011**	(0.004)
Bulk	Corn	0.001	(0.005)
Bulk	Coarse Grains (except corn)	-0.009*	(0.004)
Bulk	Rice	-0.003	(0.004)
Bulk	Soybeans	0.030**	(0.004)
Bulk	Rapeseed	-0.012*	(0.005)
Bulk	Oilseeds NESOI	0.003	(0.003)
Bulk	Cotton	-0.012**	(0.003)
Bulk	Peanuts	0.001	(0.006)
Bulk	Pulses	0.005	(0.004)
Bulk	Coffee, Unroasted	0.001	(0.005)
Bulk	Cocoa Beans	-0.001	(0.008)
Bulk	Tobacco	0.003	(0.004)
Bulk	Rubber & Allied Gums	-0.025**	(0.003)
Bulk	Other Bulk Commodities	-0.005^{+}	(0.003)
Intermediate	Soybean meal	-0.041**	(0.004)
Intermediate	Oilseed Meal/Cake (except soybean)	0.002	(0.004)
Intermediate	Soybean Oil	-0.014**	(0.004)
Intermediate	Palm Oil	-0.021**	(0.003)
Intermediate	Vegetable Oils NESOI	-0.006*	(0.003)
Intermediate	Distillers Grains	0.003	(0.006)
Intermediate	Hay	0.003	(0.006)
Intermediate	Feeds & Fodders NESOI	0.000	(0.003)
Intermediate	Live Animals	0.011**	(0.003)
Intermediate	Hides & Skins	-0.007*	(0.003)
Intermediate	Animal Fats	-0.000	(0.004)
Intermediate	Essential Oils	0.002	(0.003)
Intermediate	Planting Seeds	0.003	(0.003)
Intermediate	Sugars & Sweeteners	0.002	(0.003)
Intermediate	Other Intermediate Products	-0.015**	(0.003)
Consumer-ready	Beef & Beef Products	0.005	(0.004)
Consumer-ready	Pork & Pork Products	0.009*	(0.004)
Consumer-ready	Poultry Meat & Prods. (except eggs)	0.003	(0.004)
Consumer-ready	Meat Products NESOI	0.002	(0.003)
Consumer-ready	Eggs & Products	0.002	(0.004)
Consumer-ready	Dairy Products	0.009**	(0.003)

Consumer-ready	Fresh Fruit	0.003	(0.004)
Consumer-ready	Processed Fruit	0.003	(0.003)
Consumer-ready	Fresh Vegetables	0.003	(0.004)
Consumer-ready	Processed Vegetables	0.000	(0.003)
Consumer-ready	Fruit & Vegetable Juices	0.001	(0.003)
Consumer-ready	Tree Nuts	0.002	(0.004)
Consumer-ready	Chocolate & Cocoa Products	0.002	(0.003)
Consumer-ready	Snack Foods NESOI	0.003	(0.003)
Consumer-ready	Condiments & Sauces	-0.000	(0.003)
Consumer-ready	Prepared Foods	0.014**	(0.003)
Consumer-ready	Spices	0.002	(0.003)
Consumer-ready	Tea	0.001	(0.004)
Consumer-ready	Coffee, Roasted and Extracts	0.001	(0.004)
Consumer-ready	Non-Alcoholic Bev. (except juices, coffee, tea)	0.000	(0.004)
Consumer-ready	Wine & Beer	0.005	(0.003)
Consumer-ready	Dog & Cat Food	0.001	(0.006)
Consumer-ready	Nursery Prod. & Cut Flowers	0.003	(0.003)
Other	Distilled Spirits	0.003	(0.004)
Other	Ethanol	0.003	(0.004)
Other	Biodiesel & Blends > B30	0.008**	(0.003)
Other	Forest Products	-0.009**	(0.003)
Other	Fish Products	0.001	(0.003)
Observations	23,812		
R-squared	0.386		

Note: Standard errors in parentheses; ** $p<0.01$, * $p<0.05$, $^{+}p<0.10$

Table 2: Product-Exporter Specific β_j^n Estimates from Equation (13)

Country	Soybeans	Forest Products	Cotton	Hides & Skins	Distillers Grains	Coarse Grains (except corn)	Fish Products	Corn	Pork & Pork Products	Biodiesel & Blends > B30	Dairy Products	Wheat	Prepared Foods	Hay
USA	-0.047**	0.013**	-0.006**	0.005**	0.005	-0.009**	-0.005*	-0.022**	-0.003	0.007**	0.000	-0.012**	0.005**	-0.006*
Brazil	-0.067**	-0.009**	0.012**	0.017**	0.001	0.001	0.035**	-0.021	0.009	-0.008*	-0.007	na	-0.001	na
Australia	0.051**	-0.002	-0.008**	-0.027**	-0.029	-0.028**	-0.001	0.001	0.002	0.001	0.004*	-0.006^{+}	-0.001	0.005
Thailand	0.136**	0.014**	-0.007	0.006	-0.001	-0.001	-0.002	0.008	0.001	0.001	-0.004	0.174	0.001	na
Canada	0.005	0.009**	0.004	0.003	0.001	-0.002	0.000	0.003	0.002	-0.004^{+}	0.000	-0.040**	0.001	0.001
Malaysia	0.023^{+}	0.016**	0.012**	0.018**	na	-0.016	0.006*	0.001	0.001	-0.001	0.002	0.01	0.003	0.005
Indonesia	0.010	0.019**	0.002	0.007	na	0.005	0.002	-0.011	-0.004	-0.004	0.003	na	0.000	0.002
New Zealand	0.121	0.007**	0.011	0.005^{+}	na	-0.015	0.006^{+}	na	0.002	-0.001	0.003	na	0.001	0.001
Argentina	-0.011**	-0.009**	0.003	0.014**	na	0.007	0.009^{+}	0.000	0.001	-0.005	-0.002	-0.053	-0.001	0.001
Russia	-0.046**	-0.097**	0.080**	0.047**	na	-0.011	0.014**	-0.005	-0.027*	-0.036**	-0.007^{+}	0.004	-0.011**	-0.001
Vietnam	na	-0.039**	0.008	0.008*	0.001	0.027	-0.001	0.000	0.001	0.001	-0.002	na	-0.002	0.001
France	0.025	0.001	0.004	0.000	0.000	-0.018**	0.003	0.012	0.001	-0.001	0.002	-0.007	0.001	-0.001
India	0.008	0.001	-0.001	0.004	na	0.004	0.004	-0.001	-0.001	0.000	-0.002	0.001	0.000	0.001
Netherlands	-0.008	0.000	-0.001	0.000	-0.001	-0.001	0.004	-0.024	0.002	0.001	-0.002	na	0.001	0.000
Germany	0.004	0.008**	0.000	-0.001	0.000	0.000	0.001	-0.001	0.004	0.004**	0.001	-0.003	0.001	0.000
Uruguay	-0.010*	0.000	0.001	0.003	na	0.001	0.004	na	-0.001	0.002	0.000	na	0.000	na
South Korea	-0.001	0.006**	0.001	0.001	0.001	-0.001	0.000	-0.003	0.005	-0.001	0.001	0.017	0.002	-0.001
Chile	0.018	-0.001	-0.002	0.003	na	0.043**	0.002	0.001	0.002	-0.017**	0.000	na	0.000	na
Japan	0.004	0.001	0.000	0.001	0.000	0.005	-0.002	0.002	0.001	0.015**	0.000	0.005	0.002	0.000

Note: ** Significant at the 1% level; * significant at the 5% level; $^{+}$ significant at the 10% level. Na = not applicable.

Table 3: Forecast China's Import Demand from the United States

	2020	2021	Impact on U.S. imports		
	billion US$		Year	bill US$	Percent
Phase One Target	**36.6**	**43.6**			
Average 2007-17 growth from 2017	33.62	37.52			
Average 2007-17 growth, **subsidy = 12%**	**36.50**	40.15	2020	+2.88	8.6%
Average 2007-17 growth, **subsidy = 23%**	39.96	**43.63**	2021	+6.33	16.9%
0.5*Ave 2007-17 growth from 2017	28.41	30.07			
0.5*Ave 2007-17 growth, **subsidy = 18%**	**36.63**	38.28	2020	+8.22	28.9%
0.5*Ave 2007-17 growth, **subsidy = 41%**	41.67	**43.42**	2021	+13.35	44.4%
Zero growth from 2017	24.1	24.1			
Zero growth from 2017, **subsidy = 42%**	**36.62**	36.62	2020	+12.52	51.9%
Zero growth from 2017, **subsidy = 59%**	43.56	**43.56**	2021	+19.46	80.7%

Table 4: Impact on United States Major Agricultural Exports, Assuming Zero Growth from 2017

	No Subsidy 2020 & 2021	Subsidy=42% Difference from 2020		Subsidy=59% Difference from 2021	
Agricultural Product	**Million US$**	**Million US$**	**Percent**	**Million US$**	**Percent**
Soybeans	13,858.8	289.2	2.1%	529.7	3.8%
Forest Products	2,080.7	359.0	17.3%	558.7	26.9%
Cotton	975.3	278.3	28.5%	429.3	44.0%
Coarse Grains (ex. corn)	918.2	117.7	12.8%	228.0	24.8%
Hides & Skins	898.7	309.6	34.5%	478.7	53.3%
Fish Products	607.3	305.7	50.3%	473.8	78.0%
Pork & Pork Products	535.5	308.6	57.6%	476.7	89.0%
Dairy Products	529.9	322.4	60.8%	499.1	94.2%

Note: Only products with 2017 export sales to China exceeding $500 million are shown. Results for the complete list of products that the United States exported to China in 2017 is in Appendix Table A11.

