The Globalization Risk Premium†

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Abstract

We investigate how globalization is reflected in asset prices. We use shipping costs to measure firms' exposure to globalization. Firms in low shipping cost industries carry a 8 percent risk premium, suggesting that their cash-flows covary negatively with investors' marginal utility. We find that the premium emanates from the risk of displacement of least efficient firms triggered by import competition. These findings suggest that foreign productivity shocks are associated with times when consumption is dear for investors. We discuss conditions under which a standard model of trade with asset prices can rationalize this puzzle.

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1 Introduction

Recent decades have been characterized by a high degree of trade integration. This era of globalization[1] is generally seen in a positive light and associated with more product variety at lower prices, cheaper intermediate goods, and the access for U.S. firms to foreign markets.[2] Yet globalization also makes domestic economies more sensitive to foreign shocks. A salient example is China's productivity growth that led to a dramatic increase in its exports to the rest of the world and to the U.S. in particular, with both consumption gains, and negative consequences for manufacturing employment and wages.[3] In short, globalization exposes domestic economies to foreign shocks with heterogeneous effects on households and firms that complicate the analysis of its overall impact.

We study the effects of globalization through the lens of asset prices. Assets' exposure to macroeconomic shocks are reflected in risk premia. We capture firms' exposure to trade shocks and deduce how U.S. investors perceive them qualitatively and quantitatively. Our approach relates to a recent line of work that uses information from asset markets to evaluate the effects of innovation and technological change (see for instance Gârleanu, Panageas and Yu (2012b)). The intuition is as follows: if the performance of firms exposed to international trade flows covaries negatively with investors' marginal utility, these firms will command a risk premium. This is what we find empirically. This premium can either be driven by a positive or a negative joint reaction of domestic firms' performance and households' consumption to foreign shocks. Our evidence points to the latter and indicates that states of the world where firms suffer from increased import competition are states where consumption is dear. In summary, foreign shocks are perceived as bad news by the marginal investor.

We use shipping costs (SC) to measure firms' exposure to globalization. More precisely, we follow Bernard, Jensen and Schott (2006b) and exploit import data to compute the various costs associated to shipments, called Cost-Insurance-Freight as a percentage of the price paid by importers. We document substantial cross-sectional variation and time-series persistence in shipping costs, consistent with the idea that this proxy captures structural and slow-moving barriers to trade. We also show that shipping costs are tightly linked to the weight-to-value ratio of shipments, and find that both measures correlate negatively with

[1] While the focus of this paper is restricted to international trade flows, the term "globalization" sometimes also encompasses economic and financial integration.

[2] See, for instance Broda and Weinstein (2006); Feenstra and Weinstein (2010) for product variety at lower prices, Goldberg, Khandelwal, Pavcnik and Topalova (2010); De Loecker, Goldberg, Khandelwal and Pavcnik (2012) for cheaper intermediate goods, and Lileeva and Trefler (2010) for access to foreign markets.

[3] See Amiti, Dai, Feenstra and Romalis (2016) for consumption gains and Pierce and Schott (2012); Autor, Dorn and Hanson (2013); Acemoglu, Autor, Dorn, Hanson and Price (2014) for effects on employment and wages.

firms' propensity to import and export, namely, with their exposure to globalization.

We then build portfolios of stocks based on quintiles of shipping costs and analyze their returns from 1975 to 2015. We find that the zero cost portfolio that is long stocks in high shipping cost industries and short stocks in low shipping cost industries has average annual excess returns of -8.1 percent and a Sharpe ratio of 43 percent (see Table 4). To confirm that this premium does not reflect loadings on well-known risk factors, we estimate the residual of stock excess returns from the five factor model of Fama and French (2015). We find that the low shipping cost portfolio has abnormal returns of 12.6 percent annually, and that the high minus low shipping cost portfolio generates negative excess returns of 13.9 percent annually (see Table 5). These findings hold whether we focus on U.S. or European stocks. Importantly, they hold whether portfolios are equally or value weighted. We conclude that the risk of foreign shocks is priced in the cross-section of expected returns, and that the performance of firms exposed to these shocks covaries negatively with domestic investors' marginal utility.

There are two possible interpretations for this finding: a positive response of consumption and cash-flows to foreign shocks through higher exports or sourcing opportunities; or a negative response of consumption and cash-flows through the displacement of domestic firms by import competition. We find evidence for the latter. First, the risk premium is concentrated among firms that are likely to suffer from import competition, but unlikely to greatly benefit from increased export opportunities. Second, the returns of firms in low shipping cost industries load more negatively on a proxy for foreign productivity shocks, especially the returns of firms more likely to suffer from import competition. Taken together these results indicate that the price of the risk of foreign shocks is negative, i.e., that consumption responds negatively to foreign shocks. Given the domestic benefits associated with foreign shocks including gains from variety, lower prices, and enhanced export opportunities, this finding is a puzzle. It suggests that the displacement risk associated with foreign shocks outweighs their benefits from the perspective of domestic investors.

We ask how this puzzle can be rationalized within a standard two-country dynamic general equilibrium model à la Melitz (2003). We first derive the elasticity of domestic profits and the elasticity of foreign profits to foreign productivity shocks. The former is negative due to price effects, and amplified if demand elasticity is high. The latter is positive due to a rise in demand in the foreign country, although this effect is dampened by the intensity of competition in the foreign market. Domestic households' utility to foreign productivity shocks trades off two competing effects: a positive price effect where the price of the final consumption index decreases as import competition intensifies; an ambiguous wealth effect due to the change in the value of households' portfolios. The model predicts that if the price of risk is negative, the risk premium should be concentrated among small and less productive firms, in industries where the share of small and less productive firms is higher, and in industries with a higher demand elasticity. All these predictions hold in the cross-section of expected returns.

We calibrate the model using standard parameter values and analyze impulse responses of cash-flows, valuations and consumption to positive foreign productivity shocks. If perfect risk-sharing is allowed across countries, households are diversified internationally, and consumption always increases following foreign productivity shocks. The risk premium of firms in low shipping cost industries is close to zero and the sign of the price of risk is positive, contrary to our empirical finding that it is negative. Hence, a standard model of trade with asset prices and perfect risk-sharing fails to rationalize the globalization risk premium.

We next explore how the model can be consistent with the negative price of risk we document empirically. If we allow risk-sharing to be limited, namely, if domestic households are not internationally diversified, the response of consumption to foreign productivity shocks can become negative. Households own domestic firms that are displaced by import competition, the value of their portfolio shrinks, and their consumption drops. In that case the model delivers a risk premium for firms in low shipping cost industries, and the sign of the price of risk is negative, consistent with our baseline empirical findings. Our limited risk-sharing assumption thus allows consumption to react negatively to foreign productivity shocks. Alternative assumptions may help rationalize the puzzle of the globalization risk premium within the Melitz model – we leave them to future research.

Going back to Eaton and Kortum (2002) the literature has investigated the domestic effects of foreign shocks through trade linkages. Recent studies have focused on the consequences of China's productivity growth and the resulting increase in exports to the U.S., with mixed results across methodologies (Hsieh and Ossa, 2011; Pierce and Schott, 2012; di Giovanni, Levchenko and Zhang, 2014; Autor, Dorn and Hanson, 2013; Acemoglu, Autor, Dorn, Hanson and Price, 2014; Autor, Dorn, Hanson and Song, 2014; Caliendo, Dvorkin, Parro et al., 2015; Amiti, Dai, Feenstra and Romalis, 2016). We approach this important question in a new way, through the lens of asset prices. By showing that firms exposed to international trade flows carry a risk premium, especially those with a higher risk of displacement, we can infer that the occurrence of positive shocks in the rest of the world are perceived as times when marginal utility is high for U.S. investors.

We build on the international trade literature, which starting with Melitz (2003) and Bernard, Jensen, Eaton and Kortum (2003a), has taken firm heterogeneity into account to analyze the gains from trade. More specifically our model is closest to Chaney (2008) and Ghironi and Melitz (2005). In this framework, globalization generates both winners and losers within an industry, as better-performing firms expand into foreign markets, while worse-performing firms contract in the face of foreign competition.[4] The displacement of least efficient firms has been confirmed in a number of empirical studies including Pavcnik (2002); Trefler (2004); Bernard and Jensen (2004); Bernard, Jensen and Schott (2006a,b). Relative to this line of work, our main contribution is to show that the risk of import competition is reflected in firms' cost of capital, which suggests that investors require compensation for exposure to these firms. By analyzing the asset pricing implications of the Melitz model and confronting them with the negative price of risk that we document empirically, we also hope to stimulate and discipline future theoretical work in this area.

We finally contribute to a better understanding of the implications of product market dynamics, including international trade, for asset pricing and the cost of capital. Early work by Grossman and Levinsohn (1989) emphasized the link between import competition and contemporaneous stock returns. We show that displacement risk is reflected in the cost of capital *ex-ante*, which suggests that the marginal utility of U.S. investors covaries positively with this risk factor.[5] More recent work by Hou and Robinson (2006), Tian (2011), Loualiche (2015), Ready, Roussanov and Ward (2013), and Bustamante and Donangelo (2015) show that the risk of entry is priced in the cross-section of expected returns.[6] We focus on the risk associated with import competition and find it to be priced as well. Our work finally relates to a stream of work that uses international macroeconomy models to study risk premia across countries and the link between currency dynamics and interest rates, including Lustig, Roussanov and Verdelhan (2011), Hassan (2013), Hassan, Mertens and Zhang (2016), or Richmond (2016). Our model departs from the international business cycle literature as we allow for firm level heterogeneity, leading to novel predictions of the impact of international trade on the cross-section of firm-level stock returns.

The remainder of the paper is organized as follows. In Section 2, we present our measure of shipping costs and estimate the globalization risk premium. In Section 3, we lay out the theoretical framework and test additional empirical predictions. Section 4 concludes.

[4]For recent reviews, see Bernard, Jensen, Redding and Schott (2007), Melitz and Trefler (2012), or Melitz and Redding (2014).

[5]A related contribution is Fillat and Garetto (2015) who find that multinational corporations earn higher excess returns than non-multinationals. Other work on the role of displacement risk for asset pricing figures in Gârleanu, Kogan and Panageas (2012a) or Kogan, Papanikolaou and Stoffman (2016) for example.

[6]In addition, a series of papers have used tariff cuts to instrument for import competition and have found that it affects firms capital budgeting decisions Bloom, Draca and Van Reenen (2011); Fresard and Valta (2014), and capital structure Xu (2012); Valta (2012). Firms have also been found to suffer less from import competition if they have larger cash holdings Fresard (2010) and R&D expenses Hombert and Matray (2014).

2 Measuring the globalization risk premium

2.1 Shipping costs

We hypothesize that firms are less exposed to international trade flows if the shipping costs (SC) incurred to replace their products with imported ones are larger.[7] We measure these costs using the actual shipping cost paid by importers. We consider ad valorem freight rate from underlying product-level U.S. import data. We obtain these data at the 4-digit SIC codes level from Feenstra (1996) for 1974 to 1988, and from Peter Schott's website for 1989 to 2014. Freight costs – our proxy for shipping costs – is the markup of the Cost-Insurance-Freight value over the Free-on-Board value.

Building on prior work, we argue that SC are a structural characteristic rooted in the nature of output produced by any given industry.[8] According to Hummels (2007), SC depend on the weight-to-value ratio: the markup is larger for goods that are heavy relative to their value. From 1989 onwards, we therefore construct industry-year weight-to-value ratios (at the 4-digit SIC codes level), measured as the ratio of kilograms shipped to the value of the shipment, as an alternative measure of exposure to globalization.

