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WHY TRADE MATTERS AFTER ALL

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ABSTRACT

I show that accounting for cross-industry variation in trade elasticities greatly magnifies the estimated gains from trade. The main idea is as simple as it is general: While imports in the average industry do not matter too much, imports in some industries are critical to the functioning of the economy, so that a complete shutdown of international trade is very costly overall.

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1 Introduction

Either the gains from trade are small for most countries or the workhorse models of trade fail to adequately capture those gains. This uncomfortable conclusion seems inevitable given recent results in quantitative trade theory. As shown by Arkolakis et al (2012), the gains from trade can be calculated in the most commonly used quantitative trade models from the observed share of a country's trade with itself, λ_j, and the elasticity of aggregate trade flows with respect to trade costs, ε, using the formula $G_j = (\lambda_j)^{-\frac{1}{\varepsilon}}$.[1] Using standard methods to obtain estimates of λ_j and ε, I show below that this implies that a move from complete autarky to 2007 levels of trade would increase real income by only 16.5 percent on average among the 50 largest economies in the world.

In this paper, I argue that the workhorse models of trade actually predict much larger gains once the industry dimension of trade flows is taken into account. The main idea is as simple as it is general: While imports in the average industry do not matter too much, imports in some industries are critical to the functioning of the economy, so that a complete shutdown of international trade is very costly overall. In particular, I show that the above formula can be written as $G_j = (\lambda_j)^{-\frac{1}{\tilde{\varepsilon}_j}}$ in a multi-industry environment, where the aggregate $\frac{1}{\tilde{\varepsilon}_j}$ is now a weighted average of the industry-level $\frac{1}{\varepsilon_s}$. The point is that if ε_s is close to zero in some industries, $\frac{1}{\varepsilon_s}$ is close to infinity in these industries which is sufficient to push $\frac{1}{\tilde{\varepsilon}_j}$ up a lot. Loosely speaking, ε is a weighted average of ε_s so that the exponent of the aggregate formula is the *inverse of the average* of the trade elasticities whereas the exponent of the industry-level formula is the *average of the inverse* of the trade elasticities.

I make this point in the context of a simple Armington (1969) model in which consumers have CES preferences within industries and goods are differentiated by country of origin. As is well-known, the trade elasticities then depend on the elasticities of substitution through the simple relationship $\varepsilon_s = \sigma_s - 1$. Estimating these elasticities at the 3-digit level using the standard method developed by Feenstra (1994) and refined by Broda and Weinstein (2006), I show that the industry-level formula predicts that a move from autarky to 2007 levels of trade

[1] This includes the Armington (1969) model, the Krugman (1980) model, the Eaton and Kortum (2002) model, and the Melitz (2003) model. The aggregate trade elasticity ε corresponds to different structural parameters in different models.

increases real income by 48.6 percent on average which is around three times the number the aggregate formula predicts. It increases even further once I allow for non-traded goods and intermediate goods which have opposing effects on the gains from trade. All things considered, I find that the gains from trade average 55.9 percent among the 50 largest economies in the year 2007.[2]

While my point may seem obvious once stated, I believe it has not been made explicitly before. Arkolakis et al (2012) briefly discuss a multi-industry formula in an extension but never contrast it to their aggregate formula or use it to actually calculate the gains from trade. Caliendo and Parro (2015), Hsieh and Ossa (2012), Ossa (2014), and others work with multi-industry versions of standard trade models but also do not point out that cross-industry heterogeneity in the trade elasticities has the potential to greatly magnify the gains from trade. Closest in spirit is perhaps the contribution by Edmond et al (2012) which measures the gains from trade originating from pro-competitive effects in an oligopolistic trade model. A key finding is that such pro-competitive effects are large if there is a lot of cross-industry variation in markups which is the case if there is a lot of cross-industry variation in the elasticities of substitution.[3]

Having said this, Costinot and Rodriguez-Clare (2014) perform closely related calculations in recently published contemporaneous work. In particular, they also work out the gains from trade using the aggregate and industry-level formulas considering cases with and without intermediate goods. While my analysis features more industries (252 instead of 31), more countries (50 instead of 34), and uses different data (GTAP instead of WIOD), the main distinction lies in the elasticity estimates. Instead of relying on elasticity estimates from the literature, I estimate them using the Feenstra (1994)-Broda and Weinstein (2006) approach. This allows me to estimate confidence intervals for the elasticities and, in turn, also confidence

[2]While my general point also extends to imperfectly competitive gravity models such as Krugman (1980) and Melitz (2003), the particular gains from trade predicted by my multi-sector Armington (1969) model are only exactly the same in other perfectly competitive gravity models such as Eaton and Kortum (2002). This is because the exact isomorphism between "old" and "new" trade models does not apply in the case of multiple industries as shown by Arkolakis et al (2012). However, recent calculations by Costinot and Rodriguez-Clare (2014) suggest that even with multiple industries the gains from trade are quite similar in "old" and "new" trade models.

[3]Related points have, of course, also been made in other areas of macroeconomics. For example, Nakamura and Steinsson (2010) show how cross-industry heterogeneity in menu costs substantially increases the degree of monetary non-neutrality. Also, Jones (2011) argues that cross-industry complementarities through intermediate goods matter a great deal for understanding cross-country differences in incomes.

intervals for the gains from trade. Overall, the gains from trade appear to be quite precisely estimated with the average 95-percent confidence interval ranging from 49.3 percent until 62.5 percent.

The remainder of this paper is divided into four sections. In Section 2, I develop a multi-industry Armington (1969) model of trade in final and intermediate goods and show what it implies for the measurement of the gains from trade. In Section 3, I describe the data and discuss all applied aggregation, interpolation, and matching procedures. In Section 4, I discuss the elasticity estimation and give an overview of the obtained results. In Section 5, I report the gains from trade for 50 countries in the world and document that a small share of industries typically accounts for a large share of the gains from trade.

2 Model

There are N countries indexed by i or j and S industries indexed by s or t. In each country, consumers demand an aggregate final good C_j^F and industry t producers demand an aggregate intermediate good $C_j^{I,t}$. These aggregate goods are Cobb-Douglas combinations of industry-specific goods C_{js}, $C_{js} = C_{js}^F + \sum_{t=1}^{S} C_{js}^{I,t}$, which are in turn CES aggregates of industry-specific traded varieties C_{ijs} differentiated by the location of their production. To be clear, C_{ijs} denotes the quantity of the industry s traded variety from country i available in country j and it is at that level of disaggregation that trade physically takes place. In sum,

$$C_j^F = \prod_{s=1}^{S} \left(\frac{C_{js}^F}{\alpha_{js}} \right)^{\alpha_{js}} \tag{1}$$

$$C_j^{I,t} = \prod_{s=1}^{S} \left(\frac{C_{js}^{I,t}}{{}^{t}_{js}} \right)^{{}^{t}_{js}} \tag{2}$$

$$C_{js} = \left(\sum_{i=1}^{N} C_{ijs}^{\frac{\sigma_s - 1}{\sigma_s}} \right)^{\frac{\sigma_s}{\sigma_s - 1}} \tag{3}$$

Notice that I allow the Cobb-Douglas shares of the aggregate intermediate good to vary by country j, upstream industry s, and downstream industry t, which allows me to match input-output tables from around the world. The aggregate final good translates one-for-one into utility U_j. The aggregate intermediate good is combined with labor L_{is} using a Cobb-Douglas technology to produce the country-industry-specific traded varieties Q_{is} with total factor productivities A_{is}. In combination, these assumptions imply:

$$U_j = C_j^F \tag{4}$$

$$Q_{is} = A_{is} \left(\frac{L_{is}}{\beta_{is}} \right)^{\beta_{is}} \left(\frac{C_i^{I,s}}{1 - \beta_{is}} \right)^{1-\beta_{is}} \tag{5}$$

There is perfect competition and the shipment of an industry s traded variety from country i to country j involves iceberg trade barriers $\tau_{ijs} > 1$ in the sense that τ_{ijs} units must leave country i for one unit to arrive in country j so that $Q_{is} = \sum_{j=1}^{N} \tau_{ijs} C_{ijs}$.[4] The model can be solved by invoking the standard requirements that consumers maximize utility, firms maximize profits, firms make zero profits, and all markets clear. Since the model's solution should be intuitive to most readers, I confine myself to sketching some core aspects here.

The value of industry s trade flowing from country i to country j, X_{ijs}, follows the gravity equation $X_{ijs} = p_{ijs}^{1-\sigma_s} P_{js}^{\sigma_s - 1} E_{js}$, where p_{ijs} is the price of the industry s variety from country i in country j, P_{js} is the ideal price index of all industry s varieties available in country j, and E_{js} is total expenditure on all industry s varieties in country j originating from final and intermediate demand. Moreover, $p_{ijs} = A_{is}^{-1} (w_i)^{\beta_{is}} \left(P_i^{I,s} \right)^{1-\beta_{is}} \tau_{ijs}$, where $(w_i)^{\beta_{is}} \left(P_i^{I,s} \right)^{1-\beta_{is}}$ is a cost term aggregating over the wage w_i and the price index of the aggregate intermediate good demanded by industry s, $P_i^{I,s} = \prod_{t=1}^{S} P_{it}^{{}^{s}_{it}}$. Combining these elements, the above gravity equation becomes

$$X_{ijs} = \left(A_{is}^{-1} w_i^{\beta_{is}} \prod_{t=1}^{S} P_{it}^{{}^{s}_{it}(1-\beta_{is})} \tau_{ijs} \right)^{1-\sigma_s} P_{js}^{\sigma_s - 1} E_{js} \tag{6}$$

Defining $\lambda_{js} \equiv X_{jjs}/E_{js}$ as the own trade share in industry s of country j, the above equation implies $P_{js} = A_{js}^{-1} \lambda_{js}^{\frac{1}{\sigma_s - 1}} w_j^{\beta_{js}} \prod_{t=1}^{S} P_{jt}^{{}^{s}_{jt}\left(1-\beta_{js}\right)}$, which is a system of equations that is log-linear in P_{js}. As is easy to verify, its solution is $P_{js} = w_j \prod_{t=1}^{S} \left(A_{jt}^{-1} \lambda_{jt}^{\frac{1}{\sigma_t - 1}} \right)^{\delta_{jt}^{s}}$, where δ_{jt}^{s} is element (s,t) of matrix $(\mathbf{I} - \mathbf{B}_j)^{-1}$ with $\mathbf{I}$ denoting the identity matrix and $\mathbf{B}_j$ denoting

[4] As usual, I set $\tau_{iis} = 1$ throughout. Even though I refer to C_{ijs} as traded varieties, the model can also accommodate non-traded ones by letting the corresponding $\tau_{ijs} \to \infty$.

the matrix whose element (s,t) is $\delta^{s}_{jt}\left(1-\beta_{js}\right)$. Readers familiar with input-output analysis will recognize $(\mathbf{I}-\mathbf{B}_j)^{-1}$ as the transpose of the Leontief inverse which implies that δ^s_{jt} is a measure of the importance of industry t in the production process of industry s. In particular, a total of \$$\delta^s_{jt}$ worth of industry t goods are required to meet \$1 worth of industry s final demand. This value combines industry t goods used as inputs in industry s directly as well as industry t goods used as inputs in other industries which then also produce inputs for industry s.[5]