Table 5: China's Import Demand from the Rest of the World, Zero Growth from 2017

		No Subsidy	**Subsidy=42%**		**Subsidy=59%**	
		2020 & 2021	Difference from 2020		Difference from 2021	
	Country	Billion US$	Billion US$	Percent	Billion US$	Percent
	ROW	105.86	-12.52	-11.8%	-19.46	-18.4%
1	Brazil	24.08	-0.59	-2.5%	-0.96	-4.0%
2	Australia	9.18	-0.99	-10.8%	-1.67	-18.1%
3	Thailand	7.65	-0.51	-6.6%	-0.90	-11.8%
4	Canada	6.38	-0.87	-13.6%	-1.34	-20.9%
5	Indonesia	5.81	-0.49	-8.5%	-0.82	-14.1%
6	New Zealand	5.34	-0.43	-8.1%	-0.75	-14.0%
7	Malaysia	4.34	-0.48	-11.2%	-0.79	-18.3%
8	Vietnam	3.73	-0.57	-15.2%	-0.92	-24.5%
9	Argentina	3.55	-0.31	-8.6%	-0.41	-11.5%
10	France	2.99	-0.42	-14.0%	-0.69	-23.1%
11	Netherlands	2.93	-0.44	-14.9%	-0.65	-22.3%
12	Chile	2.12	-0.26	-12.3%	-0.45	-21.1%
13	Germany	1.97	-0.35	-18.0%	-0.59	-29.9%
14	Uruguay	1.86	-0.20	-11.0%	-0.24	-13.0%
15	Russia	1.77	-0.15	-8.3%	-0.21	-12.0%
16	Spain	1.46	-0.32	-22.0%	-0.53	-36.5%
17	Denmark	1.44	-0.22	-15.2%	-0.36	-24.7%
18	Ukraine	1.13	-0.28	-25.1%	-0.43	-38.5%
19	India	1.09	-0.30	-27.5%	-0.46	-42.4%
20	South Africa	0.97	-0.18	-18.4%	-0.27	-27.7%
21	South Korea	0.96	-0.32	-33.6%	-0.48	-50.1%
22	Belgium	0.88	-0.28	-32.1%	-0.43	-49.0%
23	Ireland	0.86	-0.14	-16.3%	-0.20	-23.5%
24	Philippines	0.78	-0.18	-23.1%	-0.26	-33.5%
25	Taiwan	0.68	-0.21	-31.3%	-0.30	-44.2%
26	United Kingdom	0.62	-0.22	-35.4%	-0.31	-50.7%
27	Japan	0.62	-0.28	-46.0%	-0.40	-63.9%
28	Singapore	0.61	-0.19	-31.0%	-0.27	-44.3%
29	Papua New Guinea	0.59	-0.03	-5.2%	-0.06	-9.9%
30	Italy	0.57	-0.25	-43.4%	-0.34	-60.3%

Note: Only countries with 2017 export sales to China exceeding $500 million are shown. The complete list of products in including in Appendix Table A2, with other growth scenarios shown in Table A3-A4.

Table 6: Forecast of China's Import Demand for Forest Products, Zero growth from 2017

Country	No Subsidy 2020 and 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	2,080.7	359.0	17.3%	558.7	26.9%
ROW	9,199.5	-1,033.6	-11.2%	-1,798.6	-19.6%
Thailand	1,385.5	-22.7	-1.6%	-61.5	-4.4%
Vietnam	998.4	-78.9	-7.9%	-145.2	-14.5%
Australia	749.9	-37.0	-4.9%	-82.9	-11.1%
Papua New Guinea	577.7	-19.3	-3.3%	-45.5	-7.9%
Malaysia	521.9	-20.6	-3.9%	-56.0	-10.7%
Solomon Is	479.8	-15.8	-3.3%	-28.3	-5.9%
Russia	400.5	-48.7	-12.2%	-49.9	-12.5%
Nigeria	387.3	-25.4	-6.6%	-43.9	-11.3%
Indonesia	369.9	-16.1	-4.3%	-37.6	-10.2%
Mozambique	317.6	-49.1	-15.4%	-91.4	-28.8%
Cameroon	288.6	-20.6	-7.1%	-47.4	-16.4%
Eq. Guinea	269.4	-9.9	-3.7%	-22.5	-8.3%
Gabon	233.2	-48.7	-20.9%	-72.2	-31.0%
Chile	224.6	-26.1	-11.6%	-53.8	-24.0%
Congo	217.4	-17.8	-8.2%	-33.7	-15.5%
Romania	168.2	-47.5	-28.3%	-77.4	-46.0%
Canada	167.3	-23.2	-13.9%	-56.0	-33.4%
Germany	153.9	-24.9	-16.2%	-50.4	-32.7%
Belgium	149.7	-27.4	-18.3%	-50.5	-33.7%
Brazil	114.2	-31.7	-27.7%	-50.3	-44.1%

Note: Only countries with 2017 export sales to China exceeding $100 million are shown, though the ROW total is computed over all countries besides the United States. The complete list of countries exporting forest products to China in 2017, with sales over $50,000, is reported in Appendix Table A5.

Table 7: Forecast China's Import Demand for Soybeans, Zero growth from 2017

Country	No Subsidy 2020 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	13,858.8	289.2	2.1%	529.7	3.8%
ROW	25,569.5	-151.5	-0.6%	-37.0	-0.1%
Brazil	20,873.2	-99.4	-0.5%	-104.4	-0.5%
Argentina	2,644.0	-110	-4.2%	-121.5	-4.6%
Uruguay	990.7	-47.6	-4.8%	-1.5	-0.2%
Canada	886.3	2.7	0.3%	46.1	5.2%
Russia	158.4	20.6	13.0%	30.7	19.4%
Ukraine	9.2	8.2	88.4%	6.5	70.5%
Ethiopia	4.5	44.7	>100%	63.6	>100%
Kazakhstan	2.8	0.4	13.0%	0.6	21.2%
Germany	0.2	8.4	>100%	12.1	>100%
Mozambique	0.1	8.4	>100%	12.1	>100%

Note: Only countries with 2017 export sales to China exceeding $50,000 are shown.

Table 8: Forecast of China's Import Demand for Rapeseed, Zero growth from 2017

Country	No Subsidy 2020 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
ROW	2,100.2	-246.6	-11.7%	-336.9	-16.0%
Canada	2,035.1	-239.6	-11.8%	-320.1	-15.7%
Mongolia	26.7	-0.2	-0.6%	-0.4	-1.4%
Australia	25.8	-6.6	-25.7%	-16	-62.2%
Russia	12.6	-0.2	-1.5%	-0.4	-3.2%

Note: All countries with 2017 export sales of rapeseed to China are shown.

Data Appendix

The Chinese import statistics, by the Harmonized System (HS) classification and by source country and destination province over 1997-2017, were acquired by UC Davis from the Customs General Administration of the People's Republic of China. These data are purchased from Mr. George Chen, China Customs Statistics Information Center, Economic Information Agency, Hong Kong; EIAET@PACIFIC.NET.HK . These statistics treat Hong Kong as a separate customs region. The Hong Kong trade statistics for imports, exports, and re-exports over 1997-2015, by HS classification and by source and destination countries, Census and Statistical Department, Hong Kong Special Administrative Region, were also purchased. We merged these dataset to attribute the products re-exported to China from Hong Kong to the origin country exporting to Hong Kong. In this way, we create Chinese imports (including those coming from Hong Kong) of agricultural products by destination province, for 1997-2017.

We further convert the HS classification to the BICO agricultural product classification developed by the United States Department of Agriculture. Based on value or level of processing, agricultural goods are broken into distinct categories: bulk, intermediate, consumer-ready, and other products. Bulk goods, like grains, soybean, cotton, and oilseeds, are relatively standardized products used as raw materials and inputs. They are sold in large quantities at relatively low unit costs. Comparatively, consumer-ready products are high value products that are usually ready for immediate use by consumers. They are typically higher value goods, mostly finished products, like meats, dairy, eggs, fruits and vegetables, processed goods, chocolates and wines. Compare with bulk commodities, they are less substitutable, because they are easy to be

differentiated by brand, quality, sanitary standards, and source countries. Other products are agricultural related products such as fish products, forest products, ethanol, and biodiesel.

Provincial level GDP, population, retail price indexes, and income data are obtained from China Statistical Year books 1997-2017. Provincial level income inequality GINI indexes are from Tian (2012) and then extrapolated to 2017. Distance between Chinese provinces and each of its trading partners is measured as the sum of internal and external distance, which takes into account the fact that the interior provinces are first transport the goods to the economic center or harbors by railway, and then send the goods from the economic center or harbors to the rest of the world. The internal distance is the train hours between the interior province and the economic center (Beijing) or harbor cities (Tianjin, Shanghai, and Guangdong), which is obtained from the Chinese Railroad Timetable. The external distance is the shipping distance from the harbor to the capital of other countries. The shipping distance is obtained from a World Map, which is designed for sketching the maritime transportation.

Table A1: China's Top Imported Products from ROW and USA, 2017

Category	BICO product	Rank in US Exports To China	Share in US Exports To China	Rank in World Exports To China	Share in World Exports To China
B	Soybeans	1	57.4%	1	29.9%
O	Forest Products	2	8.6%	2	8.9%
B	Cotton	3	4.0%	16	1.7%
B	Coarse Grains (ex. corn)	4	4.0%	14	2.2%
I	Hides & Skins	5	3.7%	15	2.2%
O	Fish Products	6	2.5%	5	4.1%
C	Pork & Pork Products	7	2.2%	10	2.8%
C	Dairy Products	8	2.2%	6	4.0%
C	Prepared Foods	9	1.8%	3	4.5%
C	Fresh Fruit	10	1.7%	7	3.8%
I	Hay	11	1.6%	33	0.4%
B	Wheat	12	1.6%	25	0.8%
I	Other Intermediate Products	13	1.5%	4	4.5%
B	Tobacco	14	0.7%	21	0.9%
B	Corn	15	0.7%	31	0.5%
C	Processed Fruit	16	0.6%	27	0.7%
C	Tree Nuts	17	0.6%	28	0.6%
I	Planting Seeds	18	0.6%	39	0.3%
C	Processed Vegetables	19	0.5%	19	1.3%
I	Essential Oils	20	0.5%	36	0.3%
I	Feeds & Fodders NESOI	21	0.5%	37	0.3%
C	Wine & Beer	22	0.3%	12	2.3%
I	Soybean Oil	23	0.3%	32	0.4%
C	Meat Products NESOI	24	0.3%	20	1.1%
I	Distillers Grains	25	0.3%	50	0.1%
B	Peanuts	26	0.2%	44	0.1%
I	Vegetable Oils NESOI	27	0.2%	13	2.3%
C	Chocolate & Cocoa Products	28	0.1%	34	0.4%
C	Beef & Beef Products	29	0.1%	11	2.4%
B	Pulses	30	0.1%	35	0.4%
C	Coffee, Roasted and Extracts	31	0.1%	43	0.2%
I	Live Animals	32	0.1%	40	0.2%
C	Condiments & Sauces	33	0.1%	46	0.1%
C	Snack Foods NESOI	34	0.1%	30	0.5%
B	Oilseeds NESOI	35	0.1%	23	0.8%
C	Fruit & Vegetable Juices	36	< 0.1%	42	0.2%
C	Distilled Spirits	37	< 0.1%	26	0.7%

I	Sugars & Sweeteners	38	< 0.1%	22	0.9%
C	Dog & Cat Food	39	< 0.1%	53	0.0%
C	Nursery Prod. & Cut Flowers	40	< 0.1%	41	0.2%
C	Non-Alcoholic Bev. (ex. juices, coffee, tea)	41	< 0.1%	49	0.1%
I	Animal Fats	42	< 0.1%	48	0.1%
B	Coffee, Unroasted	43	< 0.1%	47	0.1%
B	Rubber & Allied Gums	44	< 0.1%	8	3.7%
C	Tea	45	< 0.1%	45	0.1%
B	Other Bulk Commodities	46	< 0.1%	29	0.6%
C	Fresh Vegetables	47	< 0.1%	56	0.0%
C	Spices	48	< 0.1%	52	0.0%
C	Eggs & Products	49	< 0.1%	58	0.0%
O	Ethanol	50	< 0.1%	55	0.0%
I	Soybean meal	51	< 0.1%	54	0.0%
O	Biodiesel & Blends > B30	52	< 0.1%	57	0.0%
C	Poultry Meat & Prods. (ex. eggs)	53	< 0.1%	24	0.8%
B	Rice	54	< 0.1%	18	1.4%
I	Oilseed Meal/Cake	55	< 0.1%	38	0.3%
B	Cocoa Beans	56	< 0.1%	51	0.0%
I	Palm Oil	57	< 0.1%	9	3.3%
B	Rapeseed	58	nil	17	1.6%
2017 Total Ag Import Value (billion US$)		USA: 24.21		World 132.41	

Note: authors' calculation using trade data from China and Hong Kong's customs office.