We check that SC are widely dispersed across industries, that they are persistent and that they are indeed related to trade flows. We find substantial heterogeneity in SC across industries. Table 1 presents summary statistics for our industry-year sample that covers 439 unique manufacturing industries (with 4-digit SIC codes between 2000 and 3999). We find SC to be 5.6% of the price of shipments on average, with a 1^{st} percentile of 0.2% and a 99^{th} percentile of 22.4%.[9]

To check whether SC are indeed persistent, we sort sectors by quintiles of SC each year, and look at the transition across quintiles over time. We present this analysis in Table 2. The left side of Panel A highlights the transition from year $t-1$ to year t, while the right side shows the transition from year $t-5$ to year t. For sectors in the top or bottom quintiles of the distribution of SC, the probability of being in the same quintile in the next year (respectively five years later) is above 85% (respectively 73%). Persistence is even more pronounced when

[7] Hummels et al. (2014) also uses transportation costs as an instrument for the propensity of Danish firms to offshore tasks.

[8] The main limitation of SC is that it does not take into account unobserved shipping costs – for instance time to ship (Hummels et al., 2014) or information barriers and contract enforcement costs, holding costs for the goods in transit, inventory costs due to buffering the variability of delivery dates, or preparation costs associated with shipment size (Anderson and van Wincoop, 2004). Unless these costs are correlated in systematic ways with SC, they are likely to introduce noise in our measure of the sectoral exposure to displacement risk, which should generate an attenuation bias in our results. For recent contributions to the literature that adopts a structural approach to measure trade costs and estimate their effect on trade, see for instance Hummels and Skiba (2004), Das et al. (2007), or Irarrazabal et al. (2013).

[9] The distribution of SC across 2-digit industries is presented in Appendix Table B.1.

we consider weight-to-value ratios in Panel B, where the probability of being in the same quintile in the next year and five years later is over 90% for the top and bottom quintiles.

We next confirm SC are a relevant proxy for the exposure to the displacement risk associated with globalization. To analyze the differential trade flows in high and low SC industries, we consider imports, exports and net imports normalized by total domestic shipments plus imports at the industry-year level. We measure imports and exports as well as tariffs using U.S. data obtained from Peter Schott's website, and shipments using the NBER-CES Manufacturing Industry Database, which also provides annual industry-level information on employment, value added and total factor productivity until 2011.

Table 3 presents industry-year OLS panel regressions of trade flows on our measures for SC as well as tariffs, the log of employment, log value added, log shipments, and total factor productivity. All specifications include year fixed effects. In Panel A, we find that SC are negatively associated with imports and exports. A one standard deviation increase in SC is associated with a 2.3 percentage points decrease in imports (Column 2) and a 2.7 percentage points decrease in exports (Column 5), which amounts to 12% and 23% of the standard deviation of imports and exports, respectively. When included with controls in the regression (Column 8), SC are uncorrelated with net imports (imports minus exports), which illustrates the dual dimension of exposure to globalization: the costs in terms of higher import penetration, and the benefits in terms of higher exports. When we introduce industry fixed effects and effectively consider within-industry changes in SC (Columns 3 and 6), the coefficient on SC remains negative but drops and becomes insignificantly different from zero. This is consistent with the finding in Table 2 that SC are persistent, and that within-industry variations in SC do not predict variations in trade flows.[10] A very similar picture emerges when we consider log weight-to-value ratios instead of SC (Panel B). Overall, the evidence confirms that shipping costs proxy for differences across industries in their exposure to international trade flows.

2.2 The globalization risk premium

We then explore whether and how globalization is reflected in asset prices, by comparing the average excess returns of firms with high and low exposure to trade flows. We obtain stock returns data from the Center for Research in Security Prices (CRSP monthly file) and accounting data from Compustat. Our sample includes all manufacturing firms (4-digit SIC codes between 2000 and 3999 with non-missing data on SC) with ordinary stocks - that is with CRSP share codes of 10 or 11 - traded on the Amex, Nasdaq, or NYSE between 1975

[10]Note that contrary to within-industry changes in SC, within-industry changes in tariffs are negatively associated with imports.

to 2015. We use the 4-digit SIC code from Compustat if available, and the 4-digit SIC code from CRSP otherwise.

We first form equally-weighted stock portfolios based on the quintiles of SC in their industry in the previous year. Panel A of Table 4 presents the characteristics and moments of the five portfolios and of a portfolio, referred to as "Hi-Lo", long in the highest SC portfolio and short in the lowest SC portfolio. Size is not systematically related to SC. While book-to-market ratios, market leverage and ROA are increasing with SC, the opposite applies to investment as a fraction of property plants and equipments. We find that firms in industries with low SC have average returns that are 8.1 percent higher (annualized) than average returns in high SC industries. The Sharpe ratio of the long-short portfolio (Column 6) is 43 percent. A similar picture emerges from Panel B where we consider portfolios sorted on weight-to-value ratios: annualized returns are 9.7 percent higher on average in low weight-to-value ratio industries, and the Sharpe ratio is 43 percent. This large difference in returns between high and low SC industries is what we coin the globalization risk premium.

A concern may be that the premium reflects the differential composition of these industries or their exposure to risk factors, irrespective of their actual exposure to international trade flows. We thus estimate abnormal excess returns as the residuals of the five factor model of Fama and French (2015), in which standard errors are adjusted using the Newey-West procedure with 12 lags. We confirm the risk premium we capture is not subsumed by loadings on classic risk factors, namely the market portfolio minus the risk-free rate, the size factor (small minus big), the value factor (high minus low), the profitability factor (robust minus weak), and the investment factor (conservative minus aggressive) – all obtained from Kenneth French's website. As evidenced in Panel A of Table 5, we find that the long-short portfolio alpha is -13.9 percent annually (t-statistic equals 3.1). Importantly, when portfolio returns are value-weighted, the long-short alpha is still statistically significant albeit lower, at -4.1 percent annually (t-statistic equals 2.0). In Panel B, we obtain similar results when we sort stocks into quintiles of weight-to-value ratios.

Is this pattern in returns restricted to the U.S.? We next explore whether the globalization risk premium is also observed in Europe. We consider stocks traded in sixteen European countries studied in Fama and French (2012) and used to compute the five factors for Europe: Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, Great Britain, Greece, Ireland, Italy, the Netherlands, Norway, Portugal and Sweden. Monthly returns and 4-digit SIC codes are both obtained from the EUROFIDAI database. As in Fama and French (2012), monthly returns are in U.S. dollars and monthly excess returns are returns in excess of the one-month U.S. Treasury bill rate. In Table 6, we find that the long-short portfolio alpha is -10.0 percent annually (t-statistic equals 2.9), which is very similar to the premium obtained from U.S. data. In Europe as well as in the U.S., the premium is statistically significant and economically large whether returns are equally or value-weighted, and whether we sort stocks in quintiles of SC or weight-to-value ratios both computed from U.S. import data.

We assess the robustness of these findings in several ways. First, in Appendix Table B.2, we find similar results when we construct our portfolios based on quintiles of the sum of SC and trade tariffs, another impediment to trade. Second, we confirm in Appendix Table B.3 that our results are robust to computing weight-to-value ratios using U.S. export data instead of import data (Panel A), or using all international trades except U.S. imports and exports (Panel B). This mitigates concerns that our proxy for U.S. firms exposure to globalization is endogenous. Finally, one might worry that SC might be picking up known factors present in currency returns. In Appendix Table B.4, we show that our results are similar when we include the dollar factor from Verdelhan (Forthcoming), the carry factor from Verdelhan (Forthcoming), or the excess return of high interest rates currencies minus low interest rate currencies from Lustig et al. (2011).[11]

As an alternative to our portfolio analysis, we run Fama-MacBeth regressions of monthly returns on our (continuous) SC and weight-to-value variables, after controlling for stocks' betas with the U.S. market return, market capitalization, book-to-market, return on assets, capital expenditures, and market leverage. The findings presented in Appendix Table B.5 confirm that stock returns are negatively correlated with our two measures of trade costs. This even holds after controlling for Gomes et al. (2009) classification of sectors into non-durable sectors, durable sectors, investment sectors and other (Appendix Table B.6). Finally, we present the cumulative excess (equally-weighted) returns of the long-short portfolio in Appendix Figure A.4.

The evidence consistently indicates that firms more exposed to globalization command a robust and substantial risk premium. This suggests that their performance covaries negatively with U.S. investors' marginal utility. While this is an unexpected finding in itself, it calls for further exploration. This premium can be driven by either a positive or negative joint reaction of U.S. firms' performance and investors' consumption to foreign shocks. In other terms, the price of risk of foreign shocks can either be positive or negative depending on the underlying economic mechanism, which is what we investigate next.

[11]See the work of Lustig and Richmond (2015) and Richmond (2016) for recent studies of the empirical link of trade with currency risk premia.

2.3 The sign of the price of risk

Our identification strategy to determine whether the price of the risk of foreign shocks is positive or negative relies on the well documented heterogeneity in firms' response to these shocks. Earlier work has found robust cross-sectional heterogeneity in firms ability to export, and firms propensity to be displaced by import competition. Bernard et al. (1995) and Bernard and Jensen (1999) show that exporters are systematically larger and more productive than non-exporters, a stylized fact that has been confirmed repeatedly in subsequent work. Conversely, low productivity firms have been consistently shown to be forced to exit when import competition intensifies, as evidenced in Pavcnik (2002), Trefler (2004), and Bernard et al. (2006b), among others.

Consistent with these stylized facts, following a positive foreign shocks, large and productive firms are more likely to benefit from enhanced export opportunities while lower productivity firms are more likely to be displaced by intensified foreign competition. We would therefore expect the price of risk to be positive if the premium is concentrated among the former, and negative if it is concentrated among the latter. Hence we form double-sorted portfolios based on shipping costs and either firm size or firm profitability. We measure size using market capitalization and productivity using return-on-assets (ROA). We independently sort stocks into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into three portfolios based on either their market capitalization (Size) or their return on assets (ROA) in year $t-2$.

An alternative and more direct way to sort firms would be to use information on their export sales. This information is available from Compustat segment data, but it is unfortunately highly unreliable, due to inconsistent reporting requirements across years.[12] Instead, we searched for the word "export" in the annual "10-K" report filed with the Securities and Exchange Commission (SEC), available on Edgar website from 1994. Using this procedure to proxy for firms' exporter status, we find in Appendix Table B.7 that the probability of exporting decreases with SC. Moreover, and consistent with the stylized facts highlighted above we find that being an exporter is positively correlated with size and profitability in our sample as well.

We present the returns of our double-sorted (3×5) portfolios in Table 7. We report the residual excess returns from the Fama-French five factor model for each of the five SC portfolios, as well as for the long-short portfolio. In the lowest size tercile, an equally-weighted portfolio that goes long high SC and short low SC has an alpha of -16.3%. This difference decreases to -11.4% in the highest size tercile. Similarly, we find the long-short portfolio

[12] As an illustration of this inconsistency, the average yearly number of firms reporting export sales from a domestic segment drops fivefold from 1679 in the 1990s to 325 in the 2000s.

alpha to be -17.3% in the bottom ROA tercile while it falls to -11.9% in the top ROA tercile.[13] We obtain similar results when double-sorted portfolio returns are value-weighted. In addition, as evidenced in Panel B, results are similar when portfolios constructed based on weight-to-value ratios. Finally, Fama-MacBeth specifications presented in Appendix Tables B.5 and B.6 also confirm that the sensitivity of returns to SC and the weight-to-value ratio is strongest among small and low productivity firms. Taken together, these findings indicate that the globalization risk premium is concentrated among firms that are more likely to be negatively affected by foreign shocks, both because they are more likely to be displaced by foreign competitors, and because they are less likely to be productive enough to benefit from enhanced export opportunities.