Since the ideal price index for the aggregate final good is just a Cobb-Douglas aggregate of the ideal price indices of the industry-specific goods, $P_j = \prod_{s=1}^{S} P_{js}^{\alpha_{js}}$, the above solution for P_{js} implies an expression for real income which is just in terms of technology parameters and trade shares. In particular, $\frac{w_j}{P_j} = A_j \prod_{s=1}^{S}\prod_{t=1}^{S} \lambda_{jt}^{-\alpha_{js}\delta^s_{jt}\frac{1}{\sigma_t-1}}$, where I have defined $A_j \equiv \prod_{s=1}^{S}\prod_{t=1}^{S} A_{jt}^{\alpha_{js}\delta^s_{jt}}$ to simplify the notation. Since $\lambda_{js}=1$ for all s under autarky, the proportional gains of moving from autarky to current levels of trade are captured by the formula $\widehat{\frac{w_j}{P_j}} = \prod_{s=1}^{S}\prod_{t=1}^{S} \lambda_{jt}^{-\alpha_{js}\delta^s_{jt}\frac{1}{\sigma_t-1}}$. To be able to clearly contrast this to the aggregate formula, I implicitly define $\lambda_j^x \equiv \prod_{s=1}^{S}\prod_{t=1}^{S} \lambda_{jt}^{-\alpha_{js}\delta^s_{jt}\frac{1}{\sigma_t-1}}$ and solve for x, which then implies[6]

$$\widehat{\frac{w_j}{P_j}} = \lambda_j^{-\sum_{s=1}^{S}\sum_{t=1}^{S}\alpha_{js}\delta^s_{jt}\frac{\ln\lambda_{jt}}{\ln\lambda_j}\frac{1}{\sigma_t-1}} \tag{7}$$

For the purposes of calculating the gains from trade, the correct approach is therefore to take a weighted average of the inverse of the industry-level trade elasticities $\frac{1}{\sigma_t-1}$. The weights capture how dependent country j is on trade in industry t, $\frac{\ln\lambda_{jt}}{\ln\lambda_j}$, how dependent country j is on upstream industry t for producing final output in downstream industry s, δ^s_{jt}, and how important industry s is to final consumers in country j, α_{js}.[7] As a consequence, $\widehat{\frac{w_j}{P_j}} \to \infty$ as $\sigma_t \to 1$ in some industries as long as $\alpha_{js}\delta^s_{jt}\frac{\ln\lambda_{jt}}{\ln\lambda_j}$ is strictly positive there. While equation (7) is admittedly based on very special assumptions, it nevertheless captures what has to be a general point: Even if imports in the average industry do not matter too much, a complete

[5] I thank a referee for suggesting this way of modelling input-output linkages which is more general than what I had originally done. It is based on section 3.4 of Costinot and Rodriguez-Clare (2014) and explained in more detail in their online appendix.

[6] To be clear, $\lambda_{js} \equiv \frac{X_{jjs}}{\sum_{i=1}^{N} X_{ijs}}$ and $\lambda_j \equiv \frac{\sum_{s=1}^{S} X_{jjs}}{\sum_{i=1}^{N}\sum_{s=1}^{S} X_{ijs}}$.

[7] Notice that $\frac{\ln\lambda_{js}}{\ln\lambda_j} \approx \frac{1-\lambda_{js}}{1-\lambda_j}$ and that $1-\lambda_{js}$ and $1-\lambda_j$ are the shares of industry-level and aggregate imports in country j's total expenditure.

shutdown of international trade is still very costly, if imports in some industries are critical to the functioning of the economy.[8]

Notice that this point is overlooked if the aggregate formula is used. In the special case $S = 1$, equation (7) simplifies to $\widehat{\frac{w_j}{P_j}} = \lambda_j^{-\frac{1}{\beta_j}\frac{1}{\sigma-1}}$, where $\sigma - 1$ is now the aggregate trade elasticity. If the multi-industry model is correct, the aggregate trade elasticity $\sigma - 1$ is some weighted average of the industry-level trade elasticities $\sigma_s - 1$ because the latter ultimately govern how trade flows respond to trade costs. Loosely speaking, the exponent of the aggregate formula is therefore the *inverse of the average* of the trade elasticities whereas the exponent of the industry-level formula is the *average of the inverse* of the trade elasticities which is different as long as the elasticities vary across industries.[9]

In the empirical application, I report results using the industry-level and aggregate formulas discussed above. In addition, I also consider the simpler formulas which arise in the special case without non-traded and intermediate goods. While non-traded goods tend to dampen the gains from trade, intermediate goods tend to amplify them so that abstracting from both turns out to be a reasonable first pass. I remove non-traded goods by simply narrowing down the set of included industries, as I discuss below. I remove intermediate goods by considering the special case with $\beta_{is} = 1$ for all i and s which yields the modified formulas $\widehat{\frac{w_j}{P_j}} = \lambda_j^{-\sum_{s=1}^{S} \alpha_{js} \frac{\ln \lambda_{js}}{\ln \lambda_j} \frac{1}{\sigma_s - 1}}$ and $\widehat{\frac{w_j}{P_j}} = \lambda_j^{-\frac{1}{\sigma-1}}$.

3 Data

I focus on the world's 49 largest economies and a residual Rest of the World in the year 2007.[10] To quantify the gains from trade using formula (7), I need the full matrix of industry-

[8] In the context of their discussion of aggregation biases in elasticity estimations, Imbs and Mejean (forthcoming) seem to conjecture that the gains from trade estimated using the aggregate formula would be the same as the gains from trade estimated using the industry-level formula if the aggregate trade elasticity is estimated using a method which does not suffer from aggregation bias. A simple thought experiment reveals that this cannot be the case. In particular, suppose that $\sigma_t \rightarrow 1$ in one industry so that $\widehat{\frac{w_j}{P_j}} \rightarrow \infty$ as discussed in the main text. While this situation would imply that industry t's trade elasticity is zero, it would certainly not imply that any reasonably measured aggregate trade elasticity is zero, which would be required, however, for the aggregate formula to correctly predict infinite gains from trade.

[9] Notice that this can also be understood in terms of the familiar Jensen's inequality. To be able to use the aggregate formula, one essentially has to compute the aggregate trade elasticity as $\varepsilon = f^{-1}E\left[f\left(\varepsilon_s\right)\right]$, where $f\left(\varepsilon_s\right) = \frac{1}{\varepsilon_s}$ is a convex and decreasing function of ε_s. As a result, $\varepsilon \leq E\left[\varepsilon_s\right]$ by Jensen's inequality, where $E\left[\varepsilon_s\right]$ represents the weighted arithmetic average that is implicitly estimated when estimating aggregate trade elasticities. I would like to thank a referee for suggesting to point this out.

[10] I ranked countries by GDP as reported in the World Bank's World Development Indicators.

level trade flows to compute the statistics λ_{js} and λ_j as well as estimates of the consumption expenditure shares α_{js}, the shares of value added in gross production β_{js}, the elements of the input-output matrices $\ {}^{t}_{js}$, and the elasticities of substitution σ_s. My main data source is the eighth version of the Global Trade Analysis Project database (GTAP 8) which I supplement with the widely used NBER-UN trade data from the time periods 1994-2008 when I need time variation or a finer disaggregation of industries. The GTAP 8 database is a carefully cleaned, fully documented, publicly available, and globally consistent database covering 129 countries and 57 industries which span all sectors of the economy.[11]

It is not obvious at what level of aggregation my analysis should be performed. On the one hand, the main point of the paper is that excessive aggregation is likely to introduce biases which suggests that a low level of aggregation should be preferred. On the other hand, my Cobb-Douglas assumptions in consumption (α_{js} is constant) and production ($\ {}^{t}_{js}$ is constant) seem less reasonable the narrower the industry classification which suggests that disaggregating too finely is problematic as well. Since departing from the Cobb-Douglas assumption seems challenging particularly on the production side where it is the natural interpretation of national input-output accounts, I choose the SITC-Rev3 3-digit level as a compromise but also report results at a higher level of aggregation as a sensitivity check. After constructing a cross-walk between the GTAP 8 data and the NBER-UN data, I am left with 251 industries from agriculture, mining, and manufacturing and a residual one aggregating all other industries available in the GTAP database.

The NBER-UN data is originally at the SITC-Rev2 4-digit level and I convert it to the SITC-Rev3 3-digit level using a concordance from the Center for International Data at UC Davis. I then match the SITC-Rev3 3-digit industries to the GTAP industries using a concordance which I manually constructed with the help of various concordances available from the GTAP website. By design, the SITC classification focuses on traded goods only so that the residual industry aggregates over the remaining industries of the economy which have relatively little trade (the residual industry has an average λ_{is} of 0.94 compared to an average λ_{is} of 0.63 elsewhere and includes sectors such as construction and services). I will therefore

[11] The database is documented in Narayanan, Aguiar, and McDougall (2012) which can be accessed directly from the GTAP website under https://www.gtap.agecon.purdue.edu.

refer to the residual industry as the non-traded industry in the following even though I will actually treat it as a traded industry with little trade.

To construct λ_{js} and λ_j, I disaggregate the GTAP 8 data using bilateral trade shares from the NBER-UN data. In particular, I calculate what share of each bilateral GTAP industry trade flow should be attributed to each bilateral SITC-Rev3 3-digit trade flow from the NBER-UN data and then superimpose these shares onto the GTAP 8 data so that everything aggregates back to the GTAP 8 data in the end. Since internal trade flows are not reported in the NBER-UN data, this strategy only works for international trade flows and I simply apportion internal trade flows to SITC-Rev3 3-digit sectors uniformly.

The GTAP 8 data includes input-output accounts for all included countries which I use to calculate ${}^{t}_{js}$ and β_{js}. One problem with input-output accounts for my purposes is that they separate firms' purchases into intermediate consumption (which is reported in the main body of the input-output tables for each upstream-downstream industry pair) and fixed investment (which is reported in a separate column of the input-output tables for each upstream industry only) depending on how firms treat these purchases in their balance sheets. Since I do not explicitly allow for investment in my model, I scale all entries referring to firms' intermediate consumption by the total investment to intermediate consumption ratio of the corresponding upstream industry to obtain a more accurate picture of what firms actually buy.

For example, for each piece of "other machinery and equipment" classified as intermediate consumption in the US, there are 0.8 additional pieces classified as fixed investment on average, and I scale all intermediate consumption values in the input-output matrix by 1.8 to account for this. Using this scaled data, I then simply read off the share of intermediate consumption spending of downstream industry t on upstream industry s, ${}^{t}_{js}$, as well as the associated share of value added in gross production, β_{js}. Finally, I disaggregate to the SITC-Rev3 3-digit level by applying all shares uniformly across sub-industries.

I calculate α_{js} from the relationship $\alpha_{js} = E^F_{js} / \sum_{t=1}^{S} E^F_{jt}$, where E^F_{js} is final expenditure on industry s goods in country j. Of course, E^F_{js} is simply the difference between total expenditure and intermediate expenditure, $E^F_{js} = \sum_{m=1}^{N} X_{mjs} \square \sum_{t=1}^{S} {}^{t}_{js} X_j^{I,t}$, where the total expenditure of downstream industry t, $X_j^{I,t}$, can be calculated from the equilibrium relationship $X_j^{I,t} = \left(1 \square \beta_{jt}\right) \sum_{n=1}^{N} X_{jnt}$. One problem with this approach is that some α_{js}

turn out to be negative, essentially implying that the abovementioned strategy of uniformly applying all GTAP-industry-level β_{js} and ${}^{t}_{js}$ to the corresponding SITC-Rev3 3-digit level sub-industries does not always work. In those cases, I scale ${}^{t}_{js}$ such that $\alpha_{js} = 0$ by replacing ${}^{t}_{js}$ with $\tilde{\ }^{t}_{js} = \left(\sum_{m=1}^{N} X_{mjs} / \sum_{t=1}^{S} {}^{t}_{js} X_{j}^{I,t} \right) {}^{t}_{js}$, then scale ${}^{t}_{js}$ again to ensure $\sum_{s=1}^{S} {}^{t}_{js} = 1$, and repeat this process until all $\alpha_{js} \geq 0$. Overall, this only leads to minor corrections with the correlation between the original and the adjusted ${}^{t}_{js}$ being 99.9 percent.