Table A2: Forecasted Chinese Imports from Partner Countries, with Zero growth from 2017, Complete list of the countries

	Country	No Subsidy 2020 & 2021 Billion US$	Subsidy=42% Difference from 2020 billion US$	Percent	Subsidy=59% Difference from 2021 billion	Percent
	ROW	105.86	-12.52	-11.8%	-19.46	-18.4%
1	Brazil	24.08	-0.59	-2.5%	-0.96	-4.0%
2	Australia	9.18	-0.99	-10.8%	-1.67	-18.1%
3	Thailand	7.65	-0.51	-6.6%	-0.90	-11.8%
4	Canada	6.38	-0.87	-13.6%	-1.34	-20.9%
5	Indonesia	5.81	-0.49	-8.5%	-0.82	-14.1%
6	New Zealand	5.34	-0.43	-8.1%	-0.75	-14.0%
7	Malaysia	4.34	-0.48	-11.2%	-0.79	-18.3%
8	Vietnam	3.73	-0.57	-15.2%	-0.92	-24.5%
9	Argentina	3.55	-0.31	-8.6%	-0.41	-11.5%
10	France	2.99	-0.42	-14.0%	-0.69	-23.1%
11	Netherlands	2.93	-0.44	-14.9%	-0.65	-22.3%
12	Chile	2.12	-0.26	-12.3%	-0.45	-21.1%
13	Germany	1.97	-0.35	-18.0%	-0.59	-29.9%
14	Uruguay	1.86	-0.20	-11.0%	-0.24	-13.0%
15	Russia	1.77	-0.15	-8.3%	-0.21	-12.0%
16	Spain	1.46	-0.32	-22.0%	-0.53	-36.5%
17	Denmark	1.44	-0.22	-15.2%	-0.36	-24.7%
18	Ukraine	1.13	-0.28	-25.1%	-0.43	-38.5%
19	India	1.09	-0.30	-27.5%	-0.46	-42.4%
20	South Africa	0.97	-0.18	-18.4%	-0.27	-27.7%
21	South Korea	0.96	-0.32	-33.6%	-0.48	-50.1%
22	Belgium	0.88	-0.28	-32.1%	-0.43	-49.0%
23	Ireland	0.86	-0.14	-16.3%	-0.20	-23.5%
24	Philippines	0.78	-0.18	-23.1%	-0.26	-33.5%
25	Taiwan	0.68	-0.21	-31.3%	-0.30	-44.2%
26	United Kingdom	0.62	-0.22	-35.4%	-0.31	-50.7%
27	Japan	0.62	-0.28	-46.0%	-0.40	-63.9%
28	Singapore	0.61	-0.19	-31.0%	-0.27	-44.3%
29	Papua New Guinea	0.59	-0.03	-5.2%	-0.06	-9.9%
30	Italy	0.57	-0.25	-43.4%	-0.34	-60.3%
31	Solomon Is	0.48	-0.02	-3.6%	-0.03	-6.2%
32	Nigeria	0.45	-0.06	-13.3%	-0.09	-19.2%
33	Myanmar	0.42	-0.08	-17.7%	-0.09	-20.3%
34	Peru	0.39	-0.08	-20.0%	-0.12	-30.1%
35	Laos,PDR	0.39	-0.02	-4.5%	-0.03	-8.6%
36	Mozambique	0.36	-0.06	-17.4%	-0.11	-31.5%
37	Norway	0.32	-0.03	-9.7%	-0.06	-17.8%

38	Cameroon	0.30	-0.03	-10.5%	-0.06	-19.3%
39	Mongolia	0.30	-0.01	-4.9%	-0.02	-7.6%
40	Sudan	0.29	-0.06	-21.9%	-0.11	-37.4%
41	Eq. Guinea	0.27	-0.01	-3.7%	-0.02	-8.3%
42	Ecuador	0.27	-0.08	-29.4%	-0.12	-45.3%
43	Finland	0.26	-0.05	-20.3%	-0.08	-29.5%
44	Zimbabwe	0.25	-0.04	-17.6%	-0.06	-25.8%
45	Cuba	0.24	-0.04	-14.6%	-0.07	-30.5%
46	Ethiopia	0.24	0.01	2.5%	0.00	0.9%
47	Gabon	0.23	-0.05	-20.9%	-0.07	-30.8%
48	Congo	0.22	-0.02	-8.6%	-0.03	-15.9%
49	Pakistan	0.21	-0.07	-32.4%	-0.09	-43.8%
50	Turkey	0.20	-0.12	-59.4%	-0.14	-68.3%
51	Mexico	0.20	-0.09	-46.7%	-0.11	-57.3%
52	Romania	0.19	-0.06	-31.3%	-0.09	-47.6%
53	Kazakhstan	0.19	-0.01	-7.0%	-0.02	-10.0%
54	Iran	0.18	-0.05	-30.5%	-0.10	-53.7%
55	Korea,DPR	0.16	-0.02	-12.4%	-0.03	-17.5%
56	Switzerland	0.16	-0.05	-34.0%	-0.07	-47.9%
57	Poland	0.15	-0.08	-52.7%	-0.10	-68.6%
58	Tanzania	0.15	-0.06	-41.7%	-0.10	-69.0%
59	Democratic	0.15	-0.04	-26.0%	-0.06	-41.2%
60	Senegal	0.13	-0.05	-41.0%	-0.08	-65.8%
61	Ghana	0.12	-0.04	-36.0%	-0.06	-53.0%
62	Slovenia	0.11	-0.06	-54.0%	-0.09	-77.7%
63	Egypt	0.11	-0.04	-37.9%	-0.06	-53.1%
64	Uzbekstan	0.09	-0.01	-11.3%	-0.01	-12.9%
65	Benin	0.09	-0.04	-43.1%	-0.08	-83.2%
66	Israel	0.08	-0.04	-53.0%	-0.06	-71.5%
67	ROW	0.08	-0.02	-27.9%	-0.04	-48.1%
68	Sri Lanka	0.08	-0.05	-65.9%	-0.06	-74.2%
69	Cote d'lvoir	0.07	-0.04	-64.1%	-0.06	-86.8%
70	Togo	0.06	-0.04	-62.9%	-0.06	-86.2%
71	Sweden	0.06	-0.05	-76.0%	-0.05	-84.1%
72	United Arab	0.05	-0.04	-72.1%	-0.05	-90.5%
73	Greece	0.04	-0.04	-99.8%	-0.04	-99.5%
74	Bangladesh	0.03	-0.02	-57.2%	-0.02	-70.7%
75	Mali	0.03	-0.02	-70.9%	-0.02	-76.8%
76	Latvia	0.02	-0.02	-88.3%	-0.02	-96.7%
77	Guatemala	0.02	-0.01	-82.3%	-0.02	-98.4%

Table A3: Forecasted China Imports from Partner Countries, with Half of Average 10 year growth, 2007-2017

		No Subsidy		Subsidy=28%		Subsidy=41%	
		2020	2021	Difference from 2020		Difference from 2021	
	Country	Billion US$		Billion US$	Percent	Billion US$	Percent
	ROW	124.70	131.68	-8.22	-6.6%	-13.35	-10.1%
1	Brazil	29.37	31.50	-0.16	-0.6%	-0.29	-0.9%
2	Australia	10.23	10.57	-0.64	-6.2%	-1.09	-10.3%
3	Thailand	8.74	9.13	-0.38	-4.4%	-0.69	-7.6%
4	Canada	7.20	7.59	-0.32	-4.4%	-0.53	-7.0%
5	New Zealand	6.45	6.81	-0.31	-4.8%	-0.54	-8.0%
6	Indonesia	5.92	5.97	-0.30	-5.1%	-0.50	-8.3%
7	Malaysia	4.64	4.84	-0.36	-7.7%	-0.62	-12.9%
8	Argentina	4.64	5.18	-0.05	-1.0%	-0.09	-1.7%
9	France	3.71	3.94	-0.29	-7.9%	-0.51	-12.9%
10	Netherlands	3.41	3.58	-0.30	-8.7%	-0.46	-12.8%
11	Vietnam	3.07	2.94	-0.22	-7.2%	-0.32	-10.9%
12	Germany	2.66	2.86	-0.31	-11.7%	-0.51	-17.9%
13	Chile	2.62	2.77	-0.18	-7.0%	-0.34	-12.4%
14	Uruguay	2.54	2.90	0.00	-0.1%	-0.04	-1.3%
15	Russia	2.23	2.47	-0.06	-2.8%	-0.12	-5.0%
16	Spain	1.77	1.86	-0.24	-13.3%	-0.36	-19.2%
17	Denmark	1.65	1.71	-0.15	-8.9%	-0.26	-15.3%
18	Ukraine	1.37	1.48	-0.16	-11.5%	-0.27	-18.4%
19	South Korea	1.25	1.31	-0.25	-19.6%	-0.40	-30.7%
20	South Africa	1.22	1.26	-0.17	-14.2%	-0.26	-20.9%
21	Taiwan	1.08	1.16	-0.27	-25.2%	-0.40	-34.0%
22	Singapore	1.05	1.21	-0.17	-16.1%	-0.29	-23.8%
23	Ireland	1.02	1.05	-0.09	-9.0%	-0.14	-13.0%
24	Belgium	1.01	1.03	-0.19	-18.8%	-0.31	-29.5%
25	India	0.97	0.93	-0.20	-20.6%	-0.28	-30.2%
26	Japan	0.92	0.99	-0.25	-26.8%	-0.38	-38.3%
27	United Kingdom	0.84	0.90	-0.19	-22.2%	-0.30	-33.1%
28	Italy	0.78	0.77	-0.27	-34.5%	-0.37	-48.1%
29	Papua New Guinea	0.73	0.78	-0.02	-2.4%	-0.04	-5.1%
30	Ethiopia	0.69	0.86	-0.01	-2.1%	-0.04	-4.9%
31	Philippines	0.67	0.64	-0.09	-13.8%	-0.13	-20.9%
32	Solomon Is	0.60	0.64	-0.01	-2.3%	-0.02	-3.6%
33	Nigeria	0.57	0.61	-0.06	-10.4%	-0.11	-18.1%
34	Myanmar	0.52	0.58	-0.05	-8.8%	-0.08	-14.7%
35	Peru	0.46	0.47	-0.05	-10.6%	-0.08	-16.5%
36	Laos,PDR	0.46	0.50	-0.01	-1.9%	-0.01	-2.1%
37	Zimbabwe	0.41	0.47	-0.05	-11.7%	-0.09	-20.0%