To further establish that the price of risk is negative, we ask whether firms' performance reacts positively or negatively to a foreign productivity shock, and differentially so in high and low SC industries. To proxy for a foreign productivity shock, we consider Chinese import growth, which has been found in prior work to be driven mostly by the dramatic increase in Chinese productivity (Zhu, 2012). If the price of risk is negative, firms' cash-flows and returns should respond negatively when such a productivity shock materializes, and conversely. There is evidence from prior work that U.S. firms tend to respond negatively to Chinese import growth. Autor et al. (2013) and Acemoglu et al. (2014) find a strong negative effect of Chinese import growth on manufacturing employment from 1990 to 2007. Hombert and Matray (2014) show that firms in industries exposed to Chinese imports experience lower sales growth, lower ROA, lower capital expenditures and lower employment growth. Barrot et al. (2016) find that low SC industries are more exposed to Chinese import growth in the 2000s, and experience lower employment, shipment and value added growth as a result.[14] We consider our SC (and weight-to-value) portfolios and compute their exposure to Chinese import growth as the coefficient β of the following OLS regression estimated at the monthly frequency over the sample period:

$$R^e_{J,t} = \beta_J \cdot \text{ChImpGr}_t + \alpha_J + u_t,$$

where $R^e_{J,t}$ is the equally-weighted portfolio excess return in month t for industry portfolio J and ChImpGr_t is the growth rate of Chinese imports to the U.S. between month t and the same month in the previous year.

[13] We also form double-sorted portfolios based on shipping costs and *exporter status* obtained by searching for the word "exporter" in the annual 10-K report filed with the SEC. We find in Appendix Table B.8 that excess returns for the long-short SC and weight-to-value portfolios are stronger among non-exporters that among exporters, in particular when returns are value-weighted.

[14] We find in Appendix Table B.10 similar patterns in terms of employment, shipment and value added growth when we look at the differential reaction of low and high SC industries to tariffs cuts.

We present the results in Table 8. The first line shows that the five SC portfolios have a negative β on Chinese import growth, and that this sensitivity is stronger for the low SC portfolio. We find the same pattern when we consider weight-to-value portfolios. This confirms that firms more exposed to globalization indeed react more negatively to a positive foreign productivity shock. We then compute the exposure of double-sorted portfolios using terciles of size and terciles of ROA. Again, we find that portfolios load negatively on Chinese import growth, and that low SC portfolios have more negative loadings. The difference in loadings between the high and low SC portfolios is largest among firms that are more likely to suffer from import competition, namely, small and low ROA firms. As a robustness test, we compute Chinese import growth betas after controlling for exposure to the U.S. market portfolio and find similar results (see Appendix Table B.11).

High and low SC industries may be differentially affected by foreign productivity shocks not only through import competition and expansion on foreign markets, but also through more efficient sourcing (Amiti and Konings, 2007; Goldberg et al., 2010; De Loecker et al., 2012). If there is a lot of within-industry trade, then low SC industries might benefit from importing cheaper intermediate inputs than high SC industries. This mechanism is likely to boost the risk premium if the price of risk is positive, and to dampen the risk premium if the price of risk is negative. We check in Appendix Table B.12 that our baseline results hold after excluding firms in 4-digit industries that source more than 5% of their inputs from within their own industry. Moreover, our finding that the price of risk is negative suggests that the import competition mechanism dominates any positive sourcing effects. This might be due to the fact that small and less productive firms, that are most likely to be displaced by import competition and not to benefit from exporting opportunities, are also less likely to benefit from better sourcing opportunities (Bernard et al., 2007).

Taken together, these findings indicate that the price of risk is negative. Given the potential domestic benefits associated with foreign shocks including gains from variety, lower prices, and enhanced export opportunities, this finding is a puzzle. It suggests that the displacement risk associated with foreign shocks outweighs their benefits from the perspective of domestic investors. Under what conditions can a standard international trade model rationalize this finding? This is what we explore next.

3 Model

We write a standard model of international trade with asset prices to ask whether it can rationalize the globalization risk premium. Guided by the empirical findings of Section 2, we introduce multiple sectors with heterogeneity in their exposure to globalization. We derive predictions on which firms are most exposed to the risk of displacement, across sectors as well as within sectors (see Proposition 1). We then formulate identification restrictions on the sign of the price of risk (see Proposition 2). Finally we calibrate the model and show that it cannot explain the globalization risk premium in the case of perfect risk-sharing, but introducing frictions to risk-sharing does reconcile the model with the data.

3.1 Setup

In this section, we spell out the structure of the model and define the equilibrium. We follow Ghironi and Melitz (2005) and consider the Chaney (2008) version of the Melitz (2003) model: we assume there is a fixed number of firms in each industry. To capture industry heterogeneity, we introduce two types of industries in each of the two countries. We focus on quantities on the domestic country and denote all foreign variables with an asterisk ($\star$). We leave derivations of the model in Appendix A.1.

Demand side — There is a continuum of homogeneous households in each country, they have the following intertemporal utility:

$$\mathcal{U}_0 = \mathbf{E}_0 \sum_{t=0}^{\infty} \beta^t \frac{C_t^{1-\psi}}{1-\psi},$$

where C_t is an aggregate consumption index that represents households' intratemporal utility, β is the subjective discount factor, and ψ is the inverse of the intertemporal elasticity of substitution (IES).[15] Each period consumers derive utility from the consumption of goods in $\mathcal{J}+1$ sectors. Sector 0 provides a single homogeneous good. The other $\mathcal{J}$ sectors are made of a continuum of differentiated goods. If a consumer consumes quantity c_0 of the homogeneous good, and $c_J(\omega)$ units of each variety ω in sector J, she receives intratemporal utility C_t:

$$C_t = c_0^{1-a_0} \left[\sum_J \eta_J^{\frac{1}{\theta}} \left(\int_{\Omega_J} c_J(\omega)^{\frac{\sigma_J - 1}{\sigma_J}} d\omega \right)^{\frac{\sigma_J}{\sigma_J - 1} \frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1} a_0},$$

where $0 < a_0 < 1$ represents the expenditure share on the manufacturing sector, θ the elasticity of substitution across industries, σ_J is the elasticity of substitution across varieties in

[15] In the case of time-separable preferences with constant relative risk aversion (CRRA), the IES is equal to the inverse of the coefficient of risk aversion. In Appendix A.1 we introduce preferences of the Epstein and Zin (1989) type, to allow for a separate role of the IES and the coefficient of risk aversion. This is important quantitatively for our calibration exercise in Section 3.6.

sector J (which is assumed to be higher than θ), η_J represents a taste parameter for industry J and $\sum_J \eta_J = 1$, and Ω_J is the set of firms producing in the domestic economy in industry J and is determined in equilibrium. Households get revenues from both their inelastic labor supply in quantity L and from ownership of a world mutual fund that redistributes profits of both domestic and foreign firms. Their budget constraint reads:

$$\sum_J \int_{\Omega_J} p_J(\omega) c_J(\omega) \mathrm{d}\omega \leq wL + \Pi,$$

where $p_J(\omega)$ is the price of variety ω in industry J, w is the market price of labor, Π is the profit redistributed to domestic consumers through ownership. We specify the exact structure of firm ownership in Section 3.2.

Supply side — The homogeneous good 0 is freely traded and is used as the numeraire in each country. It is produced under constant returns to scale with one unit of labor producing one unit of good 0. Its price is set equal to 1 such that in equilibrium we can interpret productivity changes across countries as real productivity changes.

Each firm in the other $\mathcal{J}$ industries produces a differentiated variety ω in quantity $y_J(\omega)$, using one single factor, labor, in quantity $l_J(\omega)$. Firms are heterogeneous and produce each variety with different technologies indexed by φ, their idiosyncratic productivity. We index aggregate productivity by A_t. Hence a domestic firm with idiosyncratic productivity φ, produces $A_t\varphi$ units of variety ω per unit of labor.

We are mostly interested in the impact on domestic firms of productivity shocks in the foreign country $A^\star$. We assume productivities in each country, $(A, A^\star)$, both follow an AR(1) process

$$A_t = \rho_A A_{t-1} + \varepsilon_t^A, \qquad A_t^\star = \rho_{A^\star} A_{t-1}^\star + \varepsilon_t^{A^\star}.$$

Idiosyncratic productivity is fixed over time but randomly assigned across firms. As in Helpman et al. (2004), the distribution of idiosyncratic productivity is Pareto with tail parameter γ_J. The probability of a firm productivity falling below a given level φ in industry J is

$$\Pr\{\tilde{\varphi} < \varphi\} = G_J(\varphi) = 1 - \left(\frac{\varphi}{\underline{\varphi}_J}\right)^{-\gamma_J},$$

for $\varphi \geq \underline{\varphi}_J$ which is the lower bound of idiosyncratic productivity in industry J. A larger γ_J corresponds to a more homogeneous industry, in the sense that more output is concentrated among the smallest and least productive firms. Firms operate on both their domestic market and the export market. To export, a firm needs to pay a variable "iceberg" trade cost $\tau_J \geq 1$ and a fixed cost f_J measured in labor efficiency units that is paid every period.

Firms operate in a monopolistic competition setting in each industry, and behave as price setters. Given that demand is isoelastic, they set their prices at a markup over marginal cost:

$$p_J(\varphi) = \frac{\sigma_J}{\sigma_J - 1} \cdot \frac{1}{A\varphi}, \qquad p_{X,J}(\varphi) = \tau_J \cdot p_J(\varphi),$$

where p_J is the domestic price and $p_{X,J}$ the export price charged by domestic firms. Firm earn profits from both their operations on domestic markets, $\pi_{D,J}(\varphi)$ and on export markets, $\pi_{X,J}(\varphi)$. Domestic profits are free of flow costs

$$\pi_{D,J}(\varphi) = \frac{1}{\sigma_J} p_J(\varphi)^{1-\sigma_J} \cdot P_J^{\sigma_J} C_J,$$

where P_J is industry's J price index and C_J is the industry composite good, aggregated from the set of differentiated goods.[16]. Export profits include the flow cost of exporting f_J

$$\pi_{X,J}(\varphi) = \frac{1}{\sigma_J} p_{X,J}(\varphi)^{1-\sigma_J} \cdot (P_J^\star)^{\sigma_J} C_J^\star - \frac{f_J}{A}.$$

All firms produce on domestic markets, but a firm will export if and only if it makes positive profits from doing so. This is the case as long as a firm's idiosyncratic productivity is above a certain cutoff which we define as $\varphi_{X,J} = \inf\{\tilde{\varphi} | \pi_{X,J}(\tilde{\varphi}) > 0\}$.

The mass of firms M_J in each industry is fixed. There is no entry or exit in and out of an industry. However the set of producers in a given market, Ω_J, does vary over time due to trade. Each firm makes an optimal decision to export based on their idiosyncratic productivity, aggregate productivity and the flow export cost, such that $\varphi_{X,J}$ fluctuates over time.