4 Estimation

Using the abovementioned NBER-UN bilateral trade data for the years 1994-2008, I estimate the elasticities of substitution σ_s using the method developed by Feenstra (1994) and refined by Broda and Weinstein (2006) for all 251 matched SITC-Rev3 3-digit traded industries (I simply use the average σ_s for the residual non-traded industry). This method identifies the elasticities from variation in the variances and covariances of demand and supply shocks across countries and over time. I base my estimation on the instructions in Feenstra (2010) in which the method is particularly clearly explained. My estimating equation is equation (2.21) in Feenstra (2010) which I estimate using weighted least squares following the code provided in Appendix 2.2 of Feenstra (2010). However, I do not focus on a single importer, but pool across the 49 importers considered in my analysis (I keep all exporters available in the data). This is not only consistent with my theoretical assumption that σ_s does not vary by country but also gives me a much larger dataset with over 5 million price-quantity pairs.

Table 1 lists the resulting elasticity estimates in increasing order together with the SITC-Rev3 code and an abbreviated description of the corresponding industry. As can be seen, they range from 1.54 to 25.05 and have a mean of 3.63 which is within the range of other estimates in the literature. Table 1 also reports the associated 95-percent confidence intervals which I obtained by bootstrapping with 1,000 repetitions per industry. When resampling, I always clustered by exporter and importer to ensure that it is conducted separately for each exporter-importer pair. As can be seen, the confidence intervals vary widely by industry and are quite large on average. In particular, the average lower bound is 2.32 and the average upper bound is 8.16 suggesting that it might be important to account for estimation error in

σ_s when assessing the reliability of estimates of the gains from trade.[12]

5 Results

Table 2 summarizes the changes in real income resulting from a move from autarky to year 2007 levels of trade. Columns 1-3 ("Unadjusted") focus on the special case without non-traded and intermediate goods while columns 4-6 ("Adjusted") adjust for these effects. Recall that the special case without non-traded and intermediate goods involves dropping the residual non-traded industry as well as setting $\beta_{js} = 1$ for all j and s. The results under "Naive Gain" are computed using the aggregate formulas, the entries under "True Gain" are computed using the industry-level formulas, and the entries under "Ratio" are simply the ratio of the two. When using the aggregate formulas, I work with $\sigma = 3.94$ which is the trade-weighted cross-industry average of all σ_s. When allowing for non-traded and intermediate goods, I further construct aggregate β_j by calculating the economy-wide share of value added in gross production.

As can be seen, allowing for cross-industry heterogeneity in the trade elasticities substantially increases the estimated gains from trade for all countries in the sample. While the unadjusted median "naive" gains are only 16.5 percent, the unadjusted median "true" gains are actually 48.6 percent so that accounting for cross-industry heterogeneity multiplies the median gains from trade by a factor of 3.1. Similarly, the adjusted median "naive" gains are only 16.9 percent while the adjusted median "true" gains are actually 55.9 percent, representing an increase by a factor of 3.3. While the magnification effect from having multiple industries is similar to the one estimated by Costinot and Rodriguez-Clare (2014), my estimates of the absolute gains from trade are quite a bit larger than theirs.[13]

Table 3 decomposes the "true" gains from trade into the own trade share and the exponent from formula (7). This decomposition helps understand why allowing for non-traded and intermediate goods does not change the gains from trade estimates that much. On the one

[12] Recall that the Feenstra (1994)-Broda and Weinstein (2006) method assumes that all varieties are substitutes which is why all elasticity estimates and confidence intervals in Table 1 imply $\sigma_s > 1$.

[13] Costinot and Rodriguez-Clare (2014) use the elasticity estimates of Caliendo and Parro (2015) which have a higher variance, a higher mean, and a higher minimum value than the ones I use. The higher variance explains why they find a similar magnification effect despite using a higher level of aggregation. The higher mean and higher minimum value explain why they estimate lower gains from trade.

hand, including non-traded industries raises the median own trade share from 63.8 percent to 82.2 percent which tends to dampen the gains from trade. On the other hand, including intermediate goods increases the median exponent from -0.9 to -2.3 which tends to magnify the gains from trade. On average, these two forces are roughly offsetting so that the unadjusted special case provides a reasonable first pass. Columns 2 and 3 further reveal that most of the variation in the unadjusted gains from trade is due to variation in λ_j, while columns 5 and 6 point out that variation in the exponent is more pronounced in the presence of non-traded and intermediate goods.

This point is further explored in Figures 1-3. Figure 1 relates the unadjusted gains from trade to the corresponding own trade shares and shows that the correlation is very tight. Figure 2 does the same for the adjusted trade shares and it is clear that variation in the exponent now plays a larger role. Figure 3 plots the unadjusted log gains from trade against the adjusted log gains from trade and also includes a 45-degree line for ease of comparison. As can be seen, allowing for non-traded and intermediate goods tends to lower the gains from trade for richer countries but increase the gains from trade for poorer ones. The reason is that richer countries tend to have higher expenditure shares on non-traded industries and are also typically less dependent on imports for inputs that feature prominently in their input-output accounts.

Table 4 reports the 95-percent confidence intervals for the "true" gains reported in Table 2. These confidence intervals are constructed by re-calculating the gains from trade for each of the 1,000 sets of bootstrapped elasticity estimates. Despite the considerable noise in the elasticity estimates, the confidence intervals around the "true" gains from trade are actually tighter than one might have thought. In particular, the median lower bound of the confidence intervals of the unadjusted "true" gains from trade is 41.4 percent while the median upper bound of these gains is 52.8 percent. Similarly, the median lower bound of the confidence intervals of the adjusted "true" gains from trade is 49.3 percent while the median upper bound of these gains is 62.5 percent. This happens because most of the variation in the bootstrapped elasticity estimates is in the right tail which is exactly where the gains from trade do not respond to elasticity changes that much.

Figure 4 illustrates that a large share of the adjusted "true" gains from trade can be attributed to a small share of critical industries. I construct this figure based on the relationship $\ln \widehat{\frac{w_j}{P_j}} = \square \sum_{t=1}^{S} \left(\sum_{s=1}^{S} \frac{1}{\sigma_t \square 1} \alpha_{js} \delta_{jt}^{s} \ln \left(\lambda_{jt} \right) \right)$ which follows immediately from the above formulas for the gains from trade. First, I rank all industries t by their contribution to the overall log gains from trade $\square \sum_{s=1}^{S} \frac{1}{\sigma_t \square 1} \alpha_{js} \delta_{jt}^{s} \ln \left(\lambda_{jt} \right)$ for each country. Then, I compute the shares of the log gains from trade due to shares of most important industries by cumulating over $\square \sum_{s=1}^{S} \frac{1}{\sigma_t \square 1} \alpha_{js} \delta_{jt}^{s} \ln \left(\lambda_{jt} \right)$ for each country. Finally, I take the simple average of these shares across countries. As can be seen, the 10 percent most important industries account for roughly 90 percent of the log gains from trade on average.

Table 5 explores the sensitivity of the gains from trade estimates from Table 2 to the level of industry aggregation. In particular, it replicates Table 2 after first aggregating all data back to the GTAP level using trade-weighted averages of the elasticity estimates from Table 1. At this level of aggregation, there are only 28 traded industries instead of the 251 traded industries used before.[14] By construction, the "naive" gains from trade are the same in Tables 2 and 5. However, the "true" gains from trade are lower in Table 5 than in Table 2, as one would expect given the higher level of aggregation. For example, the adjusted median "true" gains fall from 55.9 percent to 35.2 percent when the analysis is conducted at the GTAP level instead of the 3-digit level.

6 Conclusion

In this paper, I argued that accounting for cross-industry variation in trade elasticities greatly magnifies the estimated gains from trade. The main idea was that a complete shutdown of international trade is very costly even though imports in the average industry do not matter too much since imports in some industries are critical to the functioning of the economy. While I have made this point in the context of a simple Armington (1969) model, it should be clear that it extends to other commonly used quantitative trade models. In an Eaton and

[14] The original GTAP data actually features 42 traded industries. I aggregate them into 28 traded industries by combining "paddy rice", "wheat", "cereal grains nec", "vegetables, fruits, nuts", "oil seeds", "plant-based fibres", "crops nec", and "processed rice" into "products of agriculture, etc", "bovine cattle, sheep and goats, horses", "animal products nec", and "wool, silk-worm cocoons" into "live animals, etc", "raw milk" and "dairy products" into "milk and dairy products", "bovine meat products", "meat products nec", and "vegetable oils and fats" into "meat, oil, etc", and "sugar cane, sugar beet", "sugar", and "food products nec" into "food products nec". This is necessary to ensure that each SITC-Rev3 3-digit sector uniquely maps into one GTAP sector.

Kortum (2002) model, for example, the interpretation would be that international productivity differences are so large in some industries that replacing efficiently-produced imports with inefficiently-produced domestic substitutes in these industries would imply extreme costs.

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TABLE 1: Elasticity estimates