38	Cameroon	0.39	0.41	-0.03	-6.6%	-0.04	-10.7%
39	Norway	0.39	0.41	-0.03	-7.3%	-0.05	-11.4%
40	Mozambique	0.34	0.39	-0.04	-12.7%	-0.09	-21.9%
41	Cuba	0.33	0.35	-0.03	-8.4%	-0.06	-17.3%
42	Sudan	0.33	0.34	-0.04	-13.0%	-0.07	-20.5%
43	Mongolia	0.31	0.32	-0.01	-1.6%	-0.01	-2.1%
44	Congo	0.30	0.33	-0.02	-5.2%	-0.04	-11.4%
45	Eq. Guinea	0.30	0.31	0.00	-1.4%	-0.01	-3.5%
46	Pakistan	0.28	0.30	-0.06	-20.7%	-0.12	-39.0%
47	Finland	0.28	0.28	-0.05	-17.7%	-0.06	-20.9%
48	Poland	0.26	0.27	-0.08	-32.0%	-0.11	-40.7%
49	Ecuador	0.25	0.26	-0.03	-13.2%	-0.07	-27.1%
50	Mexico	0.24	0.23	-0.08	-32.3%	-0.09	-37.1%
51	Kazakhstan	0.22	0.23	-0.01	-4.7%	-0.02	-7.8%
52	Switzerland	0.21	0.21	-0.04	-19.9%	-0.07	-31.5%
53	Tanzania	0.20	0.21	-0.05	-23.7%	-0.09	-41.1%
54	Senegal	0.20	0.21	-0.06	-31.9%	-0.09	-45.4%
55	Iran	0.17	0.17	-0.04	-25.1%	-0.06	-36.4%
56	Korea,DPR	0.16	0.16	-0.01	-6.4%	-0.02	-11.6%
57	Israel	0.15	0.16	-0.06	-41.1%	-0.09	-56.0%
58	Slovenia	0.15	0.16	-0.05	-35.0%	-0.07	-44.1%
59	Ghana	0.14	0.14	-0.04	-28.4%	-0.05	-36.4%
60	Turkey	0.14	0.13	-0.05	-37.6%	-0.06	-47.2%
61	Democratic Kampuchea	0.13	0.12	-0.03	-25.3%	-0.05	-42.3%
62	Mali	0.13	0.16	-0.04	-28.1%	-0.07	-46.1%
63	Romania	0.12	0.11	-0.03	-26.5%	-0.03	-31.4%
64	United Arab Emirates	0.12	0.12	-0.06	-51.1%	-0.07	-60.5%
65	Sri Lanka	0.11	0.11	-0.02	-13.9%	-0.03	-28.8%
66	ROW	0.11	0.10	-0.05	-45.1%	-0.06	-55.4%
67	Uzbekistan	0.10	0.10	-0.05	-49.1%	-0.06	-57.8%
68	Sweden	0.10	0.11	0.00	-4.8%	-0.01	-5.9%
69	Egypt	0.10	0.09	-0.02	-20.5%	-0.02	-27.3%
70	Gabon	0.08	0.05	-0.01	-11.4%	-0.01	-23.4%
71	Greece	0.08	0.08	-0.05	-62.6%	-0.05	-65.7%
72	Togo	0.07	0.08	-0.03	-37.1%	-0.05	-59.2%
73	Bangladesh	0.07	0.08	-0.03	-45.0%	-0.05	-67.1%
74	Benin	0.06	0.06	-0.02	-26.6%	-0.03	-45.7%
75	Guatemala	0.04	0.03	-0.03	-68.7%	-0.03	-89.7%
76	Cote d'lvoire	0.02	0.01	-0.01	-81.4%	-0.01	-76.5%
77	Latvia	0.01	0.01	-0.01	-74.0%	-0.01	-87.9%

Table A4: Forecasted China Imports from Partner Countries, with Average 10 year growth, 2007-2017

		No Subsidy		Subsidy=12%		Subsidy=23%	
		2020	2021	Difference from 2020		Difference from 2021	
	Country	Billion US$		billion US$	Percent	billion US$	Percent
	ROW	147.08	164.56	-2.88	-2.0%	-6.11	-3.7%
1	Brazil	36.25	41.69	-0.05	-0.1%	-0.15	-0.4%
2	Australia	11.32	12.19	-0.24	-2.1%	-0.55	-4.5%
3	Thailand	10.03	11.12	-0.14	-1.4%	-0.35	-3.1%
4	Canada	8.60	9.76	-0.11	-1.3%	-0.22	-2.2%
5	New Zealand	7.65	8.56	-0.11	-1.4%	-0.28	-3.3%
6	Argentina	6.40	7.81	-0.01	-0.1%	-0.04	-0.5%
7	Indonesia	6.11	6.40	-0.10	-1.7%	-0.20	-3.1%
8	Malaysia	5.17	5.44	-0.14	-2.7%	-0.32	-5.8%
9	France	4.38	4.82	-0.11	-2.5%	-0.25	-5.3%
10	Netherlands	3.95	4.36	-0.10	-2.6%	-0.23	-5.2%
11	Uruguay	3.70	4.62	0.00	0.1%	-0.01	-0.3%
12	Germany	3.26	3.65	-0.12	-3.7%	-0.24	-6.7%
13	Chile	3.03	3.27	-0.07	-2.4%	-0.18	-5.5%
14	Russia	2.99	3.59	-0.02	-0.8%	-0.07	-1.8%
15	Vietnam	2.83	2.87	-0.06	-2.2%	-0.09	-3.2%
16	Spain	2.07	2.31	-0.08	-4.0%	-0.17	-7.2%
17	Denmark	1.81	1.91	-0.06	-3.2%	-0.12	-6.3%
18	Ukraine	1.74	2.04	-0.07	-3.8%	-0.15	-7.2%
19	Singapore	1.52	1.87	-0.06	-3.9%	-0.14	-7.6%
20	South Korea	1.39	1.43	-0.09	-6.2%	-0.18	-12.9%
21	South Africa	1.36	1.53	-0.06	-4.2%	-0.11	-7.3%
22	Taiwan	1.29	1.42	-0.10	-7.5%	-0.16	-11.5%
23	Ethiopia	1.22	1.63	0.00	-0.3%	-0.02	-1.1%
24	Japan	1.12	1.25	-0.09	-7.8%	-0.15	-12.2%
25	Ireland	1.11	1.17	-0.03	-2.4%	-0.05	-3.9%
26	Belgium	1.06	1.08	-0.06	-6.0%	-0.13	-11.6%
27	United Kingdom	1.02	1.13	-0.06	-6.3%	-0.15	-13.4%
28	India	0.88	0.94	-0.05	-6.2%	-0.11	-11.7%
29	Papua New Guinea	0.87	0.97	-0.01	-0.8%	-0.02	-1.8%
30	Italy	0.73	0.67	-0.09	-12.5%	-0.14	-20.1%
31	Solomon Is	0.73	0.82	0.00	-0.5%	-0.01	-1.4%
32	Myanmar	0.69	0.80	-0.02	-2.9%	-0.05	-6.3%
33	Nigeria	0.64	0.65	-0.03	-4.0%	-0.05	-7.3%
34	Philippines	0.60	0.57	-0.03	-4.3%	-0.05	-8.6%
35	Zimbabwe	0.59	0.72	-0.02	-3.8%	-0.06	-8.2%
36	Laos,PDR	0.58	0.68	0.00	-0.4%	-0.01	-0.8%
37	Peru	0.50	0.52	-0.02	-3.2%	-0.03	-5.9%

38	Mozambique	0.49	0.59	-0.02	-4.0%	-0.05	-7.7%
39	Cameroon	0.45	0.48	-0.01	-2.4%	-0.02	-4.4%
40	Norway	0.44	0.48	-0.01	-1.9%	-0.02	-3.5%
41	Cuba	0.39	0.42	-0.01	-3.0%	-0.04	-8.4%
42	Congo	0.38	0.42	-0.02	-4.1%	-0.04	-9.5%
43	Sudan	0.38	0.42	-0.01	-1.9%	-0.02	-5.7%
44	Mongolia	0.34	0.36	0.00	-0.5%	0.00	-1.1%
45	Eq. Guinea	0.32	0.38	-0.02	-7.7%	-0.05	-12.0%
46	Poland	0.32	0.32	0.00	-0.7%	-0.01	-2.5%
47	Pakistan	0.31	0.30	-0.02	-7.3%	-0.06	-19.4%
48	Finland	0.28	0.28	-0.02	-6.3%	-0.02	-6.6%
49	Ecuador	0.26	0.25	-0.01	-5.2%	-0.04	-15.5%
50	Kazakhstan	0.25	0.28	0.00	-1.4%	-0.01	-3.0%
51	Mexico	0.23	0.25	-0.02	-9.2%	-0.03	-11.5%
52	Senegal	0.23	0.23	-0.02	-7.7%	-0.05	-20.3%
53	Switzerland	0.21	0.27	-0.02	-7.2%	-0.04	-14.6%
54	Mali	0.21	0.22	-0.01	-6.3%	-0.02	-8.9%
55	Tanzania	0.20	0.17	-0.03	-13.1%	-0.04	-21.7%
56	Iran	0.19	0.20	-0.01	-6.5%	-0.03	-15.6%
57	Israel	0.19	0.22	-0.02	-9.3%	-0.03	-11.4%
58	Korea,DPR	0.17	0.16	0.00	-2.4%	-0.01	-4.8%
59	Slovenia	0.16	0.17	-0.02	-12.9%	-0.05	-28.8%
60	Romania	0.13	0.14	-0.01	-5.8%	-0.02	-13.0%
61	Ghana	0.12	0.13	-0.01	-12.0%	-0.02	-18.1%
62	United Arab Emirates	0.12	0.13	-0.01	-11.8%	-0.02	-13.7%
63	Turkey	0.12	0.11	-0.01	-5.2%	-0.02	-16.5%
64	ROW	0.12	0.10	-0.01	-9.8%	-0.01	-10.6%
65	Uzbekistan	0.11	0.12	0.00	-1.4%	0.00	-0.4%
66	Sweden	0.10	0.11	-0.01	-12.7%	-0.02	-15.9%
67	Democratic Kampuchea	0.10	0.06	-0.01	-13.1%	-0.02	-41.7%
68	Sri Lanka	0.10	0.09	-0.01	-14.9%	-0.01	-13.3%
69	Greece	0.09	0.10	-0.01	-15.7%	-0.03	-25.3%
70	Togo	0.08	0.07	-0.01	-15.5%	-0.02	-27.2%
71	Bangladesh	0.08	0.06	0.00	-5.3%	-0.01	-8.9%
72	Egypt	0.08	0.06	-0.01	-14.4%	-0.02	-26.3%
73	Gabon	0.07	0.10	0.00	-2.9%	-0.01	-6.4%
74	Benin	0.05	0.04	-0.01	-11.8%	-0.01	-18.6%
75	Guatemala	0.02	0.02	-0.01	-27.4%	-0.01	-48.3%
76	Cote d'lvoire	0.01	0.01	< 0.01	-35.4%	< 0.01	-4.9%
77	Latvia	< 0.01	< 0.01	< 0.01	-37.0%	< 0.01	-100.7%