Following Melitz (2003), we define productivity averages for all producing firms in the domestic market, $\bar{\varphi}_{D,J}$, and in the export market, $\bar{\varphi}_{X,J}$. These average productivity levels

[16]Formally we show in Appendix A.1 that the consumption index is $C_J = \left(\int_{\Omega_J} c_J(\varphi)^{\frac{\sigma_J - 1}{\sigma_J}} d\varphi \right)^{\frac{\sigma_J}{\sigma_J - 1}}$, and the price index is $P_J = \left(\int_{\Omega_J} p_J(\varphi)^{1-\sigma_J} d\varphi \right)^{\frac{1}{1-\sigma_J}}$.

summarize all the information from the firm distribution for the equilibrium of the model:

$$\bar{\varphi}_{D,J} = \left(\int_{\underline{\varphi}_J} \varphi^{\sigma_J - 1} dG_J(\varphi) \right)^{\frac{1}{\sigma_J - 1}}, \qquad \bar{\varphi}_{X,J} = \left(\frac{1}{1 - G_J(\varphi_{X,J})} \int_{\varphi_{X,J}} \varphi^{\sigma_J - 1} dG_J(\varphi) \right)^{\frac{1}{\sigma_J - 1}}.$$

We show that average profits of firms domestic operations are $\pi_{D,J}(\bar{\varphi}_{D,J})$ and average profits for exporting operations are $\pi_{X,J}(\bar{\varphi}_{X,J})$. We define the fraction of firms that decide to export as $\zeta_J = \Pr\{\varphi > \varphi_{X,J}\}$. Finally we express the profits of domestic firms from all their operations as

$$\Pi_J = M_J \left[\pi_{D,J}(\bar{\varphi}_{D,J}) + \zeta_J \cdot \pi_{X,J}(\bar{\varphi}_{X,J}) \right].$$

3.2 Equilibrium

The aggregate budget constraint can be expressed in terms of the final composite consumption good C and the aggregate price index P

$$P \cdot C \leq L + \Pi.$$

The last term of the budget constraint, Π, represents the revenues of firms flowing back to households. Under perfect risk-sharing households receive a share of world industry profits, relative to their capital endowments, $\Pi_{\text{rs}} = \sum_J \frac{M_J}{M_J + M_J^\star} \cdot (\Pi_J + \Pi_J^\star)$.

The model can accommodate imperfect risk-sharing, namely, limited portfolio diversifications across countries. In Ghironi and Melitz (2005), under financial autarky households only receive the proceeds of domestic firms operations such that $\Pi_{\text{aut}} = \sum_J \Pi_J$. In our estimation of the model we introduce a parameter α that indicates the level of risk-sharing from financial autarky, $\alpha = 0$, to full risk-sharing, $\alpha = 1$. Revenues from firms' operations are a convex combination of both polar cases:

$$\Pi(\alpha) = \alpha \Pi_{\text{rs}} + (1 - \alpha) \Pi_{\text{aut}}.$$

This redistributional arrangement embeds both cases of full risk-sharing and autarky.[17]

Equilibrium definition — We solve for an endowment economy, where the mass of firms in an industry is constant over time. Hence the only production adjustments are in and out

[17] Our risk-sharing arrangement is exogenous. For empirical evidence of home bias in U.S. investors' portfolio and a deviation from full risk-sharing, see for instance example Coval and Moskowitz (1999); Ivković and Weisbenner (2005); Rauh (2006); Brown et al. (2009); Baik et al. (2010); Bernile et al. (2015).

of exporting. We define an equilibrium as a collection of prices $(p_J, p_{X,J}, P_J, P_T, P)$, output $y_J(\varphi)$, consumption $c_J(\varphi)$, labor demand $l_J(\varphi)$ such that: (a) each firm maximizes profit given consumer demand; (b) consumers maximize their intertemporal utility given prices; (c) markets for goods and for labor clear.

Practically there are $2 \cdot (\mathcal{J} + 1)$ endogenous variables in the model: the aggregate consumption level in each country, $(C, C^\star)$, and the industry level export cutoffs: $(\varphi_{X,J}, \varphi^\star_{X,J})$. Knowing these quantities is sufficient to solve for the equilibrium at each point in time. All the equilibrium equations are summarized in Appendix Table A.1.

3.3 Asset prices

We are interested in asset prices of domestic firms across different industries. Since the representative household holds these firms, they are priced using her stochastic discount factor. We derive the Euler equation using the portfolio problem faced by the representative household. She maximizes her utility subject to her budget constraint, which includes investments $x_{J,t}(\varphi)$ in firms of industry J of variety φ at a price $v_{J,t}(\varphi)$, the firm valuation. Firms pay out dividends which are equal to profits, $\pi_{J,t}(\varphi)$, since there is no investment. The problem reads as follows:

$$\max \mathbf{E}_0 \sum_{t=0}^{\infty} \beta^t \frac{C_t^{1-\psi}}{1-\psi}$$

$$\text{s.t} \quad P_t C_t + \sum_J \int_{\Omega_{D,J}} x_{J,t+1}(\varphi) v_{J,t}(\varphi) \mathrm{d}\varphi \leq L + \sum_J \int_{\Omega_{D,J}} x_{J,t}(\varphi) \left(v_{J,t}(\varphi) + \pi_{J,t}(\varphi) \right) \mathrm{d}\varphi,$$

We derive the Euler equation for pricing, leading to the classic consumption-CAPM pricing equation:

$$v_{J,t}(\varphi) = \mathbf{E}_t \{ S_{t,t+1} \left(v_{J,t+1}(\varphi) + \pi_{J,t+1}(\varphi) \right) \},$$

where $S_{t,t+1} = \beta (C_{t+1}/C_t)^{-\psi}$ is the one period ahead stochastic discount factor (SDF). To understand how investors price firms in our model, we need to understand how aggregate shocks affect their marginal utility and how cash-flows react to these shocks. We explore both sides in the next section.

3.4 Mechanism

We derive the elasticity of firms' profits and the elasticity of aggregate demand to foreign productivity $A^\star$. Tracing out the response of both the supply and the demand side of the economy sheds light on the model and its interpretation: the joint response of cash-flows (and realized returns) and the SDF ultimately determine the risk across industries and how this risk is priced in the economy.

Cash-flows — We first consider the effect of an increase in productivity in the foreign country on domestic firms and derive the following proposition:

Proposition 1. *Consider two industries* (J_1, J_2) *in the same country, both affected by the same shock to foreign productivity* $A^\star$*.*

(a) If industries have different variable trade costs such that $\tau_1 > \tau_2$*, then:*
   - *(i) Import penetration is greater in industry* J_2 *than* J_1*:* $\mathcal{I}_2 > \mathcal{I}_1$*.*
   - *(ii) The elasticity of profit to a shock to foreign productivity for small (non-exporter) firms is greater (more negative) in industry* J_2*.*
   - *(iii) The difference in the elasticity of profits between large and small firms to a shock to foreign productivity is greater in industry* J_2*.*

(b) If industries have different price elasticity of demand such that $\sigma_1 > \sigma_2$*, then the elasticity of profit to a shock to foreign productivity is lower algebraically in industry* J_1*.*

(c) If industries have different firm distribution, i.e. their Pareto tail is such that $\gamma_1 > \gamma_2$ *and* γ *is sufficiently large, then the elasticity of average profit to a shock to foreign productivity is greater in* J_1 *than in* J_2*.*

The first part of the proposition, *(a-i)*, follows from the fact that we define import penetration as the marginal impact of foreign firms on domestic industry prices (see Appendix A.2) such that larger trade costs translate into lower import penetration. The second statement, *(a-ii)* is specific to small, non-exporting firms. These firms only receive cash-flows from domestic operations as their productivity is below the exporting cutoff. Hence a larger level of import penetration leads to an amplification of the rise in competition from foreign firms, and subsequently to a larger drop in cash-flows. Statement *(a-iii)* relates to the difference between small and large firms. Large firms are above the export cutoff and do benefit from enhanced export opportunities. They suffer less from import competition than small firms. This difference between small and large firms is amplified in industries that are more exposed to foreign shocks where import penetration is larger. Statement *(b)* focuses on the elasticity of substitution at the industry level, σ_J. The effect of a foreign productivity shock is larger when consumer demand is more elastic to the drop in price triggered by import competition. Finally, in industries where the distribution of firms has a high tail parameter γ, productivity is concentrated among smaller, less productive firms (Statement *(c)*). For a given export productivity cutoff, the mass of firms exporting is smaller, decreasing the compensating effect of an increase in exports. Thus the import channel has more bite in these industries and the elasticity of average profits is more negative.

Marginal utility of consumption — We now explore how investors perceive foreign productivity shocks. Changes in their marginal utility captures the price of risk they demand. We first look at the elasticity of consumption.

Lemma 1. *The elasticity of consumption to foreign productivity is:*

$$\mathcal{E}^\star(C) = \underbrace{-\mathcal{E}^\star(P)}_{\textit{Price effect}} + \underbrace{\frac{\Pi}{L+\Pi} \cdot \mathcal{E}^\star(\Pi(\alpha))}_{\textit{Wealth effect}} \tag{3.1}$$

Both effects of trade compete in their role for aggregate consumption: a standard price effect where import competition lowers monopoly power in each industry, increases variety and lowers prices; and a wealth effect, since total household expenditures depend on the dividends received from firms.

The price of the risk of foreign shocks solely depends on the relative magnitude of these two effects. Rather than decomposing the two forces to analyze their relative magnitudes, we stay agnostic about the sign of the price of risk for now.[18] We next formulate identification restrictions on the sign of the price of risk in the model.

3.5 Identifying the price of risk in the model

Equilibrium returns — We focus on shocks to foreign productivity, $A^\star$.[19] The representative household's first order condition, her Euler equation, determines industries' asset returns:

$$\mathbf{E}_t\{S_{t,t+1}\mathbf{R}_{J,t+1}\} = 1 \tag{3.2}$$

The Euler equation delivers a consumption-CAPM model for prices, where expected returns are the price of risk multiplied by the risk exposure of an industry. To hold stocks in industries with negative exposure to trade shocks ($\mathcal{E}^\star(\pi_J) < 0$), investors command a positive (negative) risk premium if the price of risk is negative (positive), so that industries with

[18]In the calibration exercise presented below, we find the wealth effect to be positive in the case of perfect risk sharing, and negative when risk sharing is sufficiently limited.

[19]As we show in Section 3.6 when we calibrate the model, domestic shocks play a symmetric role but have a limited impact.

stronger negative exposure to foreign productivity shocks will have higher (lower) expected returns than industries with small exposure.

The key idea to identify the sign of the price of risk is to analyze whether the difference in expected returns in high and low SC industries emanates from firms and industries that are more likely to benefit from foreign productivity shocks, or from those that are more likely to be hurt. We formulate three testable predictions that identify the sign of the price of risk given the cross-section of asset returns.

Proposition 2. *In the cross-section of equity returns, it is possible to identify the price of foreign productivity risk:*

(a) If for the fraction of exporters within industries, foreign demand effects dominate such that $\mathcal{E}^{\star}(\pi_{X,J}) > 0$, then:
If the difference in expected returns between high and low SC industries among the smallest (and least productive) firms is higher than the difference in expected returns between high and low SC industries among the largest (and most productive) firms then the price of risk is negative.