SITC Code	SITC Description	Sigma	95%-CI	
656	TULLES, LACE, EMBROIDERY, RIBBONS, TRIMMINGS AND OTHER SMALL WARES	1.54	1.50	2.41
277	NATURAL ABRASIVES, N.E.S. (INCLUDING INDUSTRIAL DIAMONDS)	1.56	1.37	2.00
248	WOOD, SIMPLY WORKED AND RAILWAY SLEEPERS OF WOOD	1.57	1.50	2.63
273	STONE, SAND AND GRAVEL	1.66	1.61	2.48
291	CRUDE ANIMAL MATERIALS, N.E.S.	1.70	1.55	2.83
783	ROAD MOTOR VEHICLES, N.E.S.	1.71	1.48	4.36
663	MINERAL MANUFACTURES, N.E.S.	1.72	1.62	2.16
657	SPECIAL YARNS, SPECIAL TEXTILE FABRICS AND RELATED PRODUCTS	1.73	1.55	2.27
598	MISCELLANEOUS CHEMICAL PRODUCTS, N.E.S.	1.75	1.61	2.15
532	DYEING AND TANNING EXTRACTS, AND SYNTHETIC TANNING MATERIALS	1.76	1.66	2.53
784	PARTS AND ACCESSORIES FOR TRACTORS, MOTOR CARS AND OTHER MOTOR VEHICLES, TR	1.80	1.64	2.01
634	VENEERS, PLYWOOD, PARTICLE BOARD, AND OTHER WOOD, WORKED, N.E.S.	1.81	1.44	3.58
689	MISCELLANEOUS NONFERROUS BASE METALS EMPLOYED IN METALLURGY AND CERMETS	1.84	1.76	2.50
723	CIVIL ENGINEERING AND CONTRACTORS' PLANT AND EQUIPMENT	1.87	1.43	2.73
231	NATURAL RUBBER, BALATA, GUTTA-PERCHA, GUAYULE, CHICLE AND SIMILAR NATURAL G	1.90	1.77	2.57
641	PAPER AND PAPERBOARD	1.90	1.76	2.46
654	WOVEN FABRICS OF TEXTILE MATERIALS, OTHER THAN COTTON OR MANMADE FIBERS AND	1.90	1.58	4.55
662	CLAY CONSTRUCTION MATERIALS AND REFRACTORY CONSTRUCTION MATERIALS	1.90	1.44	3.02
523	METALLIC SALTS AND PEROXYSALTS OF INORGANIC ACIDS	1.91	1.77	2.24
664	GLASS	1.91	1.70	2.46
325	COKE AND SEMICOKE (INCLUDING CHAR) OF COAL, OF LIGNITE OR OF PEAT, AGGLOMER	1.92	1.82	3.05
694	NAILS, SCREWS, NUTS, BOLTS, RIVETS AND SIMILAR ARTICLES, OF IRON, STEEL, CO	1.92	1.69	2.50
699	MANUFACTURES OF BASE METAL, N.E.S.	1.93	1.81	2.62
533	PIGMENTS, PAINTS, VARNISHES AND RELATED MATERIALS	1.94	1.77	2.25
232	SYNTHETIC RUBBER; RECLAIMED RUBBER; WASTE, PAIRINGS AND SCRAP OF UNHARDENED	1.95	1.81	2.56
772	ELECTRICAL APPARATUS FOR SWITCHING OR PROTECTING ELECTRICAL CIRCUITS OR FOR	1.96	1.78	2.73
274	SULFUR AND UNROASTED IRON PYRITES	1.98	1.79	2.51
693	WIRE PRODUCTS (EXCLUDING INSULATED ELECTRICAL WIRING) AND FENCING GRILLS	1.98	1.73	2.70
211	HIDES AND SKINS (EXCEPT FURSKINS), RAW	1.99	1.84	2.98
281	IRON ORE AND CONCENTRATES	1.99	1.88	3.07
678	IRON AND STEEL WIRE	1.99	1.75	3.13
263	COTTON TEXTILE FIBERS	2.01	1.91	2.81
592	STARCHES, INULIN AND WHEAT GLUTEN; ALBUMINOIDAL SUBSTANCES; GLUES	2.01	1.95	2.62
882	PHOTOGRAPHIC AND CINEMATOGRAPHIC SUPPLIES	2.01	1.76	2.54
785	MOTORCYCLES (INCLUDING MOPEDS) AND CYCLES, MOTORIZED AND NOT MOTORIZED; INV	2.03	1.83	2.93
562	FERTILIZERS (EXPORTS INCLUDE GROUP 272; IMPORTS EXCLUDE GROUP 272)	2.04	1.93	2.64
695	TOOLS FOR USE IN THE HAND OR IN MACHINES	2.04	1.88	2.42
741	HEATING AND COOLING EQUIPMENT AND PARTS THEREOF, N.E.S.	2.04	1.79	2.97
34	FISH, FRESH (LIVE OR DEAD), CHILLED OR FROZEN	2.05	1.67	3.05
775	HOUSEHOLD TYPE ELECTRICAL AND NONELECTRICAL EQUIPMENT, N.E.S.	2.05	1.74	3.19
212	FURSKINS, RAW (INCLUDING FURSKIN HEADS, TAILS AND OTHER PIECES OR CUTTINGS,	2.06	1.91	3.33
675	ALLOY STEEL FLAT-ROLLED PRODUCTS	2.08	1.98	2.75
697	HOUSEHOLD EQUIPMENT OF BASE METAL, N.E.S.	2.08	1.82	2.92
778	ELECTRICAL MACHINERY AND APPARATUS, N.E.S.	2.09	1.85	2.71
746	BALL OR ROLLER BEARINGS	2.11	2.05	3.12
629	ARTICLES OF RUBBER, N.E.S.	2.12	1.91	2.86
635	WOOD MANUFACTURES, N.E.S.	2.13	1.82	2.71
278	CRUDE MINERALS, N.E.S.	2.14	1.88	2.65
265	VEGETABLE TEXTILE FIBERS (OTHER THAN COTTON AND JUTE), RAW OR PROCESSED BUT	2.16	1.87	3.55
673	IRON OR NONALLOY STEEL FLAT-ROLLED PRODUCTS, NOT CLAD, PLATED OR COATED	2.16	2.03	2.75
515	ORGANO-INORGANIC COMPOUNDS, HETEROCYCLIC COMPOUNDS, NUCLEIC ACIDS AND THEIR	2.18	1.92	2.60
111	NONALCOHOLIC BEVERAGES, N.E.S.	2.19	1.73	4.42
511	HYDROCARBONS, N.E.S. AND THEIR HALOGENATED, SULFONATED, NITRATED OR NITROSA	2.19	1.92	3.16
661	LIME, CEMENT, AND FABRICATED CONSTRUCTION MATERIALS, EXCEPT GLASS AND CLAY	2.19	1.94	2.50
679	IRON AND STEEL TUBES, PIPES AND HOLLOW PROFILES, FITTINGS FOR TUBES AND PIP	2.22	1.98	2.85
522	INORGANIC CHEMICAL ELEMENTS, OXIDES AND HALOGEN SALTS	2.23	1.84	2.60
685	LEAD	2.24	1.96	3.08

SITC Code	SITC Description	Sigma	95%-CI	
743	PUMPS (NOT FOR LIQUIDS), AIR OR GAS COMPRESSORS AND FANS; VENTILATING HOODS	2.25	1.98	3.19
651	TEXTILE YARN	2.26	2.08	2.87
724	TEXTILE AND LEATHER MACHINERY, AND PARTS THEREOF, N.E.S.	2.27	1.90	2.96
621	MATERIALS OF RUBBER, INCLUDING PASTES, PLATES, SHEETS, RODS, THREAD, TUBES,	2.29	1.93	3.02
665	GLASSWARE	2.31	1.94	2.59
872	INSTRUMENTS AND APPLIANCES, N.E.S., FOR MEDICAL, SURGICAL, DENTAL OR VETERI	2.31	1.88	11.85
516	ORGANIC CHEMICALS, N.E.S.	2.34	1.99	2.82
245	FUEL WOOD (EXCLUDING WOOD WASTE) AND WOOD CHARCOAL	2.35	2.02	7.63
574	POLYACETALS, OTHER POLYETHERS AND EPOXIDE RESINS, IN PRIMARY FORMS; POLYCAR	2.35	2.11	3.79
571	POLYMERS OF ETHYLENE, IN PRIMARY FORMS	2.36	2.08	2.83
735	PARTS AND ACCESSORIES SUITABLE FOR USE SOLELY OR PRINCIPALLY WITH METAL WOR	2.36	2.00	3.05
749	NONELECTRIC PARTS AND ACCESSORIES OF MACHINERY, N.E.S.	2.36	2.01	3.07
692	METAL CONTAINERS FOR STORAGE OR TRANSPORT	2.39	2.02	4.05
342	LIQUEFIED PROPANE AND BUTANE	2.41	2.05	11.05
524	INORGANIC CHEMICALS, N.E.S.; ORGANIC AND INORGANIC COMPOUNDS OF PRECIOUS ME	2.41	2.02	3.70
551	ESSENTIAL OILS, PERFUME AND FLAVOR MATERIALS	2.41	1.93	3.21
686	ZINC	2.42	2.05	24.55
831	TRUNKS, SUITCASES, VANITY CASES, BINOCULAR AND CAMERA CASES, HANDBAGS, WALL	2.42	2.16	3.21
541	MEDICINAL AND PHARMACEUTICAL PRODUCTS, OTHER THAN MEDICAMENTS (OF GROUP 542	2.43	2.10	3.05
579	WASTE, PARINGS AND SCRAP, OF PLASTICS	2.43	2.01	3.07
771	ELECTRIC POWER MACHINERY (OTHER THAN ROTATING ELECTRIC PLANT OF POWER GENER	2.43	1.93	3.03
251	PULP AND WASTE PAPER	2.45	2.18	3.46
582	PLATES, SHEETS, FILM, FOIL AND STRIP OF PLASTICS	2.45	2.09	2.98
54	VEGETABLES, FRESH, CHILLED, FROZEN OR SIMPLY PRESERVED; ROOTS, TUBERS AND O	2.46	2.24	3.66
272	FERTILIZER, CRUDE, EXCEPT THOSE OF DIVISION 56, (IMPORTS ONLY)	2.46	2.07	3.71
512	ALCOHOLS, PHENOLS, PHENOL-ALCOHOLS AND THEIR HALOGENATED, SULFONATED, NITRA	2.46	1.93	2.93
583	MONOFILAMENT WITH A CROSS-SECTIONAL DIMENSION EXCEEDING 1 MM, RODS, STICKS	2.46	2.02	3.08
684	ALUMINUM	2.47	2.24	3.77
292	CRUDE VEGETABLE MATERIALS, N.E.S.	2.48	2.05	3.28
591	INSECTICIDES, FUNGICIDES, HERBICIDES, PLANT GROWTH REGULATORS, ETC., DISINF	2.48	2.18	3.52
514	NITROGEN-FUNCTION COMPOUNDS	2.49	2.14	3.06
72	COCOA	2.50	2.13	3.78
282	FERROUS WASTE AND SCRAP; REMELTING INGOTS OF IRON OR STEEL	2.50	2.12	4.10
48	CEREAL PREPARATIONS AND PREPARATIONS OF FLOUR OR STARCH OF FRUITS OR VEGETA	2.52	2.32	3.52
593	EXPLOSIVES AND PYROTECHNIC PRODUCTS	2.52	2.03	3.98
726	PRINTING AND BOOKBINDING MACHINERY, AND PARTS THEREOF	2.52	2.03	3.60
744	MECHANICAL HANDLING EQUIPMENT, AND PARTS THEREOF, N.E.S.	2.52	1.89	3.83
334	PETROLEUM OILS AND OILS FROM BITUMINOUS MINERALS (OTHER THAN CRUDE), AND PR	2.55	2.05	3.55
672	IRON OR STEEL INGOTS AND OTHER PRIMARY FORMS, AND SEMIFINISHED PRODUCTS OF	2.55	2.05	3.55
268	WOOL AND OTHER ANIMAL HAIR (INCLUDING WOOL TOPS)	2.56	2.27	3.56
725	PAPER MILL AND PULP MILL MACHINERY, PAPER CUTTING MACHINES AND MACHINERY FO	2.56	1.88	3.98
786	TRAILERS AND SEMI-TRAILERS; OTHER VEHICLES, NOT MECHANICALLY PROPELLED; SPE	2.57	1.70	5.40
335	RESIDUAL PETROLEUM PRODUCTS, N.E.S. AND RELATED MATERIALS	2.58	2.05	4.05
267	MANMADE FIBERS, N.E.S. SUITABLE FOR SPINNING AND WASTE OF MANMADE FIBERS	2.60	2.20	4.09
748	TRANSMISSION SHAFTS AND CRANKS; BEARING HOUSINGS AND PLAIN SHAFT BEARINGS;	2.60	2.14	3.70
554	SOAP, CLEANSING AND POLISHING PREPARATIONS	2.62	2.22	3.25
884	OPTICAL GOODS, N.E.S.	2.62	2.28	3.31
581	TUBES, PIPES AND HOSES OF PLASTICS	2.63	2.19	3.34
776	THERMIONIC, COLD CATHODE OR PHOTOCATHODE VALVES AND TUBES; DIODES, TRANSIST	2.63	2.00	3.86
773	EQUIPMENT FOR DISTRIBUTING ELECTRICITY, N.E.S.	2.67	2.26	2.98
553	PERFUMERY, COSMETICS, OR TOILET PREPARATIONS, EXCLUDING SOAPS	2.68	2.32	3.55
791	RAILWAY VEHICLES (INCLUDING HOVERTRAINS) AND ASSOCIATED EQUIPMENT	2.68	2.01	6.49
61	SUGARS, MOLASSES, AND HONEY	2.70	2.13	3.58
733	MACHINE TOOLS FOR WORKING METAL, SINTERED METAL CARBIDES OR CERMETS, WITHOU	2.70	1.93	16.07
289	ORES AND CONCENTRATES OF PRECIOUS METALS; WASTE, SCRAP AND SWEEPINGS OF PRE	2.71	1.89	11.28
881	PHOTOGRAPHIC APPARATUS AND EQUIPMENT, N.E.S.	2.71	2.12	3.87
899	MISCELLANEOUS MANUFACTURED ARTICLES, N.E.S.	2.71	2.28	3.26
266	SYNTHETIC FIBERS SUITABLE FOR SPINNING	2.74	2.35	3.72