Table A5: Forecast of China's Import Demand for Forest Products, Zero Growth from 2017, Partner Countries with Exports > $50,000

Country	No Subsidy 2020 and 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	2,080.7	359.0	17.3%	558.7	26.9%
ROW	9,199.5	-1,033.6	-11.2%	-1,798.6	-19.6%
Thailand	1,385.5	-22.7	-1.6%	-61.5	-4.4%
Vietnam	998.4	-78.9	-7.9%	-145.2	-14.5%
Australia	749.9	-37.0	-4.9%	-82.9	-11.1%
Papua New Guinea	577.7	-19.3	-3.3%	-45.5	-7.9%
Malaysia	521.9	-20.6	-3.9%	-56.0	-10.7%
Solomon Is	479.8	-15.8	-3.3%	-28.3	-5.9%
Russia	400.5	-48.7	-12.2%	-49.9	-12.5%
Nigeria	387.3	-25.4	-6.6%	-43.9	-11.3%
Indonesia	369.9	-16.1	-4.3%	-37.6	-10.2%
Mozambique	317.6	-49.1	-15.4%	-91.4	-28.8%
Cameroon	288.6	-20.6	-7.1%	-47.4	-16.4%
Eq. Guinea	269.4	-9.9	-3.7%	-22.5	-8.3%
Gabon	233.2	-48.7	-20.9%	-72.2	-31.0%
Chile	224.6	-26.1	-11.6%	-53.8	-24.0%
Congo	217.4	-17.8	-8.2%	-33.7	-15.5%
Romania	168.2	-47.5	-28.3%	-77.4	-46.0%
Canada	167.3	-23.2	-13.9%	-56.0	-33.4%
Germany	153.9	-24.9	-16.2%	-50.4	-32.7%
Belgium	149.7	-27.4	-18.3%	-50.5	-33.7%
Brazil	114.2	-31.7	-27.7%	-50.3	-44.1%
Ghana	91.0	-21.1	-23.2%	-36.1	-39.6%
France	87.2	-20.9	-23.9%	-31.1	-35.6%
Laos,PDR	78.4	-11.2	-14.3%	-23.5	-30.0%
South Africa	57.9	-23.7	-40.9%	-42.5	-73.3%
Philippines	57.0	-15.8	-27.7%	-25.0	-43.8%
Peru	54.5	-21.1	-38.6%	-29.4	-54.0%
India	48.5	-11.5	-23.6%	-25.1	-51.8%
Italy	45.2	-16.9	-37.4%	-29.0	-64.3%
Myanmar	43.8	-28.8	-65.9%	-30.6	-69.8%
Netherlands	39.9	-18.9	-47.3%	-24.9	-62.4%
Tanzania	39.0	-17.3	-44.4%	-33.1	-84.9%
Slovenia	29.8	-16.2	-54.3%	-23.2	-77.7%

New Zealand	29.6	-11.6	-39.1%	-23.7	-79.9%
Taiwan	27.3	-7.8	-28.6%	-13.8	-50.5%
Benin	26.1	-9.4	-36.0%	-23.6	-90.3%
Dem. Kampuchea	25.4	-11.7	-46.3%	-17.2	-67.9%
Ecuador	23.9	-16.5	-69.0%	-21.6	-90.2%
Ukraine	21.8	-8.3	-38.1%	-12.9	-59.3%
Japan	21.4	-10.0	-46.6%	-15.9	-74.1%
Uruguay	20.1	-15.6	-77.4%	-19.6	-97.2%
Senegal	19.3	-10.9	-56.4%	-17.6	-91.2%
Singapore	17.1	-8.5	-49.7%	-17.1	-100.0%
Poland	16.8	-10.3	-61.6%	-16.1	-95.9%
Spain	14.4	-11.3	-78.3%	-13.0	-89.9%
Latvia	12.1	-12.1	-100.0%	-12.1	-100.0%
Switzerland	11.3	-2.8	-24.9%	-6.3	-55.6%
Mexico	10.3	-6.1	-59.8%	-9.6	-93.8%
Denmark	8.1	-8.0	-98.5%	-8.1	-100.0%
Mali	6.5	-6.5	-100.0%	-6.5	-100.0%
Sweden	5.6	-5.6	-100.0%	-5.6	-100.0%
South Korea	4.6	-4.0	-87.0%	-4.6	-100.0%
Korea,DPR	4.6	-0.7	-16.3%	-1.1	-24.1%
Sri Lanka	3.9	-3.9	-100.0%	-3.9	-100.0%
Finland	3.7	-3.7	-100.0%	-3.7	-100.0%
Bangladesh	3.6	-1.2	-33.6%	-1.4	-37.8%
Cote d'lvoire	3.6	-3.6	-100.0%	-3.6	-100.0%
Turkey	3.6	-1.9	-53.3%	-2.7	-76.8%
Argentina	1.9	-1.9	-100.0%	-1.9	-100.0%
Guatemala	1.8	-1.8	-100.0%	-1.8	-100.0%
Greece	1.2	-1.2	-100.0%	-1.2	-100.0%
United Arab Emirates	1.0	-1.0	-100.0%	-1.0	-100.0%
United Kingdom	0.9	-0.9	-100.0%	-0.9	-100.0%
Norway	0.5	-0.5	-100.0%	-0.5	-100.0%
Pakistan	0.1	-0.1	-100.0%	-0.1	-100.0%
Egypt	0.1	-0.1	-100.0%	-0.1	-100.0%
Ireland	0.1	-0.1	-100.0%	-0.1	-100.0%
Israel	0.1	-0.1	-100.0%	-0.1	-100.0%

Note: Only countries with 2017 exports to China greater than $50,000 are reported.

Table A6: Forecast of China's Import Demand for Cotton, Zero Growth from 2017

Country	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Subsidy=42% Difference from 2020 Percent	Subsidy=59% Difference from 2021 Million US$	Subsidy=59% Difference from 2021 Percent
United States	975.3	278.3	28.5%	429.3	44.0%
ROW	1,234.6	-357.8	-29.0%	-536.6	-43.5%
Australia	480	-63.4	-13.2%	-103.9	-21.6%
India	216.3	-43.7	-20.2%	-79	-36.5%
Brazil	124	-42	-33.9%	-68.4	-55.2%
Iran	103.6	-28.5	-27.6%	-53.2	-51.4%
Uzbekistan	68.7	-8.1	-11.8%	-9.6	-14.1%
Benin	61.9	-27.2	-43.9%	-49.6	-80.1%
Sudan	23.8	-14	-58.8%	-23.8	-100.0%
Togo	23.1	-14.5	-62.9%	-22.9	-99.0%
Cote d'lvoire	17.8	-15.7	-88.3%	-17.5	-98.7%
Greece	17.4	-17.4	-100.0%	-17.4	-100.0%
Mexico	17.3	-12.9	-74.8%	-17.3	-100.0%
Turkey	16.7	-15.9	-95.3%	-16.7	-100.0%
Israel	12.1	-11.4	-94.6%	-11.7	-97.3%
Cameroon	10.5	-8.8	-83.9%	-8.9	-84.3%
Egypt	7.9	-7.8	-99.3%	-7.9	-100.0%
Kazakhstan	5.6	-1.3	-23.7%	-1.5	-26.4%
South Africa	5.4	-3.2	-59.8%	-4.7	-85.6%
Malaysia	4.8	-4.8	-100.0%	-4.8	-100.0%
United Arab Emirates	3.9	-3.9	-100.0%	-3.9	-100.0%
Italy	1.5	-0.8	-53.6%	-1.5	-100.0%
Canada	1.4	-1.4	-100.0%	-1.4	-100.0%
Zimbabwe	1.4	-1.4	-100.0%	-1.4	-100.0%
Russia	1.2	-1.2	-100.0%	-1.2	-100.0%
Pakistan	1.2	-1.2	-100.0%	-1.2	-100.0%
Spain	1	-1	-100.0%	-1	-100.0%
Korea Rep	0.9	-0.9	-100.0%	-0.9	-100.0%
Senegal	0.9	-0.9	-100.0%	-0.9	-100.0%
Vietnam	0.8	-0.8	-100.0%	-0.8	-100.0%
Singapore	0.8	-0.8	-100.0%	-0.8	-100.0%
Tanzania	0.7	-0.7	-100.0%	-0.7	-100.0%
Nigeria	0.6	-0.6	-100.0%	-0.6	-100.0%
Argentina	0.5	-0.5	-100.0%	-0.5	-100.0%
Taiwan	0.5	-0.5	-100.0%	-0.5	-100.0%
Mozambique	0.5	-0.5	-100.0%	-0.5	-100.0%
Belgium	0.2	-0.2	-100.0%	-0.2	-100.0%

Note: Only countries with 2017 exports to China greater than $50,000 are reported.

Table A7: Forecast of China's Import Demand for Corn

Country	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	147.5	127.6	86.5%	186.2	126.2%
ROW	425.5	-136.5	-32.1%	-199.4	-46.8%
Ukraine	354.5	-134.9	-38.0%	-196.9	-55.5%
Laos, PDR	45.2	-0.3	-0.6%	-0.6	-1.3%
Myanmar	24.5	-0.3	-1.1%	-0.6	-2.4%
Peru	0.6	-0.6	-100.0%	-0.6	-100.0%
Canada	0.5	-0.4	-80.5%	-0.5	-100.0%
Russia	0.3	-0.1	-48.0%	-0.2	-85.7%

Note: Only countries with 2017 exports to China greater than $50,000 are reported.