(b) If two sets of industries have different price elasticity of demand such that $\sigma_1 > \sigma_2$, then:
If the difference in expected returns between high and low SC industries in the high elasticity of substitution set (σ_2) is higher than the difference in expected returns between high and low SC industries in the low elasticity of substitution set (σ_1) then the price of risk is negative.

(c) If two sets of industries have different firm distribution such that $\gamma_1 > \gamma_2$, and foreign demand effects dominate such that $\mathcal{E}^{\star}(\pi_{X,J}) > 0$, then:
If the difference in expected returns between high and low SC industries in the high γ_1 industries is higher than the difference in expected returns between high and low SC industries with low γ_2 then the price of risk is negative.

Predictions (a) and (c) are obtained only when export profits increase following a foreign productivity shock, namely when foreign demand effects outweigh competitive effects in the foreign country. This assumption seems to hold for the U.S. where import growth is highly correlated with aggregate manufacturing productivity growth.[20] Prediction (b) does not depend on the behavior export profits, and therefore allows us to identify the sign of the price of risk unconditionally.

These three predictions are intuitively connected to the mechanics of the model detailed in Proposition 1. Only large and productive firms export. Hence when export profits increase

[20]Using import data and the NBER CES data from 1974 to 2011, we find this correlation to be 0.6.

with foreign productivity, small firms are more negatively affected than large firms by foreign productivity shocks. Whether the difference in expected returns between high and low SC is more pronounced among small or large firms[21] allows to distinguish if the price of risk is positive or negative (Statement *(a)*). This result provides a theoretical foundation for our finding in Section 2 that the globalization risk premium is concentrated among smaller and less productive firms (Table 7), and that the price of risk is therefore negative.

The elasticity of substitution amplifies the competitive effects of a shock to foreign productivity. Hence greater elasticity of substitution leads to lower elasticity of cash-flows. Analyzing the expected returns of high-minus-low SC portfolios in high and low demand elasticity industries allows us to determine if the risk premium is due to covariance with a factor that increases or decreases consumption growth (Statement *(b)*). Intuitively, displacement risk will be lower in an industry where consumers are less sensitive to prices. To test whether this prediction is found in the data, we independently sort stocks into five portfolios based on either their industry's SC or weight-to-value ratio in the previous year, and into two portfolios based on their industry U.S. trade elasticities (σ). U.S. trade elasticities are estimated by Broda and Weinstein (2006) from 1990 to 2001 at the commodity level, and aggregated at the four-digit SIC based on total imports over 1990-2001. We present the results in Table 9. Whether portfolios are based on shipping costs or weight-to-value ratios, and whether portfolio returns are equally or value-weighted, we find the excess returns of exposed firms to be concentrated in high demand elasticity industries, consistent with a negative price of risk.

Finally when the distribution of firms has a high Pareto-tail parameter, production is spread out among less productive firms. Hence the effects of a positive productivity shocks are amplified through the extensive margin of trade: not only foreign firms do export more, but new foreign firms enter the domestic market increasing competition for domestic firms. Comparing the expected returns of high-minus-low SC portfolios in high and low Pareto-tail parameter industries therefore allows us to recover the sign of the price of risk (Statement *(c)*). We form double-sorted (2×5) portfolios based on shipping costs and the Pareto tail parameter. We estimate the Pareto parameter separately for each industry-year as the estimated coefficient γ of the following OLS regression:

$$\log(\text{SIZE}_i) = \gamma_J \log(\text{RANK}_{i \in J}) + u_i,$$

where for each year and 4-digit industry, firms are ranked in descending order according to their size measured as total firm market value. Table 10 presents estimates of excess returns

[21] In the model, the assumption of a Pareto distribution for productivity induces a size distribution of firms that is also Pareto.

from a Fama-French five factor model for each SC or weight-to-value portfolio, separately for high and low Pareto tail parameter (γ) industries. The long-short portfolio has more negative excess returns in high γ industries.

Domestic shocks — A concern may be that what we are capturing is the response to changes in foreign productivity *relative* to domestic productivity, and that considering the response to domestic productivity shocks would deliver symmetric results. In Appendix A.4.1 we derive analytical results for both domestic and export profits in response to the domestic shocks, ε^A. The response of cash-flows and valuations to these shocks are significantly different, mainly due to the response of exporters. They react slightly negatively to a shock to domestic productivity, with no significant differences across sectors. This effect is due to the extensive margin: as new exporters enter in response to an increase in domestic productivity, incumbents exporters have to compete on foreign markets with them. This result is in contrast to the response to foreign shocks.

Exchange rate — Even though the nominal exchange rate is set to one, it is possible to think about the effects of productivity shocks on the real exchange rate in the model. In Appendix A.4.2, we introduce the real exchange rate in the model. We find that the exchange rate reflects the relative productivity across countries. After a foreign productivity shock, the relative price of consumption goods across country, $P^\star/P$ decreases. The composite aggregate good in the foreign country becomes cheaper relative to the domestic economy. A symmetric effect appears in response to shocks to domestic productivity, where the domestic price index falls relative to the foreign one.

In summary, the model predicts that if the price of risk of foreign productivity shocks is negative, the risk premium should be concentrated among small and less productive firms, in industries with a higher demand elasticity, and in industries where the share of small and less productive firms is higher. We find that all these predictions hold in the cross-section of expected returns. We next turn to a calibration of the model to check whether and how the response of domestic consumption to foreign productivity shocks can be consistent with a negative price of risk.

3.6 Calibration

Can this framework rationalize the globalization risk premium? To address this question, we calibrate our model with two countries, two industries, and an homogeneous good sector. Parameters are listed in Table 11. We follow the standards of the asset pricing literature, see for instance Bansal and Yaron (2004), to choose preference parameters, namely the elasticity of intertemporal substitution and the coefficient of risk aversion.[22] Regarding industries' organization, we follow Bernard et al. (2003b) to choose the coefficient σ. We set the Pareto tail parameter, θ, to fit the standard deviations of plant sales, following Ghironi and Melitz (2005). We set the ratio of foreign labor to domestic labor to 3, thereby matching the ratio of the working-age population in China relative to the U.S. We also choose the ratio of baseline productivities across countries to match GDP per capita in China relative to the U.S. We set trade costs to 1 in the most exposed industry and to 1.5 in the less exposed industry, slightly higher than Ghironi and Melitz (2005), but in line with Obstfeld and Rogoff (2001). Finally we choose fixed costs of exporting and the mass of firms to match both the level of import penetration and its volatility in the U.S.

We present impulse response functions (IRFs) of consumption and asset prices to foreign shocks in Figure 1, for an economy with perfect risk-sharing (bottom panel). With perfect risk-sharing, valuations decrease after a foreign productivity shock, especially for low trade costs (High Trade Exposure) industries, and consumption goes up. This generates a negative risk premium, and a positive price of the risk of foreign shocks, which is strictly inconsistent with the empirical findings in Section 2. This is a key result of this paper: the standard model of trade with perfect risk-sharing across countries cannot rationalize the globalization risk premium that we document empirically.

To make progress in trying to rationalize the globalization risk premium, we allow for financial autarky (top panel). As the shock hits, valuations decrease, but so does consumption. This is consistent with a positive risk premium on exposed firms, and with a negative price of risk, in line with the empirical estimates of the globalization risk premium in Section 2. In what follows, we consider limited risk-sharing as our baseline parameterization ($\alpha = 0$) to calibrate the model. At the end of this section, we revisit this assumption and run sensitivity analysis of our asset pricing predictions to the degree of risk-sharing in the economy.

Trade flows — We report moments from model simulations in Table 12. The first panel describes key moments of the model related to trade. Our main target is the level of import penetration across high and low trade costs industries. The difference in the elasticity of import penetration to a foreign shock between both sectors is in line with some of our own estimates (0.7, see Table B.9) although slightly smaller. This suggests the model captures key differences in trade dynamics across sectors. The second panel presents results for aggregate quantities. The volatility of aggregate domestic consumption is too high with respect to its

[22] We conduct sensitivity analysis with respect to risk aversion in Figure 3a.

empirical counterpart. This is mainly due to the the large role played by trade shocks on the domestic economy in the model.

Cash-flow mechanism — In the bottom panel of Figure 2, we plot the IRFs of import penetration, the fraction of exporters and domestic profits for high and low trade costs sectors. Higher trade costs lead to a lower elasticity of import from the foreign country in high trade costs industries. This difference translates into a differential response of cash-flows: the profit response of low trade costs industries is 4% more negative. As we explain below, this difference in cash-flows leads to a difference in returns due to the comovement with consumption. We examine this channel next.

Consumption response — As shown in lemma (1) and equation (3.1), consumption moves in response to two forces: a price effect whereby consumption becomes cheaper due to more productive varieties being imported from the foreign country; a wealth effects that depends on the value of households' portfolio. As we impose no risk-sharing ($\alpha = 0$), the wealth effect is negative and dominates. Domestic consumption responds negatively to a shock to foreign productivity.

Valuations — Given the response of cash-flows and consumption, we now address our central questions: how much do investors care about the risk of foreign productivity shocks?

Qualitatively the model provides a clear answer. As consumption declines when foreign productivity increases, consumption is dear exactly at times when firms' cash-flows are negative. Investors seek protection to hedge against that source of systematic risk. Firms doing poorly when consumption is low trade at a discount relative to firms with high cash-flows in these states of the world. The price of the risk of foreign productivity shocks is therefore negative.

Quantitatively, our baseline calibration delivers a globalization risk premium of 0.4% (see the third panel of Table 12), and an aggregate equity premium in the domestic economy of around 1%. The difference in excess returns across industries falls short of our empirical estimates of 8.1%. The cause for this discrepancy is two-fold. First, the difference in trade elasticities and profits in the model is too small compared to elasticities observed in the data (first panel of Table 12); second the price of consumption risk is too small in the model, a fact that is corroborated by the small aggregate equity premium.

To further assess the role of the aggregate risk premium, we run sensitivity analyses in Figure 3a. We represent the risk premium of small firms in high and low trade exposure industries, for different values of the risk aversion parameter ν. At the very end of the spectrum we set risk aversion to 200.[23] For such a large value of risk aversion, the aggregate risk premium is around 7%, in line with its empirical counterpart. In that case, differences in average returns is close to 4%, closer to our empirical estimates of 8.1 %.

Domestic shocks — As already discussed, a concen may be that we are picking up the response to changes in relative productivity across countries. Yet responses to domestic shocks are not symmetric to the responses to foreign shocks. In Appendix Figure A.1, we represent the IRFs of trade quantities and profits to domestic shocks. While low trade costs industries appear to benefit more from the shock, the effect is tenuous. The IRF of profits to the domestic shock only goes up to 0.25%, a small response when compared to the magnitudes of the impact of the foreign shock (-7.5%). The magnitude of domestic shocks is thus too small to be driving the globalization risk premium.

Risk-sharing — We next let the risk-sharing parameter α vary between zero and one from financial autarky to full risk-sharing. Figure 3b shows the average returns for both industries and the risk free rate in economies with different degrees of risk-sharing. In Figure 3c we estimate the elasticity of consumption to the foreign shock for each of these economies. As anticipated, the consumption response becomes less negative when we increase risk-sharing. As a consequence the risk premium for exposure to import competition declines with the level of risk-sharing. In fact, the consumption response changes signs and becomes positive for a risk-sharing parameter above 0.9. In this region, the risk premium changes sign and becomes negative, inconsistent with the globalization risk premium we document empirically. Finally we follow Ghironi and Melitz (2005) and allow for the trading of bonds across country to check whether this might affect our results. As we show in in Appendix A.4.3, the simulated model with bond trading generates the same moments as without bond trading. We conclude that the introduction of risk-sharing through a risk-free security does not affect the risk premia generated by the model.