SITC Code	SITC Description	Sigma	95%-CI	
844	WOMEN'S OR GIRLS' COATS, CAPES, JACKETS, SUITS, TROUSERS, DRESSES, UNDERWEA	2.75	2.41	13.88
793	SHIPS, BOATS (INCLUDING HOVERCRAFT) AND FLOATING STRUCTURES	2.77	2.40	4.80
722	TRACTORS (OTHER THAN MECHANICAL HANDLING EQUIPMENT)	2.82	1.55	25.05
287	ORES AND CONCENTRATES OF BASE METALS, N.E.S.	2.83	2.36	3.52
659	FLOOR COVERINGS, ETC.	2.83	1.86	25.05
676	IRON AND STEEL BARS, RODS, ANGLES, SHAPES AND SECTIONS, INCLUDING SHEET PIL	2.84	2.36	3.52
284	NICKEL ORES AND CONCENTRATES; NICKEL MATTES, NICKEL OXIDE SINTERS AND OTHER	2.87	1.81	7.34
597	PREPARED ADDITIVES FOR MINERAL OILS ETC.; LIQUIDS FOR HYDRAULIC TRANSMISSIO	2.90	2.37	3.80
687	TIN	2.90	2.34	13.50
642	PAPER AND PAPERBOARD, CUT TO SIZE OR SHAPE, AND ARTICLES OF PAPER OR PAPERB	2.91	2.39	3.72
531	SYNTHETIC ORGANIC COLORING MATTER AND COLOR LAKES AND PREPARATIONS BASED TH	2.93	2.37	3.42
572	POLYMERS OF STYRENE, IN PRIMARY FORMS	2.94	2.14	5.24
17	MEAT AND EDIBLE MEAT OFFAL, PREPARED OR PRESERVED N.E.S.	2.95	2.30	6.28
74	TEA AND MATE	2.96	2.43	3.78
633	CORK MANUFACTURES	2.98	2.27	6.59
885	WATCHES AND CLOCKS	2.98	2.09	13.69
658	MADE-UP ARTICLES, WHOLLY OR CHIEFLY OF TEXTILE MATERIALS, N.E.S.	2.99	2.31	4.01
893	ARTICLES, N.E.S. OF PLASTICS	2.99	2.29	3.79
671	PIG IRON AND SPIEGELEISEN, SPONGE IRON, IRON OR STEEL GRANULES AND POWDERS	3.00	2.47	4.01
56	VEGETABLES, ROOTS AND TUBERS, PREPARED OR PRESERVED, N.E.S.	3.04	2.36	4.29
269	WORN CLOTHING AND OTHER WORN TEXTILE ARTICLES; RAGS	3.04	2.43	4.75
75	SPICES	3.08	2.21	4.34
891	ARMS AND AMMUNITION	3.08	2.27	7.39
573	POLYMERS OF VINYL CHLORIDE OR OTHER HALOGENATED OLEFINS, IN PRIMARY FORMS	3.09	2.31	3.75
716	ROTATING ELECTRIC PLANT AND PARTS THEREOF, N.E.S.	3.11	2.36	4.02
36	CRUSTACEANS MOLLUSCS,AQUTC INVRTBRTS FRSH (LVE/DEAD) CH SLTD ETC.; CRUSTACE	3.13	2.37	4.04
222	OIL SEEDS AND OLEAGINOUS FRUITS USED FOR THE EXTRACTION OF SOFT FIXED VEGET	3.13	2.53	4.70
897	JEWELRY, GOLDSMITHS' AND SILVERSMITHS' WARES, AND OTHER ARTICLES OF PRECIOU	3.16	2.40	25.05
47	CEREAL MEALS AND FLOURS, N.E.S.	3.17	2.53	5.53
223	OIL SEEDS AND OLEAGINOUS FRUITS, WHOLE OR BROKEN, OF A KIND USED FOR EXTRAC	3.19	1.99	3.93
742	PUMPS FOR LIQUIDS, WHETHER OR NOT FITTED WITH A MEASURING DEVICE; LIQUID EL	3.19	1.97	4.71
261	SILK TEXTILE FIBERS	3.20	2.46	10.62
98	EDIBLE PRODUCTS AND PREPARATIONS, N.E.S.	3.24	2.55	3.91
737	METALWORKING MACHINERY (OTHER THAN MACHINE TOOLS) AND PARTS THEREOF, N.E.S.	3.25	2.26	4.22
764	TELECOMMUNICATIONS EQUIPMENT, N.E.S.; AND PARTS, N.E.S., AND ACCESSORIES OF	3.25	2.51	4.19
874	MEASURING, CHECKING, ANALYSING AND CONTROLLING INSTRUMENTS AND APPARATUS, N	3.25	2.55	4.31
513	CARBOXYLIC ACIDS AND ANHYDRIDES, HALIDES, PEROXIDES AND PEROXYACIDS; THEIR	3.26	2.40	4.22
898	MUSICAL INSTRUMENTS, PARTS AND ACCESSORIES THEREOF; RECORDS, TAPES AND OTHE	3.26	2.08	4.56
11	MEAT OF BOVINE ANIMALS, FRESH, CHILLED OR FROZEN	3.29	2.91	23.30
871	OPTICAL INSTRUMENTS AND APPARATUS, N.E.S.	3.29	2.49	5.18
896	WORKS OF ART, COLLECTORS' PIECES AND ANTIQUES	3.29	2.77	5.61
422	FIXED VEGETABLE FATS AND OILS (OTHER THAN SOFT), CRUDE, REFINED OR FRACTION	3.30	2.47	6.39
575	PLASTICS, N.E.S., IN PRIMARY FORMS	3.30	2.43	3.74
1	LIVE ANIMALS OTHER THAN ANIMALS OF DIVISION 03	3.31	2.31	5.20
718	POWER GENERATING MACHINERY AND PARTS THEREOF, N.E.S.	3.34	2.73	5.08
846	CLOTHING ACCESSORIES, OF TEXTILE FABRICS, WHETHER OR NOT KNITTED OR CROCHET	3.39	2.42	7.50
821	FURNITURE AND PARTS THEREOF; BEDDING, MATTRESSES, MATTRESS SUPPORTS, CUSHIO	3.41	2.56	4.73
931	SPECIAL TRANSACTIONS AND COMMODITIES NOT CLASSIFIED ACCORDING TO KIND	3.42	2.60	15.02
42	RICE	3.43	2.55	5.99
285	ALUMINUM ORES AND CONCENTRATES (INCLUDING ALUMINA)	3.43	2.23	5.43
674	IRON AND NONALLOY STEEL FLAT-ROLLED PRODUCTS, CLAD, PLATED OR COATED	3.43	2.16	4.38
321	COAL, PULVERIZED OR NOT, BUT NOT AGGLOMERATED	3.44	2.50	5.60
721	AGRICULTURAL MACHINERY (EXCLUDING TRACTORS) AND PARTS THEREOF	3.44	1.98	5.56
883	CINEMATOGRAPHIC FILM, EXPOSED AND DEVELOPED, WHETHER OR NOT INCORPORATING S	3.48	2.15	27.26
44	MAIZE (NOT INCLUDING SWEET CORN) UNMILLED	3.51	2.62	5.99
57	FRUIT AND NUTS (NOT INCLUDING OIL NUTS), FRESH OR DRIED	3.55	2.70	4.14
122	TOBACCO, MANUFACTURED (WHETHER OR NOT CONTAINING TOBACCO SUBSTITUTES)	3.56	2.24	7.80
655	KNITTED OR CROCHETED FABRICS (INCLUDING TUBULAR KNIT FABRICS, N.E.S., PILE	3.56	2.27	6.34

SITC Code	SITC Description	Sigma	95%-CI	
711	STEAM OR OTHER VAPOR GENERATING BOILERS, SUPER-HEATED WATER BOILERS AND AUX	3.56	2.34	10.50
666	POTTERY	3.57	2.92	4.11
288	NONFERROUS BASE METAL WASTE AND SCRAP, N.E.S.	3.58	2.87	6.86
45	CEREALS, UNMILLED (OTHER THAN WHEAT, RICE, BARLEY AND MAIZE)	3.60	2.60	7.30
22	MILK AND CREAM AND MILK PRODUCTS OTHER THAN BUTTER OR CHEESE	3.61	3.08	6.01
81	FEEDING STUFF FOR ANIMALS (NOT INCLUDING UNMILLED CEREALS)	3.61	2.34	5.01
714	ENGINES AND MOTORS, NONELECTRIC (OTHER THAN STEAM TURBINES, INTERNAL COMBUS	3.63	1.93	25.05
421	FIXED VEGETABLE FATS AND OILS, SOFT, CRUDE, REFINED OR FRACTIONATED	3.65	2.81	5.33
683	NICKEL	3.65	2.75	7.01
728	MACHINERY AND EQUIPMENT SPECIALIZED FOR PARTICULAR INDUSTRIES, AND PARTS TH	3.78	2.09	5.67
745	NONELECTRICAL MACHINERY, TOOLS AND MECHANICAL APPARATUS, AND PARTS THEREOF,	3.78	2.38	5.85
112	ALCOHOLIC BEVERAGES	3.79	1.92	9.28
727	FOOD-PROCESSING MACHINES (EXCLUDING DOMESTIC)	3.84	2.27	6.79
894	BABY CARRIAGES, TOYS, GAMES AND SPORTING GOODS	3.88	2.73	5.78
333	PETROLEUM OILS AND OILS FROM BITUMINOUS MINERALS, CRUDE	3.96	2.55	6.31
411	ANIMAL OILS AND FATS	3.96	2.55	15.89
612	MANUFACTURES OF LEATHER OR COMPOSITION LEATHER, N.E.S.; SADDLERY AND HARNES	3.97	2.51	22.60
244	CORK, NATURAL, RAW AND WASTE (INCLUDING NATURAL CORK IN BLOCKS OR SHEETS)	3.98	1.86	7.01
41	WHEAT (INCLUDING SPELT) AND MESLIN, UNMILLED	4.00	2.05	10.56
12	MEAT, OTHER THAN OF BOVINE ANIMALS, AND EDIBLE OFFAL, FRESH, CHILLED OR FRO	4.04	2.82	6.07
682	COPPER	4.04	2.57	4.60
264	JUTE AND OTHER TEXTILE BAST FIBERS, N.E.S., RAW OR PROCESSED BUT NOT SPUN;	4.05	1.55	6.55
542	MEDICAMENTS (INCLUDING VETERINARY MEDICAMENTS)	4.05	2.75	6.36
58	FRUIT PRESERVED, AND FRUIT PREPARATIONS (EXCLUDING FRUIT JUICES)	4.07	2.84	6.20
43	BARLEY, UNMILLED	4.08	3.05	21.80
73	CHOCOLATE AND OTHER FOOD PREPARATIONS CONTAINING COCOA, N.E.S.	4.10	3.36	5.22
841	MEN'S OR BOYS' COATS, JACKETS, SUITS, TROUSERS, SHIRTS, UNDERWEAR ETC. OF W	4.11	3.19	5.73
71	COFFEE AND COFFEE SUBSTITUTES	4.19	2.79	6.00
774	ELECTRO-DIAGNOSTIC APPARATUS FOR MEDICAL, SURGICAL, DENTAL OR VETERINARY SC	4.19	2.80	5.63
731	MACHINE TOOLS WORKING BY REMOVING METAL OR OTHER MATERIAL	4.20	2.11	14.34
842	WOMEN'S OR GIRLS' COATS, CAPES, JACKETS, SUITS, TROUSERS, DRESSES, SKIRTS,	4.23	2.71	6.71
59	FRUIT JUICES (INCL. GRAPE MUST) AND VEGETABLE JUICES, UNFERMENTED AND NOT C	4.27	2.63	7.21
691	METAL STRUCTURES AND PARTS, N.E.S., OF IRON, STEEL OR ALUMINUM	4.28	2.92	4.90
713	INTERNAL COMBUSTION PISTON ENGINES AND PARTS THEREOF, N.E.S.	4.30	2.58	5.95
712	STEAM TURBINES AND OTHER VAPOR TURBINES, AND PARTS THEREOF, N.E.S.	4.35	2.57	20.75
322	BRIQUETTES, LIGNITE AND PEAT	4.45	2.67	12.27
851	FOOTWEAR	4.45	2.99	7.30
121	TOBACCO, UNMANUFACTURED; TOBACCO REFUSE	4.51	3.64	12.59
812	SANITARY, PLUMBING AND HEATING FIXTURES AND FITTINGS, N.E.S.	4.56	3.10	6.27
653	WOVEN FABRICS OF MANMADE TEXTILE MATERIALS (NOT INCLUDING NARROW OR SPECIAL	4.60	2.21	21.35
747	TAPS, COCKS, VALVES AND SIMILAR APPLIANCES FOR PIPES, BOILER SHELLS, TANKS,	4.62	2.86	5.14
873	METERS AND COUNTERS, N.E.S.	4.63	2.77	7.72
25	BIRDS' EGGS AND EGG YOLKS, FRESH, DRIED OR OTHERWISE PRESERVED, SWEETENED O	4.73	2.13	34.45
246	WOOD IN CHIPS OR PARTICLES AND WOOD WASTE	4.77	2.68	6.49
813	LIGHTING FIXTURES AND FITTINGS, N.E.S.	4.88	2.85	6.05
35	FISH, DRIED, SLTD R IN BRINE; SMKD FISH (WHETHR R NT COOKD BEFORE OR DURNG	4.92	3.04	12.74
848	ARTICLES OF APPAREL AND CLOTHING ACCESSORIES OF OTHER THAN TEXTILE FABRICS;	4.97	2.64	7.50
667	PEARLS, PRECIOUS AND SEMIPRECIOUS STONES, UNWORKED OR WORKED	5.11	1.87	25.05
24	CHEESE AND CURD	5.13	3.66	7.31
46	MEAL AND FLOUR OF WHEAT AND FLOUR OF MESLIN	5.19	3.54	9.95
23	BUTTER AND OTHER FATS AND OILS DERIVED FROM MILK	5.26	3.36	8.82
763	SOUND RECORDERS OR REPRODUCERS; TELEVISION IMAGE AND SOUND RECORDERS OR REP	5.26	3.50	7.02
611	LEATHER	5.30	1.82	20.38
677	IRON AND STEEL RAILS AND RAILWAY TRACK CONSTRUCTION MATERIAL	5.63	2.35	14.13
247	WOOD IN THE ROUGH OR ROUGHLY SQUARED	5.64	2.38	25.82
895	OFFICE AND STATIONERY SUPPLIES, N.E.S.	5.79	2.50	7.34
625	RUBBER TIRES, INTERCHANGEABLE TIRE TREADS, TIRE FLAPS AND INNER TUBES FOR W	5.84	2.73	11.16
845	ARTICLES OF APPAREL, OF TEXTILE FABRICS, WHETHER OR NOT KNITTED OR CROCHETE	6.10	3.45	11.71