Table A8: Forecast of China's Import Demand for Pork, Zero Growth from 2017

Country	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	535.5	308.6	57.6%	476.7	89.0%
ROW	3,155.3	-510.9	-16.2%	-875.9	-27.8%
Spain	645.6	-55.2	-8.6%	-113.9	-17.6%
Germany	607.3	-51.8	-8.5%	-101.3	-16.7%
Canada	456.9	-57.7	-12.6%	-113.6	-24.9%
Denmark	400.1	-49	-12.2%	-81.3	-20.3%
Netherlands	311.5	-53.2	-17.1%	-87.2	-28.0%
France	228.3	-53.6	-23.5%	-86.2	-37.8%
Brazil	112.5	-42.5	-37.8%	-65	-57.8%
Chile	100.5	-31	-30.9%	-51.9	-51.7%
Ireland	98.1	-37.9	-38.6%	-55.7	-56.7%
United Kingdom	96.1	-33.4	-34.8%	-54.4	-56.6%
Belgium	38.9	-20.2	-51.8%	-24.3	-62.6%
Slovenia	37.3	-13.7	-36.9%	-28.2	-75.7%
Romania	14	-3.4	-24.6%	-4.7	-33.8%
Mexico	3.2	-3.1	-97.6%	-3.1	-97.6%
Italy	2.8	-2.8	-100.0%	-2.8	-100.0%
Finland	2.0	-2.0	-100.0%	-2.0	-100.0%
Korea Rep	0.1	-0.1	-100.0%	-0.1	-100.0%
Cote d'lvoire	0.1	-0.1	-100.0%	-0.1	-100.0%

Note: Only countries with 2017 exports to China greater than $50,000 are reported.

Table A9: Forecast of China's Import Demand for Beef, Zero Growth from 2017

Country	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	25.1	240.4	956.4%	370	1,472.4%
ROW	3,091.7	-349.9	-11.3%	-626.5	-20.3%
Brazil	870.4	-70	-8.0%	-140.9	-16.2%
Uruguay	683.9	-62.5	-9.1%	-103.5	-15.1%
Australia	672.7	-69.4	-10.3%	-138.6	-20.6%
New Zealand	396.2	-59.7	-15.1%	-109.7	-27.7%
Argentina	369.9	-45.8	-12.4%	-60.6	-16.4%
Canada	79.3	-30.2	-38.1%	-54.2	-68.4%
Chile	14.6	-8.3	-56.8%	-14.2	-97.1%
South Africa	4.3	-3.5	-80.3%	-4.3	-100.0%
Mexico	0.2	-0.2	-100.0%	-0.2	-100.0%
Korea Rep	0.1	-0.1	-100.0%	-0.1	-100.0%
Ukraine	0.1	-0.1	-100.0%	-0.1	-100.0%

Note: Only countries with 2017 exports to China greater than $50,000 are reported.

Table A10: Forecast of China's Import Demand for Soybean Oil, Zero growth from 2017

Country	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
United States	70.4	229.5	326.2%	351.1	499.0%
ROW	464.7	-174.8	-37.6%	-273.7	-58.9%
Brazil	267.9	-73.1	-27.3%	-136.1	-50.8%
Russia	107.9	-41.9	-38.9%	-61	-56.5%
Ukraine	54.9	-34.1	-62.2%	-47.2	-85.9%
Turkey	27.1	-22.1	-81.5%	-25.8	-95.2%
Vietnam	2.5	-2.5	-100.0%	-2.5	-100.0%
Greece	0.7	-0.7	-100.0%	-0.7	-100.0%
Malaysia	0.1	-0.1	-100.0%	-0.1	-100.0%
France	0.1	-0.1	-100.0%	-0.1	-100.0%
Sweden	0.1	-0.1	-100.0%	-0.1	-100.0%

Note: Only countries with 2017 exports to China greater than $50,000 are reported.

Table A11: Impact on United States, Zero Growth from 2017, Complete list of Products

Agricultural Product	No Subsidy 2020 & 21 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
Soybeans	13858.8	289.2	2.1%	529.7	3.8%
Forest Products	2080.7	359	17.3%	558.7	26.9%
Cotton	975.3	278.3	28.5%	429.3	44.0%
Coarse Grains (ex. corn)	918.2	117.7	12.8%	228	24.8%
Hides & Skins	898.7	309.6	34.5%	478.7	53.3%
Fish Products	607.3	305.7	50.3%	473.8	78.0%
Pork & Pork Products	535.5	308.6	57.6%	476.7	89.0%
Dairy Products	529.9	322.4	60.8%	499.1	94.2%
Prepared Foods	426	333.7	78.3%	517.4	121.4%
Fresh Fruit	400.9	299.1	74.6%	463.2	115.5%
Wheat	390.4	210.6	53.9%	316.4	81.0%
Hay	387.3	241.8	62.4%	367.8	95.0%
Other Intermediate Products	366	336.1	91.8%	521.1	142.4%
Tobacco	166.7	139.5	83.7%	212.9	127.7%
Processed Fruit	155.5	329.4	211.8%	510.4	328.3%
Corn	147.5	127.6	86.5%	186.2	126.2%
Tree Nuts	144.8	305	210.6%	470.8	325.1%
Planting Seeds	140.7	220.2	156.5%	341.5	242.7%
Processed Vegetables	126	313	248.5%	484.2	384.4%
Essential Oils	123	314.7	255.8%	486.5	395.4%
Feeds & Fodders NESOI	120.8	304.7	252.3%	471.3	390.3%
Wine & Beer	80.7	331.1	410.5%	513.5	636.6%
Soybean Oil	70.4	229.5	326.2%	351.1	499.0%
Meat Products NESOI	69.8	269.6	386.3%	416.7	597.1%
Distillers Grains	65.2	62.1	95.1%	85.2	130.6%
Peanuts	59.4	65.2	109.7%	99.1	166.8%
Vegetable Oils NESOI	42.7	323.5	756.8%	501.1	>1,000%
Chocolate & Cocoa Products	25.5	299.4	>1,000%	463.5	>1,000%
Beef & Beef Products	25.1	240.4	956.4%	370	>1,000%
Pulses	24.7	228.7	924.7%	351.5	>1,000%
Coffee, Roasted and Extracts	20	235.1	>1,000%	364.4	>1,000%
Live Animals	18.9	271.3	>1,000%	418.6	>1,000%
Condiments & Sauces	13.8	305.8	>1,000%	473.2	>1,000%

Snack Foods NESOI	13.6	310.1	>1,000%	480.3	>1,000%
Oilseeds NESOI	12.7	170.7	>1,000%	267	>1,000%
Fruit & Vegetable Juices	10.9	287.8	>1,000%	445.2	>1,000%
Distilled Spirits	9.7	226.6	>1,000%	352.6	>1,000%
Sugars & Sweeteners	7.4	303.2	>1,000%	469.6	>1,000%
Dog & Cat Food	4.4	159.9	>1,000%	247.2	>1,000%
Nursery Products & Cut Flowers	4.1	296	>1,000%	456.3	>1,000%
Non-Alcoholic Bev.	3	223.3	>1,000%	346.7	>1,000%
Animal Fats	2.4	172.6	>1,000%	267.4	>1,000%
Coffee, Unroasted	1	209.6	>1,000%	324.6	>1,000%
Rubber & Allied Gums	0.8	157.5	>1,000%	244.3	>1,000%
Tea	0.7	198.3	>1,000%	307.9	>1,000%
Other Bulk Commodities	0.6	212.7	>1,000%	330.2	>1,000%
Fresh Vegetables	0.5	148.7	>1,000%	229.9	>1,000%
Spices	0.4	229.2	>1,000%	352.9	>1,000%
Ethanol	0.3	125.3	>1,000%	190.5	>1,000%
Eggs & Products	0.3	112.4	>1,000%	176.4	>1,000%
Soybean meal	0.2	93.8	>1,000%	146.5	>1,000%
Biodiesel & Blends > B30	0.1	43.9	>1,000%	65.6	>1,000%
Poultry Meat & Prods. (ex. eggs)	0.1	44.5	>1,000%	69.2	>1,000%
Rice	0.1	112.8	>1,000%	176.1	>1,000%
Oilseed Meal/Cake (ex. soybean)	< 0.1	13.9	>1,000%	21.1	>1,000%
Cocoa Beans	< 0.1	11.0	>1,000%	16.3	>1,000%
Palm Oil	< 0.1	34.7	>1,000%	54.8	>1,000%

Note: All products that were exported to China in 2017 are reported, with < 0.1 indicating that export sales or the drop in exports was less than $50,000.

Table A12: Impact on Brazil, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 21 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
Soybeans	20873.2	-99.4	-0.5%	-104.4	-0.5%
Poultry Meat & Prods.	873	-38.1	-4.4%	-82.9	-9.5%
Beef & Beef Products	870.4	-70	-8.0%	-140.9	-16.2%
Sugars & Sweeteners	347.9	-37.3	-10.7%	-78.3	-22.5%
Soybean Oil	267.9	-73.1	-27.3%	-136.1	-50.8%
Tobacco	263.8	-44.6	-16.9%	-74.8	-28.4%
Cotton	124	-42	-33.9%	-68.4	-55.2%
Forest Products	114.2	-31.7	-27.7%	-50.3	-44.1%
Pork & Pork Products	112.5	-42.5	-37.8%	-65	-57.8%
Fruit & Vegetable Juices	74.6	-24.3	-32.6%	-35.9	-48.2%
Vegetable Oils NESOI	38.1	-19.5	-51.3%	-36.1	-94.8%
Processed Fruit	26.2	-7.2	-27.4%	-12.6	-48.2%
Other Intermediate Products	22.1	-7	-31.9%	-11.7	-52.8%
Feeds & Fodders NESOI	14.7	-9.4	-63.6%	-12.7	-86.3%
Essential Oils	11.7	-9.5	-81.2%	-11.7	-100.0%
Coffee, Unroasted	10.9	-8.8	-80.6%	-10.4	-95.9%
Prepared Foods	10.7	-8.7	-81.4%	-10.7	-100.0%
Other Bulk Commodities	10.5	-10.5	-100.0%	-10.5	-100.0%
Fish Products	7.9	-1.8	-22.6%	-1.3	-16.7%
Meat Products NESOI	2.5	-2.5	-100.0%	-2.5	-100.0%
Coffee, Roasted and Extracts	1.4	-1.4	-100.0%	-1.4	-100.0%
Spices	1.4	-1.4	-100.0%	-1.4	-100.0%
Wine & Beer	0.8	-0.8	-100.0%	-0.8	-100.0%
Chocolate & Cocoa Products	0.3	-0.3	-100.0%	-0.3	-100.0%
Tree Nuts	0.2	-0.2	-100.0%	-0.2	-100.0%
Snack Foods NESOI	0.2	-0.2	-100.0%	-0.2	-100.0%
Nursery Products & Cut Flowers	0.2	-0.2	-100.0%	-0.2	-100.0%
Hides & Skins	0.1	-0.1	-100.0%	-0.1	-100.0%
Non-Alcoholic Bev.	0.1	-0.1	-100.0%	-0.1	-100.0%
Distilled Spirits	0.1	-0.1	-100.0%	-0.1	-100.0%
Dog & Cat Food	0.1	-0.1	-100.0%	-0.1	-100.0%
Dairy Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Fresh Fruit	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Processed Vegetables	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

Planting Seeds	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Rubber & Allied Gums	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Tea	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Eggs & Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Soybean meal	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

Note: All products that were exported from this country to China in 2017 are reported, with the value "< 0.1" indicating that exports or the drop in exports was less than $50,000. When the percentage drop in export sales is -100.0%, then country exports became zero under the effective subsidy to the U.S.