In summary, the model can only generate positive excess returns for low trade cost firms if we allow for at least moderate frictions to risk-sharing. There may be other ways to generate this negative response of domestic consumption to foreign shocks[24] and explain the globalization risk premium: we leave them to future research.

[23]While this value might seem outlandish, we think of it as reduced form for other forms of shocks that are known to generate large risk premia even with "normal" levels of risk aversions, see for e.g. Rietz (1988) and Barro (2006).

[24]For instance, Demidova (2008) assumes that domestic and foreign firms draw idiosyncratic productivities from different distributions and shows that a foreign productivity shock can reduce domestic consumption and welfare.

4 Conclusion

This paper studies how globalization is reflected in asset prices, and thus how investors perceive the domestic consequences of foreign productivity shocks. We use shipping costs to measure firms' exposure to globalization. We find that firms in low shipping costs industries carry a 8 percent risk premium, suggesting that their cash-flows covary negatively with investors' marginal utility. This premium can be driven by either a positive or negative joint reaction of firms' performance and investors' consumption to foreign productivity shocks. We find that the premium emanates from the risk of displacement of least efficient firms triggered by import competition. These findings suggest that foreign productivity shocks are associated with times when consumption is dear for investors. We attempt to rationalize this puzzle within a standard two-country dynamic general equilibrium model of trade (Melitz, 2003) with asset prices. Under perfect risk-sharing, the model cannot rationalize our findings. When we allow for limited risk-sharing, the model predictions can be consistent with our empirical findings. Other types of financial frictions could be introduced to rationalize the globalization risk premium: we hope this will motivate future research.

References

Acemoglu, Daron, David Autor, David Dorn, Gordon H. Hanson, and Brendan Price, "Import Competition and the Great U.S. Employment Sag of the 2000s," *NBER Working Paper*, 2014.

Amiti, Mary and Jozef Konings, "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia," *American Economic Review*, 2007, *97* (5), 1611–1638.

_ , Mi Dai, Robert C Feenstra, and John Romalis, "How Did China's WTO Entry Benefit US Consumers?," 2016.

Anderson, James E. and Eric van Wincoop, "Trade Costs," *Journal of Economic Literature*, 2004, *42* (3), 691–751.

Autor, David H., David Dorn, and Gordon H. Hanson, "The China Syndrome: Local Labor Market Effects of Import Competition in the United States," *American Economic Review*, 2013, *103* (6), 2121–68.

_ , _ , _ , and Jae Song, "Trade Adjustment: Worker Level Evidence," *Quarterly Journal of Economics*, 2014, *129* (4), 1799–1860.

Baik, Bok, Jun-Koo Kang, and Jin-Mo Kim, "Local Institutional Investors, Information Asymmetries, and Equity Returns," *Journal of Financial Economics*, 2010, *97* (1), 81–106.

Bansal, Ravi and Amir Yaron, "Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles," *Journal of Finance*, 2004, *59* (4), 1481–1509.

Barro, Robert J., "Rare Disasters and Asset Markets in the Twentieth Century," *Quarterly Journal of Economics*, 2006, *121* (3), 823–866.

Barrot, Jean-Noel, Erik Loualiche, Matthew C Plosser, and Julien Sauvagnat, "Import Competition and Household Debt," *Available at SSRN 2808981*, 2016.

Bernard, Andrew B and J Bradford Jensen, "Exceptional exporter performance: cause, effect, or both?," *Journal of international economics*, 1999, *47* (1), 1–25.

_ and _ , "Exporting and Productivity in the USA," *Oxford Review of Economic Policy*, 2004, *20* (3), 343–357.

_ , _ , and Peter K Schott, "Survival of the Best Fit: Exposure to Low-wage Countries and the (uneven) Growth of US Manufacturing Plants," *Journal of International Economics*, 2006, *68* (1), 219–237.

_ , _ , and _ , "Trade Costs, Firms and Productivity," *Journal of Monetary Economics*, 2006, *53* (5), 917–937.

_ , _ , and Robert Z Lawrence, "Exporters, jobs, and wages in US manufacturing: 1976-1987," *Brookings papers on economic activity. Microeconomics*, 1995, *1995*, 67–119.

_ , _ , Jonathan Eaton, and Samuel Kortum, "Plants and Productivity in International Trade," *American Economic Review*, 2003, *93* (4), 1268–1290.

_ , _ , Stephen J Redding, and Peter K Schott, "Firms in International Trade," *Journal of Economic Perspectives*, 2007, *21* (3), 105–130.

_ , Jonathan Eaton, J Bradford Jensen, and Samuel Kortum, "Plants and Productivity in International Trade," *American Economic Review*, 2003, *93* (4), 1268–1290.

Bernile, Gennaro, Alok Kumar, and Johan Sulaeman, "Home away from Home: Geography of Information and Local Investors," *Review of Financial Studies*, 2015, *28* (7), 2009–2049.

Bloom, Nicholas, Mirko Draca, and John Van Reenen, "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity," *NBER Working Paper*, 2011.

Broda, Christian and David E Weinstein, "Globalization and the Gains From Variety," *Quarterly Journal of Economics*, 2006, *121* (2), 541–585.

Brown, Jeffrey, Joshua Pollet, and Scott Weisbenner, "The Investment Behavior of State Pension Plans," *NBER Working Paper*, 2009.

Bustamante, Maria Cecilia and Andres Donangelo, "Industry Concentration and Markup: Implications for Asset Pricing," *Working Paper*, 2015.

Caliendo, Lorenzo, Maximiliano Dvorkin, Fernando Parro et al., "Trade and Labor Market Dynamics," *Federal Reserve Bank of St. Louis Working Paper Series*, 2015, (2015-009).

Chaney, Thomas, "Distorted Gravity: The Intensive and Extensive Margins of International Trade," *American Economic Review*, 2008, *98* (4), 1707–1721.

Coval, Joshua D and Tobias J Moskowitz, "Home Bias at Home: Local Equity Preference in Domestic Portfolios," *Journal of Finance*, 1999, *54* (6), 2045–2073.

Das, Sanghamitra, Mark J Roberts, and James R Tybout, "Market Entry Costs, Producer Heterogeneity, and Export Dynamics," *Econometrica*, 2007, *75* (3), 837–873.

Demidova, Svetlana, "Productivity Improvements and Falling Trade Costs: Boon or Bane?," *International Economic Review*, 2008, *49* (4), 1437–1462.

di Giovanni, Julian, Andrei A. Levchenko, and Jing Zhang, "The Global Welfare Impact of China: Trade Integration and Technological Change," *American Economic Journal: Macroeconomics*, 2014, *6* (3), 153–83.

Eaton, Jonathan and Samuel Kortum, "Technology, Geography, and Trade," *Econometrica*, 2002, *70* (5), 1741–1779.

Epstein, Larry G and Stanley E Zin, "Substitution, risk aversion, and the intertemporal behavior of consumption and asset returns: A theoretical framework," *Econometrica*, 1989, *57*, 937–969.

Fama, Eugene F. and Kenneth R. French, "Size, Value, and Momentum in International Stock Returns," *Journal of Financial Economics*, 2012, *105* (3), 457–472.

_ **and** _ , "A Five-Factor Asset Pricing Model," *Journal of Financial Economics*, 2015, *116* (1), 1 – 22.

Feenstra, Robert C, "US imports, 1972-1994: Data and Concordances," *NBER Working Paper*, 1996.

_ **and David E Weinstein**, "Globalization, markups and US welfare," 2010.

Fillat, José L. and Stefania Garetto, "Risk, Returns, and Multinational Production," *Quarterly Journal of Economics*, 2015, *130* (4), 2027–2073.

Fresard, Laurent, "Financial Strength and Product Market Behavior: The Real Effects of Corporate Cash Holdings," *Journal of Finance*, 2010, *65* (3), 1097–1122.

_ **and Philip Valta**, "How Does Corporate Investment Respond to Increased Entry Threat?," *Working Paper*, 2014.

Gârleanu, Nicolae, Leonid Kogan, and Stavros Panageas, "Displacement risk and asset returns," *Journal of Financial Economics*, September 2012, *105* (3), 491–510.

_ , Stavros Panageas, and Jianfeng Yu, "Technological Growth and Asset Pricing," *Journal of Finance*, 2012, *67* (4), 1265–1292.

Ghironi, Fabio and Marc Melitz, "International Trade and Macroeconomics Dynamics with Heterogeneous Firms," *Quarterly Journal of Economics*, 2005, pp. 865–915.

Goldberg, Pinelopi Koujianou, Amit Kumar Khandelwal, Nina Pavcnik, and Petia Topalova, "Imported Intermediate Inputs and Domestic Product Growth: Evidence from India," *Quarterly Journal of Economics*, 2010, *125* (4), 1727–1767.

Gomes, Joao F, Leonid Kogan, and Motohiro Yogo, "Durability of Output and Expected Stock Returns," *Journal of Political Economy*, 2009, *117* (5).

Grossman, Gene M. and James A. Levinsohn, "Import Competition and the Stock Market Return to Capital," *American Economic Review*, 1989, *79* (5), 1065–1087.

Hassan, Tarek A, "Country Size, Currency Unions, and International Asset Returns," *Journal of Finance*, 2013, *68* (6), 2269–2308.

_ , Thomas M Mertens, and Tony Zhang, "Not so disconnected: Exchange rates and the capital stock," *Journal of International Economics*, 2016, *99*, S43–S57.

Helpman, Elhanan, Marc J Melitz, and Stephen R Yeaple, "Export versus FDI with heterogeneous firms," *American Economic Review*, 2004, *94*, 300–316.

Hombert, Johan and Adrien Matray, "Can Innovation Help US Manufacturing Firms Escape Import Competition from China?," *Working Paper*, 2014.

Hou, Kewei and David T Robinson, "Industry Concentration and Average Stock Returns," *Journal of Finance*, 2006, *61* (4), 1927–1956.

Hsieh, Chang-Tai and Ralph Ossa, "A Global View of Productivity Growth in China," *Working Paper*, 2011.

Hummels, David, "Transportation Costs and International Trade in the Second Era of Globalization," *Journal of Economic Perspectives*, 2007, *21* (3), 131–154.

_ and Alexandre Skiba, "Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen Conjecture," *Journal of Political Economy*, 2004, *112* (6), 1384–1402.

_ , Rasmus Jørgensen, Jakob Munch, and Chong Xiang, "The Wage Effects of Offshoring: Evidence from Danish Matched Worker-Firm Data," *American Economic Review*, 2014, *104* (6), 1597–1629.

Irarrazabal, Alfonso, Andreas Moxnes, and Luca David Opromolla, "The Tip of the Iceberg: A Quantitative Framework for Estimating Trade Costs," *NBER Working Paper*, 2013.

Ivković, Zoran and Scott Weisbenner, "Local does as Local is: Information Content of the Geography of Individual Investors' Common Stock Investments," *Journal of Finance*, 2005, *60* (1), 267–306.

Kogan, Leonid, Dimitris Papanikolaou, and Noah Stoffman, "Winners and Losers: Creative Destruction and the Stock Market," *Working Paper*, 2016.

Lileeva, Alla and Daniel Trefler, "Improved Access to Foreign Markets Raises Plant-level Productivity... For Some Plants," *Quarterly Journal of Economics*, 2010, *125* (3), 1051–1099.