SITC Code	SITC Description	Sigma	95%-CI	
16	MEAT AND EDIBLE MEAT OFFAL, SALTED, IN BRINE, DRIED OR SMOKED; EDIBLE FLOUR	6.35	2.92	11.58
752	AUTOMATIC DATA PROCESSING MACHINES AND UNITS THEREOF; MAGNETIC OR OPTICAL R	6.40	3.46	7.98
525	RADIOACTIVE AND ASSOCIATED MATERIALS	6.51	2.35	40.13
62	SUGAR CONFECTIONERY	6.85	3.36	18.20
971	GOLD, NONMONETARY (EXCLUDING GOLD ORES AND CONCENTRATES)	6.88	2.48	80.04
892	PRINTED MATTER	7.13	3.49	11.16
751	OFFICE MACHINES	7.83	3.38	15.23
761	TV RECEIVERS (INCLUDING VIDEO MONITORS & PROJECTORS) WHETH R NT INCORP RADI	7.88	4.40	20.13
843	MEN'S OR BOYS' COATS, CAPES, JACKETS, SUITS, BLAZERS, TROUSERS, SHIRTS, ETC	7.97	3.56	16.24
681	SILVER, PLATINUM AND OTHER PLATINUM GROUP METALS	8.25	3.18	70.33
283	COPPER ORES AND CONCENTRATES; COPPER MATTES; CEMENT COPPER	8.52	3.45	25.05
37	FISH, CRUSTACEANS, MOLLUSCS AND OTHER AQUATIC INVERTEBRATES, PREPARED OR PR	8.73	3.49	14.61
696	CUTLERY	10.70	4.38	21.20
652	COTTON FABRICS, WOVEN (NOT INCLUDING NARROW OR SPECIAL FABRICS)	10.95	7.39	30.97
762	RADIO-BROADCAST RECEIVERS, WHETHER OR NOT INCORPORATING SOUND RECORDING OR	12.13	5.27	19.74
613	FURSKINS, TANNED OR DRESSED (INCLUDING PIECES OR CUTTINGS), ASSEMBLED OR UN	12.59	2.05	40.62
792	AIRCRAFT AND ASSOCIATED EQUIPMENT; SPACECRAFT (INCLUDING SATELLITES) AND SP	16.55	6.55	39.29
91	MARGARINE AND SHORTENING	18.05	3.05	44.81
781	MOTOR CARS AND OTHER MOTOR VEHICLES PRINCIPALLY DESIGNED FOR THE TRANSPORT	21.55	1.95	25.05
782	MOTOR VEHICLES FOR THE TRANSPORT OF GOODS AND SPECIAL PURPOSE MOTOR VEHICLE	25.05	2.05	47.20
	MEAN	3.63	2.32	8.16

TABLE 2: Gains from trade

	Unadjusted			Adjusted		
	Naïve Gain (%)	True Gain (%)	Ratio	Naïve Gain (%)	True Gain (%)	Ratio
United Arab Emirates	39.8	133.2	3.3	35.9	148.8	4.2
Argentina	9.2	28.3	3.1	9.6	31.5	3.3
Australia	13.1	35.9	2.7	9.7	28.7	3.0
Austria	32.1	103.4	3.2	27.1	95.5	3.5
Belgium	53.3	259.9	4.9	59.5	505.2	8.5
Brazil	4.7	9.8	2.1	4.9	9.5	1.9
Canada	19.0	53.6	2.8	14.4	44.0	3.0
Switzerland	39.0	134.6	3.5	24.1	111.0	4.6
Chile	17.0	67.0	3.9	16.0	109.0	6.8
China	5.7	12.9	2.2	13.8	30.8	2.2
Colombia	9.5	30.8	3.2	7.6	29.2	3.8
Czech Republic	22.6	71.4	3.2	38.0	137.4	3.6
Germany	18.5	45.7	2.5	17.7	40.2	2.3
Denmark	26.5	79.2	3.0	25.4	75.4	3.0
Spain	16.4	52.0	3.2	15.4	53.4	3.5
Finland	17.2	52.6	3.1	22.0	68.0	3.1
France	15.0	39.2	2.6	13.1	35.3	2.7
United Kingdom	18.3	44.7	2.4	12.6	31.8	2.5
Greece	20.8	72.6	3.5	19.4	121.9	6.3
Hungary	26.0	86.5	3.3	45.4	166.1	3.7
Indonesia	8.3	25.2	3.0	11.3	35.6	3.2
India	7.3	13.7	1.9	11.2	20.9	1.9
Ireland	31.7	99.2	3.1	41.9	134.5	3.2
Iran, Islamic Rep.	8.9	28.5	3.2	11.7	50.3	4.3
Israel	29.4	115.0	3.9	21.7	77.5	3.6
Italy	11.1	32.7	2.9	13.6	38.1	2.8
Japan	7.8	25.7	3.3	7.1	21.4	3.0
Korea, Rep.	12.3	42.7	3.5	21.3	65.4	3.1
Mexico	15.0	45.0	3.0	11.3	33.9	3.0
Malaysia	22.8	74.1	3.2	46.8	219.0	4.7
Nigeria	10.5	52.6	5.0	13.2	70.9	5.4
Netherlands	26.2	79.8	3.0	18.8	52.1	2.8
Norway	19.7	63.3	3.2	14.9	51.0	3.4
New Zealand	11.7	30.6	2.6	11.5	32.3	2.8
Pakistan	9.5	36.7	3.8	12.8	61.9	4.8
Philippines	18.5	57.7	3.1	23.0	127.8	5.5
Poland	16.6	47.7	2.9	21.1	72.0	3.4
Portugal	18.8	59.6	3.2	19.1	75.0	3.9
Romania	15.3	44.1	2.9	20.5	70.0	3.4
Rest of World	16.3	35.5	2.2	21.9	56.6	2.6
Russian Federation	9.1	25.1	2.7	10.8	34.9	3.2
Saudi Arabia	14.9	49.6	3.3	21.1	68.1	3.2
Singapore	57.2	218.3	3.8	73.1	361.7	4.9
Sweden	21.4	57.5	2.7	21.2	55.3	2.6
Thailand	19.1	51.3	2.7	35.5	89.0	2.5
Turkey	12.6	37.5	3.0	12.3	41.0	3.3
Ukraine	22.3	86.7	3.9	31.4	174.3	5.6
United States	9.9	19.4	2.0	6.4	13.5	2.1
Venezuela, RB	8.4	27.9	3.3	9.2	41.0	4.5
South Africa	11.2	30.5	2.7	14.6	42.3	2.9
Median	16.5	48.6	3.1	16.9	55.9	3.3

Note: This table summarizes the changes in real income resulting from a move from autarky to year 2007 levels of trade. The results under "True Gain" are computed using the industry-level formulas, the results under "Naïve Gain" are computed using the aggregate formulas, and the results under "Ratio" simply compute the ratio of the two. Columns 1-3 do not adjust for non-traded or intermediate goods while columns 4-6 do. I include Hong Kong in my definition of China.