Table A13: Impact on Australia, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Subsidy=42% Difference from 2020 Percent	Subsidy=59% Difference from 2021 Million US$	Subsidy=59% Difference from 2021 Percent
Other Intermediate Products	2,062.2	-46.2	-2.2%	-93.4	-4.5%
Coarse Grains (ex. corn)	1,391.0	-143.6	-10.3%	-228.8	-16.4%
Forest Products	749.9	-37	-4.9%	-82.9	-11.1%
Beef & Beef Products	672.7	-69.4	-10.3%	-138.6	-20.6%
Prepared Foods	661.1	-42	-6.4%	-71.7	-10.8%
Wine & Beer	577.4	-49.6	-8.6%	-95.7	-16.6%
Hides & Skins	491.2	-50.2	-10.2%	-94.5	-19.2%
Cotton	480.0	-63.4	-13.2%	-103.9	-21.6%
Wheat	420.6	-124.5	-29.6%	-206.4	-49.1%
Dairy Products	357.5	-43.4	-12.1%	-80.4	-22.5%
Meat Products NESOI	351.8	-39.2	-11.1%	-59.2	-16.8%
Fresh Fruit	229.4	-13.6	-5.9%	-28.7	-12.5%
Fish Products	127.3	-20.4	-16.0%	-36.3	-28.5%
Live Animals	122.4	-32.8	-26.8%	-44	-35.9%
Oilseeds NESOI	85.1	-21.7	-25.5%	-42	-49.4%
Hay	83.6	-52	-62.1%	-64.9	-77.7%
Sugars & Sweeteners	71.3	-18	-25.3%	-21.5	-30.2%
Tree Nuts	57.7	-15.1	-26.2%	-30.6	-53.0%
Vegetable Oils NESOI	51.2	-25.2	-49.2%	-36.4	-71.2%
Animal Fats	45.3	-20.7	-45.8%	-32.1	-70.9%
Rapeseed	25.8	-6.6	-25.7%	-16	-62.2%
Pulses	16.5	-12.2	-73.9%	-16.3	-99.0%
Snack Foods NESOI	10.3	-5.3	-52.0%	-7.8	-75.6%
Oilseed Meal/Cake (ex. soybean)	6	-5.8	-96.8%	-6	-100.0%
Chocolate & Cocoa Products	5.3	-3.5	-66.2%	-4.5	-85.8%
Processed Fruit	5.1	-5.1	-100.0%	-5.1	-100.0%
Feeds & Fodders NESOI	4.3	-4.3	-100.0%	-4.3	-100.0%
Fruit & Vegetable Juices	4.3	-4.2	-97.9%	-4.3	-99.1%
Essential Oils	3.8	-3.8	-100.0%	-3.8	-100.0%
Planting Seeds	2.8	-1.1	-40.6%	-2.1	-74.3%
Coffee, Roasted and Extracts	1.9	-1.9	-100.0%	-1.9	-100.0%
Condiments & Sauces	1.9	-1.9	-100.0%	-1.9	-100.0%
Dog & Cat Food	1.6	-1.6	-100.0%	-1.6	-100.0%

Non-Alcoholic Bev. (ex. juices, coffee, tea)	1.4	-1.4	-100.0%	-1.4	-100.0%
Distilled Spirits	1.2	-1.2	-100.0%	-1.2	-100.0%
Nursery Products & Cut Flowers	1.2	-1.2	-100.0%	-1.2	-100.0%
Spices	0.6	-0.6	-100.0%	-0.6	-100.0%
Processed Vegetables	0.3	-0.3	-100.0%	-0.3	-100.0%
Tea	0.3	-0.3	-100.0%	-0.3	-100.0%
Eggs & Products	0.1	-0.1	-100.0%	-0.1	-100.0%
Coffee, Unroasted	0.1	-0.1	-100.0%	-0.1	-100.0%
Rice	0.1	-0.1	-100.0%	-0.1	-100.0%
Pork & Pork Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Ethanol	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Other Bulk Commodities	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Fresh Vegetables	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

See notes to Table A12.

Table A14: Impact on Thailand, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
Rubber & Allied Gums	1881.5	-45.2	-2.4%	-102.3	-5.4%
Forest Products	1385.5	-22.7	-1.6%	-61.5	-4.4%
Processed Vegetables	1174.2	-38.5	-3.3%	-76.7	-6.5%
Fresh Fruit	1004.7	-24	-2.4%	-44.1	-4.4%
Other Intermediate Products	687.1	-48.8	-7.1%	-108.1	-15.7%
Rice	547.3	-34.6	-6.3%	-70.4	-12.9%
Processed Fruit	237.7	-28.8	-12.1%	-50.4	-21.2%
Prepared Foods	174.5	-28.9	-16.6%	-53.4	-30.6%
Sugars & Sweeteners	140.7	-40	-28.4%	-73.2	-52.0%
Fish Products	131.7	-24.4	-18.6%	-47.3	-35.9%
Tree Nuts	63	-23.7	-37.7%	-40.4	-64.1%
Non-Alcoholic Bev.	30.4	-14.4	-47.3%	-25.4	-83.7%
Dog & Cat Food	27.7	-20.6	-74.6%	-21.5	-77.6%
Snack Foods NESOI	24.8	-15.8	-63.6%	-21	-84.9%
Planting Seeds	20.3	-12.5	-61.5%	-20.2	-99.7%
Condiments & Sauces	17.4	-11.7	-67.3%	-15.5	-89.5%
Nursery Products & Cut Flowers	17.1	-3.5	-20.4%	-3.9	-22.8%
Feeds & Fodders NESOI	16.1	-16.1	-100.0%	-16.1	-100.0%
Other Bulk Commodities	15.6	-13.8	-88.5%	-14.2	-91.2%
Coffee, Roasted and Extracts	14.7	-5.3	-36.4%	-9.6	-65.4%
Vegetable Oils NESOI	7.8	-7.8	-100.0%	-7.8	-100.0%
Fruit & Vegetable Juices	7.8	-7.8	-99.9%	-7.8	-99.9%
Pulses	6	-5.8	-96.9%	-6	-100.0%
Palm Oil	4.8	-3.8	-79.8%	-4.1	-86.5%
Dairy Products	3.1	-3	-97.1%	-3.1	-100.0%
Chocolate & Cocoa Products	1.2	-1.2	-100.0%	-1.2	-100.0%
Essential Oils	1	-1	-100.0%	-1	-100.0%
Wine & Beer	0.7	-0.7	-100.0%	-0.7	-100.0%
Meat Products NESOI	0.5	-0.5	-100.0%	-0.5	-100.0%
Tea	0.5	-0.5	-100.0%	-0.5	-100.0%
Spices	0.5	-0.5	-100.0%	-0.5	-100.0%
Distillers Grains	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Pork & Pork Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Poultry Meat & Prods. (ex. eggs)	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Live Animals	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

Oilseeds NESOI	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Distilled Spirits	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Beef & Beef Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Animal Fats	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Eggs & Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Coffee, Unroasted	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Soybean meal	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Fresh Vegetables	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

See notes to Table A12.

Table A15: Impact on Canada, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
Rapeseed	2,035.10	-239.6	-11.8%	-320.1	-15.7%
Soybeans	886.3	2.7	0.3%	46.1	5.2%
Vegetable Oils NESOI	551.9	-28.8	-5.2%	-52.4	-9.5%
Pork & Pork Products	456.9	-57.7	-12.6%	-113.6	-24.9%
Fish Products	446.5	-32.9	-7.4%	-69.8	-15.6%
Pulses	372.5	-56	-15.0%	-98.1	-26.3%
Coarse Grains (ex. corn)	324.6	-71.8	-22.1%	-121.2	-37.3%
Oilseed Meal/Cake (ex. soybean)	289.1	-21.6	-7.5%	-49.3	-17.1%
Hides & Skins	222.9	-53.2	-23.9%	-106.9	-48.0%
Forest Products	167.3	-23.2	-13.9%	-56	-33.4%
Wheat	157.7	-74.5	-47.2%	-103.1	-65.4%
Oilseeds NESOI	122.5	-9.3	-7.6%	-16.5	-13.5%
Beef & Beef Products	79.3	-30.2	-38.1%	-54.2	-68.4%
Other Intermediate Products	38.9	-24.8	-63.9%	-33.4	-85.9%
Prepared Foods	32	-15.9	-49.7%	-30.4	-94.9%
Fresh Fruit	27	-13.4	-49.4%	-25	-92.5%
Tobacco	22.3	-1.6	-7.0%	-3	-13.4%
Meat Products NESOI	20.7	-18.1	-87.5%	-20.7	-100.0%
Planting Seeds	19.8	-6.8	-34.7%	-8.9	-45.2%
Dairy Products	19.5	-17.5	-89.5%	-19.3	-98.9%
Processed Fruit	18	-14.2	-78.8%	-17.8	-98.6%
Hay	16.6	-16.6	-100.0%	-16.6	-100.0%
Wine & Beer	15.4	-13.1	-85.3%	-15.4	-100.0%
Feeds & Fodders NESOI	8.3	-8.2	-98.3%	-8.3	-100.0%
Animal Fats	6.8	-6.3	-93.8%	-6.6	-98.0%
Dog & Cat Food	5.7	-1.9	-33.2%	-4.3	-76.1%
Live Animals	3.6	-3.6	-100.0%	-3.6	-100.0%
Processed Vegetables	2.7	-1.1	-42.1%	-1.4	-52.2%
Sugars & Sweeteners	2.3	-2.3	-100.0%	-2.3	-100.0%
Snack Foods NESOI	2	-2	-100.0%	-2	-100.0%
Cotton	1.4	-1.4	-100.0%	-1.4	-100.0%
Distillers Grains	1.2	-1.2	-100.0%	-1.2	-100.0%
Essential Oils	1	-1	-100.0%	-1	-100.0%
Fruit & Vegetable Juices	1	-1	-100.0%	-1	-100.0%
Distilled Spirits	0.9	-0.9	-100.0%	-0.9	-100.0%

Other Bulk Commodities	0.7	-0.7	-100.0%	-0.7	-100.0%
Chocolate & Cocoa Products	0.6	-0.6	-100.0%	-0.6	-100.0%
Corn	0.5	-0.4	-80.5%	-0.5	-100.0%
Condiments & Sauces	0.5	-0.5	-100.0%	-0.5	-100.0%
Non-Alcoholic Bev. (ex. juices, coffee, tea)	0.1	-0.1	-100.0%	-0.1	-100.0%
Coffee, Roasted and Extracts	0.1	-0.1	-100.0%	-0.1	-100.0%
Nursery Products & Cut Flowers	0.1	-0.1	-100.0%	-0.1	-100.0%
Tree Nuts	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Rubber & Allied Gums	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Tea	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Eggs & Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Coffee, Unroasted	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Rice	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Spices	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Soybean meal	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Fresh Vegetables	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

See notes to Table A12.