Loecker, Jan De, Pinelopi K Goldberg, Amit K Khandelwal, and Nina Pavcnik, "Prices, Markups and Trade Reform," *Working Paper*, 2012.

Loualiche, Erik, "Asset Pricing with Entry and Imperfect Competition," *Working Paper*, 2015.

Lustig, Hanno and Robert J. Richmond, "Gravity in FX Rsquared: Understanding the Factor Structure in Exchange Rates," 2015. Mimeo Stanford University.

_ **, Nikolai Roussanov, and Adrien Verdelhan**, "Common Risk Factors in Currency Markets," *Review of Financial Studies*, 2011, *24* (11), 3731–3777.

Melitz, Marc J, "The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity," *Econometrica*, 2003, *71* (6), 1695–1725.

_ **and Daniel Trefler**, "Gains from Trade when Firms Matter," *Journal of Economic Perspectives*, 2012, *26* (2), 91–118.

_ **and Stephen J Redding**, "Heterogeneous Firms and Trade," *Handbook of International Economics,*, 2014, *4*, 1–54.

Obstfeld, Maurice and Kenneth S. Rogoff, *The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?*, Vol. NBER Macroeconomics Annual 2000, MIT Press, 2001.

Pavcnik, Nina, "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants," *Review of Economic Studies*, 2002, *69* (1), 245–276.

Pierce, Justin R. and Peter K. Schott, "The Surprisingly Swift Decline of U.S. Manufacturing Employment," *NBER Working Paper*, 2012.

Rauh, Joshua D, "Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans," *Journal of Finance*, 2006, *61* (1), 33–71.

Ready, Robert, Nikolai Roussanov, and Colin Ward, "Commodity Trade and the Carry Trade: A tale of Two Countries," *NBER Working Paper*, 2013.

Richmond, Robert J, "Trade Network Centrality and Currency Risk Premia," *Available at SSRN 2607735*, 2016.

Rietz, Thomas A., "The Equity Risk Premium a Solution," *Journal of Monetary Economics*, 1988, *22* (1), 117 – 131.

Tian, Mary, "Tradability of Output, Business Cycles, and Asset Prices," *Working Paper*, 2011.

Trefler, Daniel, "The Long and Short of the Canada-US Free Trade Agreement," *American Economic Review*, 2004, *94* (4), 870–895.

Valta, Philip, "Competition and the Cost of Debt," *Journal of Financial Economics*, 2012, *105* (3), 661–682.

Verdelhan, Adrien, "The Share of Systematic Variation in Bilateral Exchange Rates," *Journal of Finance*, Forthcoming.

Xu, Jin, "Profitability and Capital Structure: Evidence from Import Penetration," *Journal of Financial Economics*, 2012, *106* (2), 427–446.

Zhu, Xiaodong, "Understanding China's growth: Past, present, and future," *The Journal of Economic Perspectives*, 2012, *26* (4), 103–124.

Table 1
Summary statistics

This table presents summary statistics for the industry-year sample that covers 439 unique manufacturing industries (with 4-digit SIC codes between 2000 and 3999). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. Tariffs are measured at the industry-year level as the ratio of customs duties to the Free-on-Board value of imports. Imports, Exports and Net Imports are measured at the industry-year level and normalized by the sum of total shipments and imports. Shipping costs, weight-to-value ratio, tariffs, imports, exports are available from the Census and obtained from Peter Schott's website. Employment, shipments, value added, and total factor productivity (TFP) are obtained from the NBER-CES files, and are available until 2011. All variables are windsorized at the first and ninety-ninth percentiles. The sample period is 1974-2011.

	Obs.	Mean	SD	p1	p50	p99
Trade Data						
Shipping costs	14366	0.056	0.038	0.002	0.047	0.224
Log Weight-to-value	8705	-1.750	1.519	-6.106	-1.742	2.154
Tariffs	14366	0.043	0.051	0.000	0.027	0.261
Imports	14366	0.169	0.192	0.000	0.099	0.887
Exports	14366	0.106	0.117	0.000	0.067	0.619
Net Imports	14366	0.062	0.196	-0.416	0.013	0.803
Industry Controls						
Log employment	14366	2.979	1.115	0.000	2.970	5.615
Log value added	14366	7.261	1.293	4.182	7.272	10.397
Log shipments	14366	7.997	1.295	4.944	8.029	11.204
TFP	14366	1.001	0.169	0.617	0.990	1.695

Table 2
Shipping cost persistence

This table presents transition frequencies across shipping cost quintiles (respectively weight-to-value quintiles) from year $t-1$ to t (Columns 1 to 6) and from year $t-5$ to t (Columns 7 to 12) in the sample over the period 1974-2014 (respectively 1989-2014). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports.

Panel A: Transition across shipping cost quintiles

from year $t-1$ to year t						from year $t-5$ to year t					
	Q1 (t)	Q2 (t)	Q3 (t)	Q4 (t)	Q5 (t)		Q1 (t)	Q2 (t)	Q3 (t)	Q4 (t)	Q5 (t)
Q1 (t-1)	0.866	0.113	0.013	0.003	0.0061	Q1 (t-5)	0.761	0.163	0.044	0.018	0.014
Q2 (t-1)	0.113	0.734	0.137	0.014	0.002	Q2 (t-5)	0.153	0.572	0.213	0.047	0.015
Q3 (t-1)	0.010	0.138	0.685	0.158	0.010	Q3 (t-5)	0.039	0.206	0.494	0.224	0.036
Q4 (t-1)	0.004	0.012	0.154	0.709	0.121	Q4 (t-5)	0.013	0.048	0.206	0.549	0.183
Q5 (t-1)	0.003	0.005	0.014	0.120	0.857	Q5 (t-5)	0.015	0.018	0.054	0.183	0.730

Panel B: Transition across weight-to-value quintiles

from year $t-1$ to year t						from year $t-5$ to year t					
	Q1 (t)	Q2 (t)	Q3 (t)	Q4 (t)	Q5 (t)		Q1 (t)	Q2 (t)	Q3 (t)	Q4 (t)	Q5 (t)
Q1 (t-1)	0.946	0.047	0.003	0.001	0.002	Q1 (t-5)	0.896	0.095	0.004	0.002	0.003
Q2 (t-1)	0.047	0.882	0.065	0.005	0.000	Q2 (t-5)	0.092	0.785	0.112	0.011	0.000
Q3 (t-1)	0.002	0.068	0.863	0.066	0.001	Q3 (t-5)	0.005	0.112	0.749	0.132	0.002
Q4 (t-1)	0.002	0.003	0.066	0.884	0.046	Q4 (t-5)	0.003	0.010	0.127	0.773	0.087
Q5 (t-1)	0.002	0.001	0.002	0.045	0.951	Q5 (t-5)	0.002	0.002	0.004	0.085	0.908

Table 3
Shipping costs and trade flows

This table presents the result of industry-year regressions of the value of trade flows on shipping costs (Panel A) and the weight-to-value ratio (Panel B). We consider successively imports (Columns 1 to 3), exports (Columns 4 to 6) and imports net of exports (Columns 7 to 9) normalized by the total value of shipments plus imports. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. Tariffs are measured at the industry-year level as the ratio of customs duties to the Free-on-Board value of imports. Some regressions include control for the industry level of tariffs, penetration, log employment, log value added, log shipments and total factor productivity (TFP), all obtained from the NBER-CES datasets. Standard errors are clustered at the industry level and reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance. The sample period is 1974-2011 in Panel A, and 1989-2011 in Panel B.

	Panel A: Shipping costs								
	Imports			Exports			Net imports		
Shipping costs	-0.327*	-0.614***	-0.096	-0.690***	-0.707***	-0.030	0.369*	0.099	-0.059
	(0.168)	(0.160)	(0.091)	(0.119)	(0.106)	(0.096)	(0.198)	(0.169)	(0.119)
Tariffs		0.643***	-0.556***		-0.242***	-0.126		0.877***	-0.431***
		(0.137)	(0.141)		(0.055)	(0.078)		(0.139)	(0.147)
Log employment		0.031***	-0.067***		-0.031***	-0.028*		0.061***	-0.040*
		(0.012)	(0.016)		(0.010)	(0.015)		(0.013)	(0.021)
Log value added		-0.042*	-0.054***		0.023	-0.009		-0.064***	-0.045*
		(0.023)	(0.020)		(0.015)	(0.018)		(0.022)	(0.026)
Log shipments		-0.038*	-0.009		-0.003	0.008		-0.034	-0.013
		(0.022)	(0.022)		(0.013)	(0.018)		(0.022)	(0.027)
TFP		0.021	-0.006		0.011	-0.029		0.008	0.017
		(0.037)	(0.020)		(0.025)	(0.018)		(0.034)	(0.024)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	14366	14366	14366	14366	14366	14366	14366	14366	14366
R^2	0.143	0.327	0.861	0.129	0.163	0.741	0.049	0.262	0.783
	Panel B: Weight-to-value ratio								
	Imports			Exports			Net imports		
Log Weight-to-value	-0.040***	-0.037***	-0.003	-0.025***	-0.032***	0.006	-0.015**	-0.005	-0.009
	(0.006)	(0.006)	(0.007)	(0.004)	(0.004)	(0.005)	(0.007)	(0.006)	(0.008)
Tariffs		1.284***	-0.196		-0.755***	-0.256**		2.016***	0.073
		(0.273)	(0.157)		(0.104)	(0.102)		(0.274)	(0.201)
Log employment		0.014	-0.056***		-0.043***	-0.007		0.056***	-0.049**
		(0.016)	(0.016)		(0.010)	(0.015)		(0.016)	(0.024)
Log value added		-0.038	-0.016		0.007	-0.005		-0.044	-0.011
		(0.031)	(0.018)		(0.016)	(0.019)		(0.030)	(0.029)
Log shipments		-0.037	-0.051**		0.017	-0.014		-0.053*	-0.033
		(0.033)	(0.021)		(0.015)	(0.023)		(0.031)	(0.035)
TFP		0.056	-0.028		0.009	-0.025		0.044	-0.008
		(0.041)	(0.020)		(0.027)	(0.020)		(0.039)	(0.029)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	8705	8705	8705	8705	8705	8705	8705	8705	8705
R^2	0.132	0.383	0.934	0.105	0.187	0.828	0.031	0.333	0.871

Table 4
Shipping cost and weight-to-value portfolios

This table reports summary statistics for five shipping costs portfolios (Panel A), and five weight-to-value portfolios (Panel B). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. ME is the average portfolio market capitalization over the sample period converted into 2013 constant billions dollars. BE/ME is book-to-market equity defined as book value of equity (item CEQ) divided by market value of equity (item CSHO× item PRCC_F). Return on assets (ROA) is defined as operating income after depreciation and amortization (item OIBDP-itemDP) divided by total assets. I/K is capital expenditure (item CAPX) divided by property, plant and equity (item PPENT). Market leverage is total debt (item DLC+item DLTT) divided by the sum of total debt and market value of equity. The sample period is 1975-2015 in Panel A, and 1990-2015 in Panel B.