TABLE 3: Decomposition of the gains from trade

	True Gain (%)	Unadjusted Lambda (%)	Exponent	True Gain (%)	Adjusted Lambda (%)	Exponent
United Arab Emirates	133.19	37.29	-0.86	148.82	64.46	-2.08
Argentina	28.28	77.18	-0.96	31.46	88.46	-2.23
Australia	35.93	69.59	-0.85	28.68	89.65	-2.31
Austria	103.43	44.05	-0.87	95.50	74.06	-2.23
Belgium	259.88	28.45	-1.02	505.22	64.02	-4.04
Brazil	9.76	87.39	-0.69	9.48	93.34	-1.31
Canada	53.57	59.94	-0.84	43.97	83.75	-2.06
Switzerland	134.65	37.95	-0.88	111.00	75.12	-2.61
Chile	66.97	62.92	-1.11	108.98	83.16	-4.00
China	12.86	84.86	-0.74	30.78	89.48	-2.41
Colombia	30.85	76.50	-1.00	29.20	89.97	-2.42
Czech Republic	71.42	54.93	-0.90	137.42	74.15	-2.89
Germany	45.70	60.73	-0.75	40.16	80.83	-1.59
Denmark	79.21	50.01	-0.84	75.38	75.61	-2.01
Spain	51.99	63.98	-0.94	53.40	83.71	-2.41
Finland	52.60	62.64	-0.90	67.97	80.35	-2.37
France	39.19	66.26	-0.80	35.35	86.27	-2.05
United Kingdom	44.68	61.03	-0.75	31.80	85.06	-1.71
Greece	72.64	57.37	-0.98	121.91	78.89	-3.36
Hungary	86.53	50.62	-0.92	166.14	69.18	-2.66
Indonesia	25.16	79.04	-0.95	35.58	86.93	-2.17
India	13.73	81.18	-0.62	20.91	88.09	-1.50
Ireland	99.17	44.47	-0.85	134.52	65.75	-2.03
Iran, Islamic Rep.	28.48	77.76	-1.00	50.29	84.97	-2.50
Israel	114.97	46.86	-1.01	77.49	78.02	-2.31
Italy	32.70	73.27	-0.91	38.05	86.69	-2.26
Japan	25.68	80.21	-1.04	21.43	91.91	-2.30
Korea, Rep.	42.74	71.15	-1.05	65.43	83.12	-2.72
Mexico	44.99	66.28	-0.90	33.92	85.14	-1.81
Malaysia	74.13	54.57	-0.92	219.00	70.58	-3.33
Nigeria	52.59	74.54	-1.44	70.91	76.39	-1.99
Netherlands	79.77	50.39	-0.86	52.10	81.01	-1.99
Norway	63.33	58.92	-0.93	51.03	82.77	-2.18
New Zealand	30.58	72.19	-0.82	32.30	87.60	-2.11
Pakistan	36.70	76.45	-1.16	61.90	85.77	-3.14
Philippines	57.71	60.66	-0.91	127.80	76.05	-3.01
Poland	47.69	63.63	-0.86	72.01	80.79	-2.54
Portugal	59.58	60.26	-0.92	74.97	81.67	-2.76
Romania	44.12	65.82	-0.87	69.98	80.33	-2.42
Rest of World	35.47	64.15	-0.68	56.56	78.65	-1.87
Russian Federation	25.08	77.31	-0.87	34.86	88.00	-2.34
Saudi Arabia	49.60	66.51	-0.99	68.06	72.71	-1.63
Singapore	218.27	26.39	-0.87	361.71	59.58	-2.95
Sweden	57.53	56.43	-0.79	55.31	79.96	-1.97
Thailand	51.27	59.82	-0.81	88.97	72.09	-1.94
Turkey	37.55	70.47	-0.91	40.97	84.68	-2.06
Ukraine	86.75	55.28	-1.05	174.28	76.04	-3.68
United States	19.38	75.73	-0.64	13.47	91.47	-1.42
Venezuela, RB	27.95	78.79	-1.03	40.97	88.37	-2.78
South Africa	30.53	73.18	-0.85	42.28	86.28	-2.39
Median	48.64	63.80	-0.90	55.93	82.22	-2.30

Note: This table provides more detail on the calculation of the gains from trade in Table 2. In particular, it again lists the gains from trade computed using the industry-level formulas and explicitly shows the λ and the exponent from formula (7). Notice that the gains and the λ are expressed as percentages so that "True Gain (%)"=100*(("Lambda (%)"/100)^"Exponent"-1). Columns 1-3 do not adjust for non-traded or intermediate goods while columns 4-6 do.

TABLE 4: Confidence intervals

	Unadjusted			Adjusted		
	True Gain (%)	95%-CI		True Gain (%)	95%-CI	
United Arab Emirates	133.2	92.9	142.3	148.8	105.1	159.3
Argentina	28.3	23.8	31.3	31.5	26.5	34.2
Australia	35.9	26.8	39.1	28.7	21.9	30.7
Austria	103.4	88.2	117.0	95.5	81.4	105.2
Belgium	259.9	207.9	318.6	505.2	387.0	622.1
Brazil	9.8	8.7	10.4	9.5	8.3	9.8
Canada	53.6	44.3	60.3	44.0	36.6	48.7
Switzerland	134.6	105.6	156.8	111.0	86.5	127.6
Chile	67.0	47.5	72.2	109.0	76.4	138.4
China	12.9	11.4	14.7	30.8	26.8	35.2
Colombia	30.8	25.1	32.3	29.2	23.6	30.3
Czech Republic	71.4	63.3	80.8	137.4	119.6	159.0
Germany	45.7	41.7	51.1	40.2	35.9	43.7
Denmark	79.2	65.1	81.2	75.4	60.6	75.2
Spain	52.0	42.3	62.1	53.4	43.7	63.1
Finland	52.6	41.7	61.1	68.0	53.2	77.0
France	39.2	32.8	43.6	35.3	29.8	38.7
United Kingdom	44.7	36.6	50.0	31.8	26.0	34.2
Greece	72.6	54.8	83.2	121.9	91.6	157.8
Hungary	86.5	74.5	101.4	166.1	137.8	193.8
Indonesia	25.2	20.1	26.7	35.6	28.1	37.6
India	13.7	12.5	18.6	20.9	18.8	26.6
Ireland	99.2	80.2	106.3	134.5	102.2	142.7
Iran, Islamic Rep.	28.5	24.0	28.7	50.3	41.5	50.0
Israel	115.0	93.0	139.1	77.5	61.3	90.3
Italy	32.7	24.7	37.8	38.1	28.6	42.9
Japan	25.7	21.2	35.3	21.4	17.7	29.0
Korea, Rep.	42.7	36.1	59.2	65.4	53.1	88.7
Mexico	45.0	40.3	48.4	33.9	30.4	36.1
Malaysia	74.1	58.0	92.2	219.0	154.3	293.2
Nigeria	52.6	41.2	53.5	70.9	55.1	70.9
Netherlands	79.8	70.9	92.3	52.1	45.2	56.1
Norway	63.3	49.9	67.4	51.0	40.3	52.3
New Zealand	30.6	23.2	32.5	32.3	24.5	33.8
Pakistan	36.7	31.4	39.7	61.9	52.6	67.9
Philippines	57.7	45.8	72.8	127.8	103.0	271.8
Poland	47.7	42.7	52.2	72.0	64.1	78.9
Portugal	59.6	50.3	70.5	75.0	63.3	89.1
Romania	44.1	36.3	46.8	70.0	57.0	73.4
Rest of World	35.5	32.2	37.4	56.6	49.8	58.4
Russian Federation	25.1	19.1	27.5	34.9	26.5	37.4
Saudi Arabia	49.6	37.0	52.1	68.1	49.3	69.3
Singapore	218.3	175.6	330.9	361.7	274.1	439.3
Sweden	57.5	52.6	67.1	55.3	49.2	62.0
Thailand	51.3	47.8	60.5	89.0	80.4	103.2
Turkey	37.5	31.8	42.0	41.0	34.9	45.8
Ukraine	86.7	61.6	101.0	174.3	121.2	201.9
United States	19.4	16.5	22.0	13.5	11.5	14.9
Venezuela, RB	27.9	21.5	30.5	41.0	32.0	44.5
South Africa	30.5	25.8	35.1	42.3	35.4	47.4
Median	48.6	41.4	52.8	55.9	49.3	62.5

Note: This table summarizes the 95-percent confidence intervals around the "true" gains from trade reported in Table 2. Columns 1-3 do not adjust for non-traded or intermediate goods while columns 4-6 do.

TABLE 5: Gains from trade with GTAP instead of 3-digit industry aggregation

	Unadjusted			Adjusted		
	Naïve Gain (%)	True Gain (%)	Ratio	Naïve Gain (%)	True Gain (%)	Ratio
United Arab Emirates	39.8	58.8	1.5	35.9	68.8	1.9
Argentina	9.2	14.2	1.5	9.6	16.6	1.7
Australia	13.1	17.7	1.4	9.7	15.5	1.6
Austria	32.1	48.7	1.5	27.1	48.2	1.8
Belgium	53.3	132.3	2.5	59.5	259.6	4.4
Brazil	4.7	6.3	1.3	4.9	6.4	1.3
Canada	19.0	24.8	1.3	14.4	21.9	1.5
Switzerland	39.0	72.7	1.9	24.1	55.6	2.3
Chile	17.0	31.9	1.9	16.0	60.0	3.7
China	5.7	7.7	1.3	13.8	17.8	1.3
Colombia	9.5	15.9	1.7	7.6	15.7	2.1
Czech Republic	22.6	42.8	1.9	38.0	80.5	2.1
Germany	18.5	28.7	1.6	17.7	25.7	1.4
Denmark	26.5	40.3	1.5	25.4	42.1	1.7
Spain	16.4	35.0	2.1	15.4	38.5	2.5
Finland	17.2	33.4	1.9	22.0	42.4	1.9
France	15.0	26.0	1.7	13.1	24.2	1.9
United Kingdom	18.3	24.3	1.3	12.6	19.2	1.5
Greece	20.8	40.4	1.9	19.4	85.7	4.4
Hungary	26.0	47.9	1.8	45.4	88.8	2.0
Indonesia	8.3	12.8	1.5	11.3	18.7	1.7
India	7.3	11.4	1.6	11.2	17.4	1.5
Ireland	31.7	51.3	1.6	41.9	70.7	1.7
Iran, Islamic Rep.	8.9	15.9	1.8	11.7	31.1	2.7
Israel	29.4	59.0	2.0	21.7	41.1	1.9
Italy	11.1	23.1	2.1	13.6	27.1	2.0
Japan	7.8	23.2	3.0	7.1	19.5	2.7
Korea, Rep.	12.3	35.4	2.9	21.3	52.4	2.5
Mexico	15.0	23.4	1.6	11.3	18.1	1.6
Malaysia	22.8	31.7	1.4	46.8	64.5	1.4
Nigeria	10.5	24.2	2.3	13.2	37.1	2.8
Netherlands	26.2	48.7	1.9	18.8	30.6	1.6
Norway	19.7	28.8	1.5	14.9	26.8	1.8
New Zealand	11.7	16.1	1.4	11.5	18.1	1.6
Pakistan	9.5	22.0	2.3	12.8	45.5	3.6
Philippines	18.5	28.5	1.5	23.0	97.0	4.2
Poland	16.6	28.0	1.7	21.1	44.1	2.1
Portugal	18.8	37.9	2.0	19.1	50.4	2.6
Romania	15.3	22.8	1.5	20.5	37.3	1.8
Rest of World	16.3	23.0	1.4	21.9	36.2	1.7
Russian Federation	9.1	12.3	1.4	10.8	17.8	1.6
Saudi Arabia	14.9	23.6	1.6	21.1	33.9	1.6
Singapore	57.2	113.1	2.0	73.1	134.4	1.8
Sweden	21.4	35.1	1.6	21.2	34.3	1.6
Thailand	19.1	31.8	1.7	35.5	49.1	1.4
Turkey	12.6	24.9	2.0	12.3	28.6	2.3
Ukraine	22.3	53.4	2.4	31.4	101.8	3.2
United States	9.9	12.2	1.2	6.4	8.9	1.4
Venezuela, RB	8.4	13.2	1.6	9.2	20.7	2.3
South Africa	11.2	17.7	1.6	14.6	24.2	1.7
Median	16.5	27.0	1.6	16.9	35.2	1.8

Note: This table summarizes the changes in real income resulting from a move from autarky to year 2007 levels of trade using a 2-digit instead of a 3-digit industry aggregation. The results under "True Gain" are computed using the industry-level formulas, the results under "Naïve Gain" are computed using the aggregate formulas, and the results under "Ratio" simply compute the ratio of the two. Columns 1-3 do not adjust for non-traded or intermediate goods while columns 4-6 do. I include Hong Kong in my definition of China. The GTAP aggregation features 28 traded and one non-traded industry while the earlier 3-digit aggregation features 251 traded and one non-traded industry.