Table A16: Impact on Malaysia, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 21 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
Rubber & Allied Gums	1,483.7	-45.9	-3.1%	-103.9	-7.0%
Palm Oil	1450.0	-74.5	-5.1%	-126.2	-8.7%
Forest Products	521.9	-20.6	-3.9%	-56	-10.7%
Vegetable Oils NESOI	154.7	-43.3	-28.0%	-71.2	-46.0%
Prepared Foods	122.6	-20.9	-17.1%	-41.8	-34.1%
Other Intermediate Products	113.7	-37	-32.6%	-71.6	-63.0%
Chocolate & Cocoa Products	93.0	-28	-30.1%	-44.2	-47.5%
Coffee, Roasted and Extracts	84.7	-25	-29.5%	-37	-43.7%
Snack Foods NESOI	65.6	-14.9	-22.8%	-30.9	-47.0%
Other Bulk Commodities	47.6	-24.9	-52.4%	-31.3	-65.8%
Meat Products NESOI	41.9	-29.5	-70.3%	-34.7	-82.9%
Processed Fruit	23.8	-14.8	-62.3%	-21	-88.4%
Fish Products	20.6	-17.5	-84.7%	-20	-97.1%
Non-Alcoholic Bev. (ex. juices, coffee, tea)	18.2	-11.2	-61.4%	-18.2	-99.9%
Oilseed Meal/Cake (ex. soybean)	17.8	-15.4	-86.7%	-17.8	-100.0%
Spices	13.8	-5.2	-37.5%	-10.1	-73.4%
Feeds & Fodders NESOI	12.3	-10.1	-81.9%	-12.3	-100.0%
Condiments & Sauces	8.8	-6.9	-78.0%	-8.8	-100.0%
Sugars & Sweeteners	5.9	-5.9	-100.0%	-5.9	-100.0%
Cotton	4.8	-4.8	-100.0%	-4.8	-100.0%
Tree Nuts	4.6	-4.6	-100.0%	-4.6	-100.0%
Wine & Beer	4.3	-4.3	-100.0%	-4.3	-100.0%
Fruit & Vegetable Juices	3.7	-1.5	-41.9%	-2.6	-70.2%
Biodiesel & Blends > B30	3.3	-3.3	-100.0%	-3.3	-100.0%
Processed Vegetables	3.3	-3.3	-100.0%	-3.3	-100.0%
Tea	2.6	-2.6	-100.0%	-2.6	-100.0%
Dairy Products	2.1	-2.1	-100.0%	-2.1	-100.0%
Cocoa Beans	1.8	-1.8	-100.0%	-1.8	-100.0%
Essential Oils	1.7	-1.7	-100.0%	-1.7	-100.0%
Fresh Fruit	1.1	-1.1	-100.0%	-1.1	-100.0%
Live Animals	1	-0.7	-65.1%	-1	-100.0%
Coarse Grains (ex. corn)	0.2	-0.2	-100.0%	-0.2	-100.0%
Distilled Spirits	0.2	-0.2	-100.0%	-0.2	-100.0%
Nursery Products & Cut Flowers	0.2	-0.2	-100.0%	-0.2	-100.0%
Soybean Oil	0.1	-0.1	-100.0%	-0.1	-100.0%

Hides & Skins	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Pork & Pork Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Planting Seeds	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Oilseeds NESOI	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Pulses	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Beef & Beef Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Eggs & Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Dog & Cat Food	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Coffee, Unroasted	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Rice	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Soybean meal	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

See notes to Table A12.

Table A17: Impact on Argentina, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Percent	Subsidy=59% Difference from 2021 Million US$	Percent
Soybeans	2644	-110	-4.2%	-121.5	-4.6%
Beef & Beef Products	369.9	-45.8	-12.4%	-60.6	-16.4%
Fish Products	150.7	-29.3	-19.5%	-52.1	-34.6%
Poultry Meat & Prods.	113.1	-13.6	-12.0%	-23.1	-20.4%
Tobacco	77	-4.8	-6.3%	-8.7	-11.3%
Other Intermediate Products	60.4	-21.5	-35.6%	-37.5	-62.1%
Vegetable Oils NESOI	56.9	-19.2	-33.8%	-34.6	-60.8%
Dairy Products	30.5	-19.6	-64.3%	-25.8	-84.7%
Wine & Beer	12.1	-11.1	-91.9%	-12.1	-100.0%
Feeds & Fodders NESOI	10.9	-10	-91.8%	-10.9	-100.0%
Planting Seeds	4.9	-2.2	-44.2%	-3.1	-63.3%
Hides & Skins	4.3	-4.1	-95.4%	-4.3	-100.0%
Fresh Fruit	3.2	-3.2	-100.0%	-3.2	-100.0%
Peanuts	3	-3	-100.0%	-3	-100.0%
Fruit & Vegetable Juices	2.7	-2.7	-100.0%	-2.7	-100.0%
Live Animals	2.1	-1.8	-87.5%	-2	-98.4%
Forest Products	1.9	-1.9	-100.0%	-1.9	-100.0%
Prepared Foods	0.6	-0.3	-55.7%	-0.6	-100.0%
Cotton	0.5	-0.5	-100.0%	-0.5	-100.0%
Essential Oils	0.5	-0.5	-100.0%	-0.5	-100.0%
Tea	0.4	-0.4	-100.0%	-0.4	-100.0%
Snack Foods NESOI	0.2	-0.2	-100.0%	-0.2	-100.0%
Sugars & Sweeteners	0.2	-0.2	-100.0%	-0.2	-100.0%
Nursery Products	0.2	-0.2	-100.0%	-0.2	-100.0%
Hay	0.1	-0.1	-100.0%	-0.1	-100.0%
Processed Fruit	0.1	-0.1	-100.0%	-0.1	-100.0%
Coarse Grains (ex. corn)	< 0.1	< 0.1	0.0%	< 0.1	0.0%
Pork & Pork Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Processed Vegetables	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Tree Nuts	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Meat Products NESOI	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Chocolate & Cocoa Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Oilseeds NESOI	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Distilled Spirits	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Animal Fats	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Other Bulk Commodities	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

See notes to Table A12.

Table A18: Impact on Japan, Zero Growth from 2017

Agricultural Product	No Subsidy 2020 & 2021 Million US$	Subsidy=42% Difference from 2020 Million US$	Subsidy=42% Difference from 2020 Percent	Subsidy=59% Difference from 2021 Million US$	Subsidy=59% Difference from 2021 Percent
Fish Products	107.5	-29	-27.0%	-58.4	-54.3%
Prepared Foods	103.2	-29.1	-28.2%	-38.2	-37.0%
Other Intermediate Products	62.8	-30.9	-49.2%	-41.7	-66.5%
Planting Seeds	54	-34.9	-64.6%	-48.1	-89.1%
Nursery Products & Cut Flowers	52.4	-15.9	-30.3%	-22.4	-42.7%
Snack Foods NESOI	47.6	-17	-35.6%	-34.4	-72.2%
Essential Oils	33.4	-20.5	-61.5%	-27.4	-82.1%
Forest Products	21.4	-10	-46.6%	-15.9	-74.1%
Wine & Beer	21.3	-11.2	-52.7%	-16.3	-76.8%
Condiments & Sauces	16.6	-14.7	-88.3%	-16.4	-98.3%
Coffee, Roasted and Extracts	14.9	-12.8	-85.8%	-14.9	-100.0%
Vegetable Oils NESOI	14.5	-9.7	-66.9%	-14.2	-98.1%
Distilled Spirits	11.7	-7.9	-67.9%	-11.7	-100.0%
Non-Alcoholic Bev. (ex. juices, coffee, tea)	8.8	-8.6	-97.5%	-8.6	-97.9%
Chocolate & Cocoa Products	7.2	-6.4	-88.2%	-7.2	-100.0%
Feeds & Fodders NESOI	5.4	-5.4	-100.0%	-5.4	-100.0%
Tree Nuts	5.1	-3.4	-66.6%	-3.8	-73.3%
Dairy Products	4.6	-3.8	-83.2%	-4.6	-100.0%
Processed Fruit	3.2	-3.2	-100.0%	-3.2	-100.0%
Fruit & Vegetable Juices	3	-3	-100.0%	-3	-100.0%
Fresh Fruit	2.7	-2.7	-100.0%	-2.7	-100.0%
Sugars & Sweeteners	2.5	-2.4	-95.7%	-2.4	-97.8%
Rubber & Allied Gums	2.3	-2.3	-100.0%	-2.3	-100.0%
Live Animals	2.2	-2.2	-100.0%	-2.2	-100.0%
Processed Vegetables	1.8	-1.8	-98.6%	-1.8	-98.6%
Tea	1.8	-1.8	-100.0%	-1.8	-100.0%
Hides & Skins	1.4	-1.4	-100.0%	-1.4	-100.0%
Rice	1.3	-1.2	-95.1%	-1.3	-100.0%
Oilseeds NESOI	1.1	-1.1	-100.0%	-1.1	-100.0%
Poultry Meat & Prods.	0.6	-0.6	-100.0%	-0.6	-100.0%
Spices	0.5	-0.4	-92.6%	-0.5	-100.0%
Ethanol	0.3	-0.3	-100.0%	-0.3	-100.0%
Dog & Cat Food	0.3	-0.3	-100.0%	-0.3	-100.0%
Coarse Grains (ex. corn)	0.2	-0.2	-100.0%	-0.2	-100.0%

Meat Products NESOI	0.2	-0.2	-100.0%	-0.2	-100.0%
Coffee, Unroasted	0.2	-0.2	-100.0%	-0.2	-100.0%
Biodiesel & Blends > B30	0.1	-0.1	-100.0%	-0.1	-100.0%
Animal Fats	0.1	-0.1	-100.0%	-0.1	-100.0%
Eggs & Products	0.1	-0.1	-100.0%	-0.1	-100.0%
Other Bulk Commodities	0.1	-0.1	-100.0%	-0.1	-100.0%
Soybeans	< 0.1	12.3	>100%	18.8	>100%
Cotton	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Pork & Pork Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Hay	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Tobacco	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Soybean Oil	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Peanuts	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Pulses	< 0.1	< 0.1	-12.2%	< 0.1	-16.2%
Beef & Beef Products	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Oilseed Meal/Cake (ex. soybean)	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Soybean meal	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%
Palm Oil	< 0.1	< 0.1	-100.0%	< 0.1	-100.0%

See notes to Table A12.