Figure 1: Gains from trade without non-traded and intermediate goods

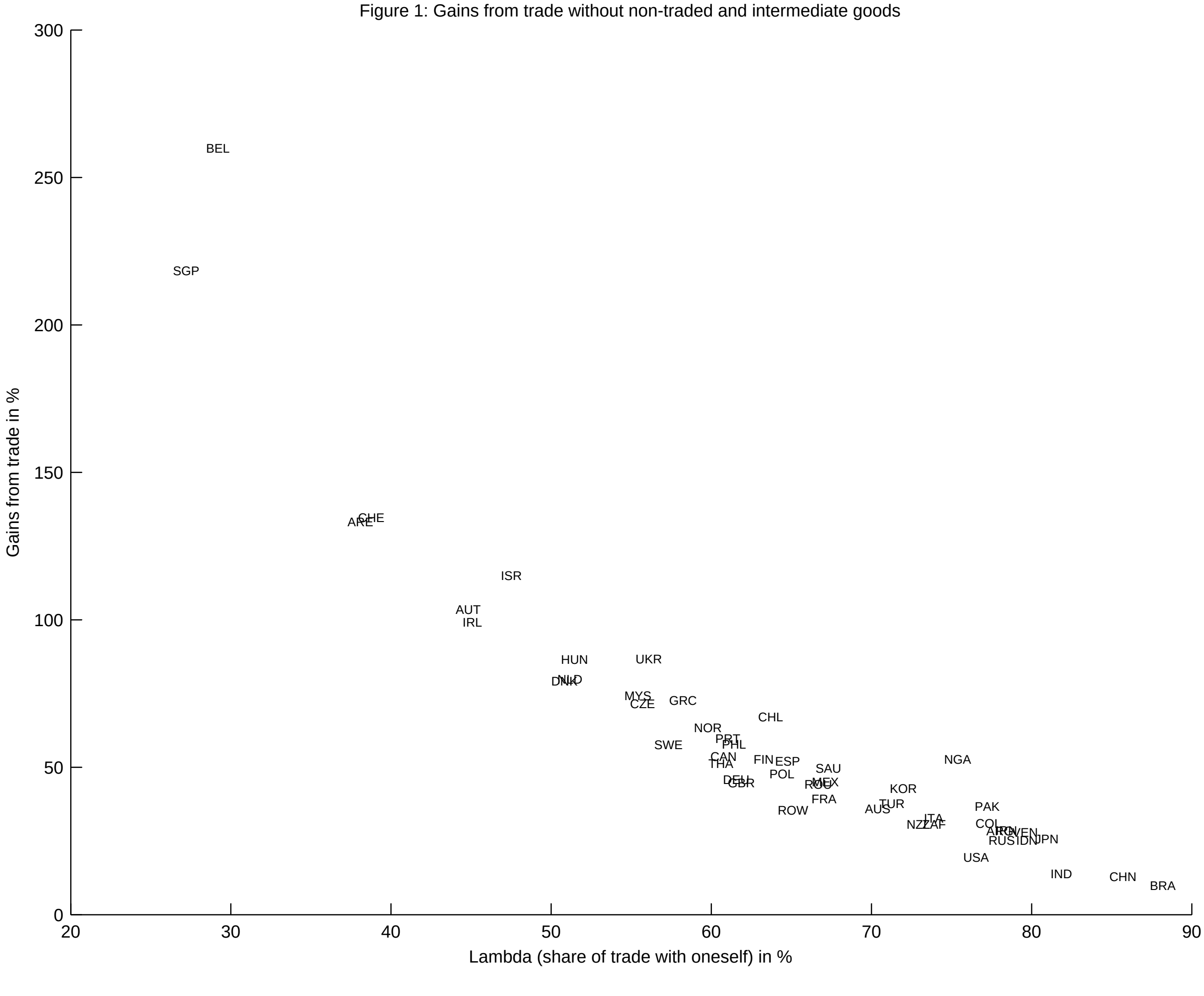

Figure 2: Gains from trade with non-traded and intermediate goods

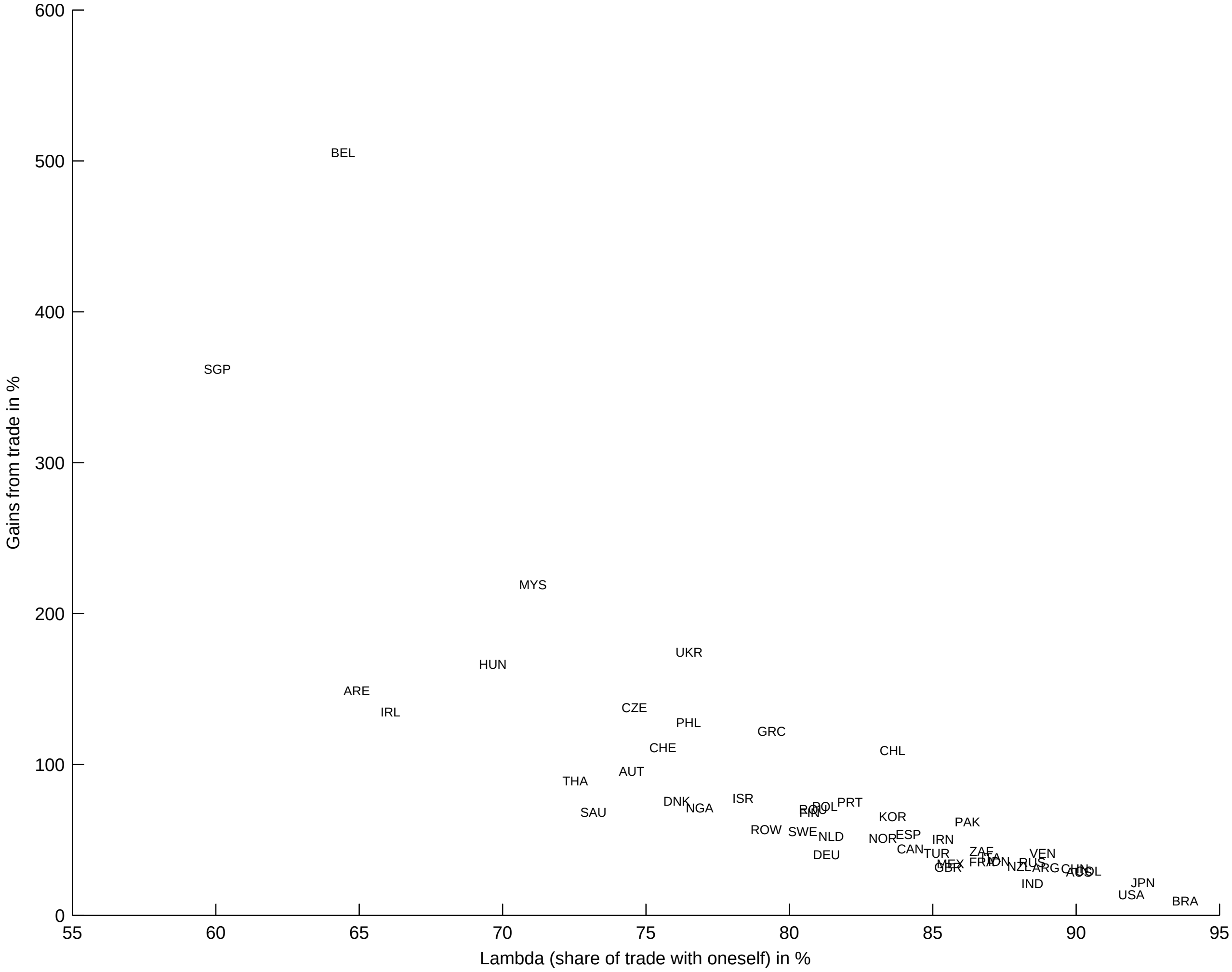

Figure 3: Gains from trade with and without non-traded and intermediate goods

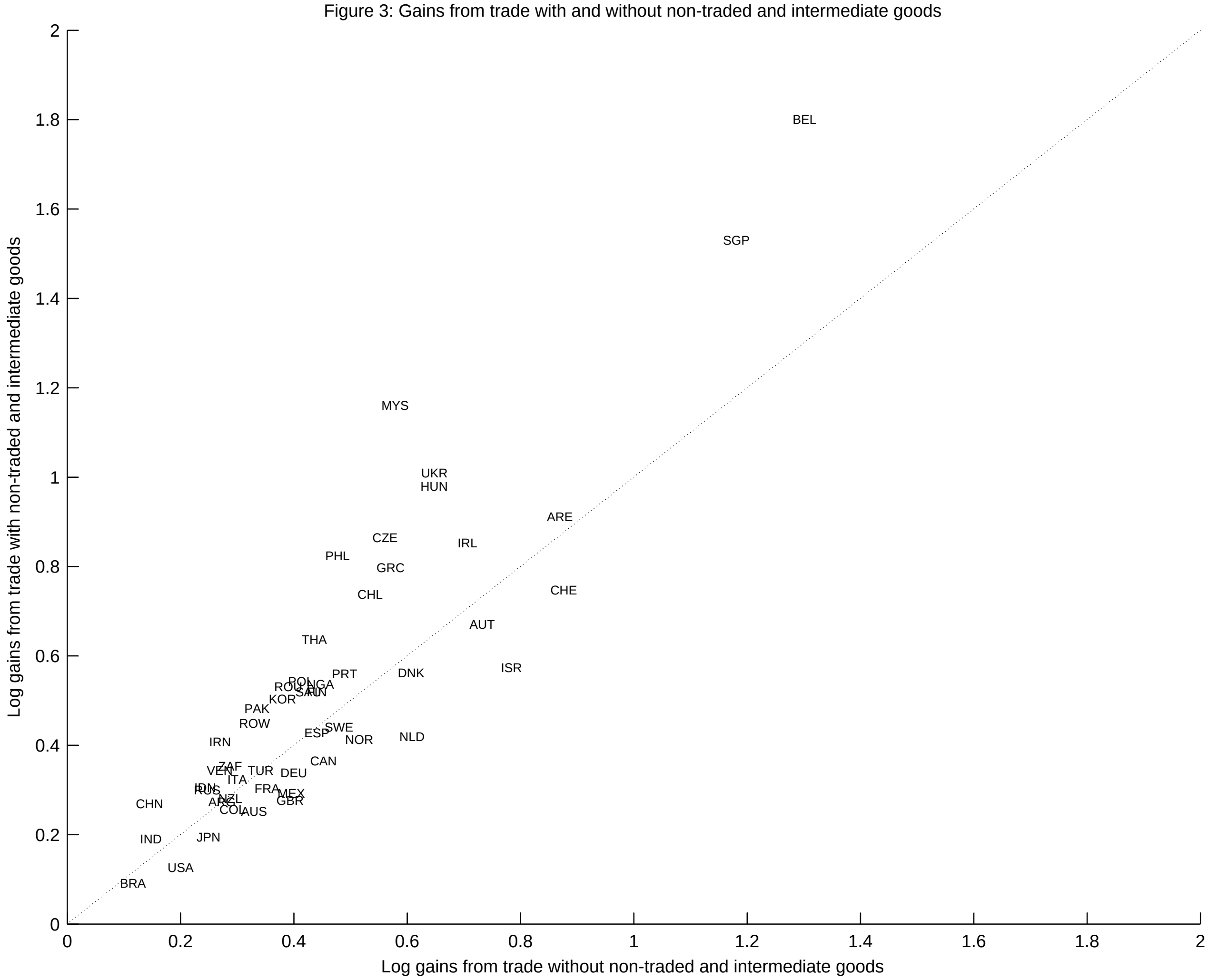

Figure 4: Industry contributions to gains from trade