	Panel A: Shipping cost portfolios					
	Low	2	3	4	High	Hi-Lo
Portfolio Characteristics						
ME	3.710	2.448	2.165	2.847	3.492	
BE/ME	0.609	0.690	0.730	0.827	0.914	
Market leverage	0.160	0.169	0.186	0.238	0.307	
ROA	-0.091	-0.001	0.005	0.056	0.078	
I/K	0.309	0.315	0.294	0.249	0.206	
Portfolio Moments						
Mean excess return (%)	19.569	14.532	12.781	12.417	11.462	-8.107
Sharpe ratio	0.678	0.547	0.531	0.565	0.569	-0.431

	Panel B: Weight-to-value portfolios					
	Low	2	3	4	High	Hi-Lo
Portfolio Characteristics						
ME	4.499	3.293	1.958	2.760	5.006	
BE/ME	0.437	0.535	0.606	0.624	0.695	
Market leverage	0.103	0.105	0.131	0.191	0.282	
ROA	-0.181	-0.058	-0.024	0.032	0.072	
I/K	0.329	0.331	0.310	0.261	0.186	
Portfolio Moments						
Mean excess return (%)	18.923	15.841	13.251	9.945	9.264	-9.659
Sharpe ratio	0.609	0.563	0.503	0.481	0.463	-0.426

Table 5
Shipping cost and weight-to-value portfolios - Returns

This table presents excess returns (α) over a five-factor Fama-French model of either shipping costs portfolios (Panel A) or weight-to-value portfolios (Panel B). Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. In any given month, stocks are sorted into five portfolios based on the sum of their industry shipping costs and tariffs in the previous year. We regress a given portfolio's return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), the value factor (high minus low), the profitability factor (robust minus weak), and the investment factor (conservative minus aggressive) all obtained from Kenneth French's website. Portfolios returns are either equally-weighted (Columns 1 to 6) or value-weighted (Columns 7 to 12). Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Panel A, and 1990-2015 in Panel B.

Panel A: Shipping costs portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
α	12.570***	6.233***	4.431**	1.332	-1.318	-13.888***	3.023**	1.876	1.596	-0.180	-1.090	-4.113**
	(2.611)	(2.080)	(1.942)	(1.727)	(1.524)	(3.064)	(1.432)	(1.475)	(1.708)	(1.562)	(1.226)	(1.995)
β^{MKT}	1.017***	0.970***	0.966***	1.059***	1.034***	0.016	0.997***	1.029***	1.045***	1.087***	0.944***	-0.053
	(0.035)	(0.031)	(0.032)	(0.040)	(0.036)	(0.054)	(0.046)	(0.038)	(0.030)	(0.028)	(0.027)	(0.046)
β^{HML}	-0.513***	-0.185**	-0.141*	0.185	0.520***	1.033***	-0.519***	-0.227***	-0.043	-0.142*	0.196**	0.714***
	(0.090)	(0.080)	(0.085)	(0.116)	(0.103)	(0.122)	(0.068)	(0.064)	(0.086)	(0.073)	(0.093)	(0.111)
β^{SMB}	1.053***	1.141***	0.946***	0.793***	0.789***	-0.264***	-0.081	0.184***	0.043	0.049	0.048	0.129*
	(0.077)	(0.084)	(0.073)	(0.080)	(0.066)	(0.078)	(0.056)	(0.058)	(0.063)	(0.067)	(0.049)	(0.068)
β^{RMW}	-0.874***	-0.591***	-0.548***	-0.226*	0.090	0.964***	0.094	-0.248***	-0.453***	-0.078	0.326***	0.232**
	(0.120)	(0.071)	(0.082)	(0.128)	(0.093)	(0.157)	(0.075)	(0.060)	(0.114)	(0.082)	(0.062)	(0.105)
β^{CMA}	0.141	-0.120	0.003	0.028	-0.123	-0.264	0.327**	-0.311***	-0.175	0.220**	0.287***	-0.040
	(0.146)	(0.132)	(0.162)	(0.198)	(0.144)	(0.215)	(0.135)	(0.111)	(0.133)	(0.104)	(0.111)	(0.174)

Panel B: Weight-to-value portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
α	14.281***	10.661***	7.402***	1.589	-0.625	-14.906***	4.386**	7.732***	0.038	-2.515*	-0.154	-4.540
	(3.838)	(3.420)	(2.839)	(2.108)	(2.098)	(4.130)	(1.986)	(2.358)	(2.026)	(1.477)	(1.437)	(2.832)
β^{MKT}	1.003***	0.945***	1.007***	0.993***	1.062***	0.059	0.907***	1.044***	1.147***	1.035***	0.876***	-0.031
	(0.049)	(0.045)	(0.052)	(0.045)	(0.057)	(0.082)	(0.060)	(0.060)	(0.041)	(0.030)	(0.030)	(0.077)
β^{HML}	-0.485***	-0.262***	-0.149	0.291**	0.657***	1.143***	-0.444***	-0.475***	-0.408***	0.191**	0.279**	0.722***
	(0.118)	(0.091)	(0.120)	(0.125)	(0.105)	(0.118)	(0.068)	(0.095)	(0.072)	(0.076)	(0.120)	(0.171)
β^{SMB}	0.984***	1.045***	0.859***	0.744***	0.650***	-0.335***	-0.117	0.125	0.130**	0.191***	-0.044	0.073
	(0.121)	(0.105)	(0.107)	(0.093)	(0.061)	(0.109)	(0.088)	(0.088)	(0.065)	(0.040)	(0.061)	(0.126)
β^{RMW}	-1.015***	-0.695***	-0.696***	-0.165*	-0.030	0.985***	-0.013	-0.321***	-0.312*	0.214***	0.140**	0.153
	(0.163)	(0.100)	(0.115)	(0.097)	(0.081)	(0.194)	(0.114)	(0.082)	(0.163)	(0.052)	(0.065)	(0.163)
β^{CMA}	0.209	-0.141	-0.009	-0.125	-0.168	-0.377	0.240	-0.390***	0.031	0.139**	0.120	-0.120
	(0.169)	(0.168)	(0.226)	(0.216)	(0.167)	(0.256)	(0.171)	(0.128)	(0.168)	(0.069)	(0.132)	(0.267)

Table 6
Shipping costs and weight-to-value portfolios - Evidence from European stock markets

This table presents excess returns (α) over a five-factor Fama-French model of either shipping costs portfolios (Panel A) or weight-to-value portfolios (Panel B). Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. In any given month, stocks traded on European stock markets are sorted into respectively five shipping costs and five weight-to-value portfolios based on the same sorting of 4-digit SIC codes industries used in Table 5. Monthly returns and 4-digit SIC codes are both obtained from the EUROFIDAI database. As in Fama and French (2012), monthly returns are in U.S. dollars and monthly excess returns are returns in excess of the one-month U.S. Treasury bill rate. We include all stocks (2,601 unique stocks in manufacturing industries for which data on shipping costs is available) traded in the following 16 European countries: Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, Great Britain, Greece, Ireland, Italy, The Netherlands, Norway, Portugal and Sweden. This list of European countries is the one studied in Fama and French (2012) and used to compute the five factors for Europe (the market portfolio minus the risk-free rate, the size factor, the value factor, the profitability factor, and the investment factor), all available on Kenneth French's website from July 1990. Portfolios returns are either equally-weighted (Columns 1 to 6) or value-weighted (Columns 7 to 12). Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1990-2015.

Panel A: Shipping cost portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
α	8.293***	1.604	1.673	-1.024	-1.706	-9.999***	7.512***	3.168	1.117	-1.839	-2.410	-9.922***
	(2.698)	(2.726)	(1.968)	(1.478)	(1.111)	(2.906)	(2.006)	(3.425)	(3.141)	(2.577)	(1.553)	(2.800)
β^{MKT}	0.960***	1.101***	1.015***	1.040***	0.967***	0.008	0.769***	1.093***	1.101***	1.024***	1.035***	0.266***
	(0.046)	(0.036)	(0.043)	(0.026)	(0.021)	(0.051)	(0.041)	(0.071)	(0.056)	(0.041)	(0.038)	(0.065)
β^{HML}	-0.312***	-0.018	-0.186	0.193**	0.345***	0.657***	-0.402***	-0.013	0.032	0.127	0.131	0.533***
	(0.116)	(0.115)	(0.117)	(0.091)	(0.057)	(0.142)	(0.082)	(0.214)	(0.217)	(0.086)	(0.103)	(0.131)
β^{SMB}	0.677***	0.791***	0.785***	0.815***	0.751***	0.074	-0.353***	0.052	0.194	0.159**	0.210***	0.563***
	(0.065)	(0.061)	(0.067)	(0.044)	(0.033)	(0.063)	(0.107)	(0.138)	(0.125)	(0.074)	(0.074)	(0.131)
β^{RMW}	-0.708***	-0.371**	-0.461***	-0.098	0.028	0.736***	-0.080	-0.421	-0.225	0.433***	0.348***	0.428***
	(0.146)	(0.168)	(0.159)	(0.098)	(0.049)	(0.152)	(0.130)	(0.267)	(0.196)	(0.142)	(0.121)	(0.159)
β^{CMA}	-0.263*	-0.262**	-0.110	-0.100	-0.106	0.158	0.127	-0.722***	-0.288	0.028	0.218	0.091
	(0.151)	(0.131)	(0.128)	(0.084)	(0.075)	(0.180)	(0.121)	(0.217)	(0.203)	(0.096)	(0.178)	(0.226)

Panel B: Weight-to-value portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
α	8.851***	3.965	0.892	0.584	-2.195**	-11.045***	4.804	14.953***	3.066	-0.351	-3.323**	-8.127**
	(2.999)	(2.552)	(2.075)	(1.382)	(1.051)	(3.291)	(2.989)	(3.834)	(2.651)	(2.598)	(1.494)	(3.687)
β^{MKT}	0.992***	1.064***	1.020***	1.004***	0.983***	-0.010	0.761***	1.066***	1.122***	1.099***	1.021***	0.260***
	(0.050)	(0.038)	(0.040)	(0.029)	(0.017)	(0.054)	(0.051)	(0.062)	(0.065)	(0.059)	(0.038)	(0.069)
β^{HML}	-0.325***	-0.194	-0.172	0.176***	0.369***	0.694***	-0.272***	-0.717***	-0.400**	0.556***	0.143	0.415***
	(0.117)	(0.119)	(0.106)	(0.064)	(0.065)	(0.143)	(0.093)	(0.215)	(0.158)	(0.125)	(0.098)	(0.117)
β^{SMB}	0.702***	0.706***	0.839***	0.781***	0.755***	0.054	-0.210***	-0.386**	0.150	0.076	0.189***	0.399***
	(0.079)	(0.080)	(0.063)	(0.048)	(0.027)	(0.075)	(0.078)	(0.173)	(0.108)	(0.105)	(0.069)	(0.105)
β^{RMW}	-0.736***	-0.488***	-0.461***	-0.098	0.037	0.773***	-0.104	-0.727**	-0.561***	0.386***	0.422***	0.526***
	(0.160)	(0.170)	(0.139)	(0.073)	(0.053)	(0.158)	(0.169)	(0.325)	(0.211)	(0.146)	(0.128)	(0.180)
β^{CMA}	-0.176	-0.426***	-0.178	-0.087	-0.100	0.076	0.486***	-0.768***	-0.168	-0.516***	0.263	-0.223
	(0.161)	(0.128)	(0.137)	(0.067)	(0.078)	(0.192)	(0.112)	(0.296)	(0.197)	(0.130)	(0.167)	(0.161)

Table 7

Shipping cost and weight-to-value portfolios - Returns, conditional on size and profitability

This table presents excess returns (α) over a five-factor Fama-French model of either shipping costs portfolios (Panel A) or weight-to-value portfolios (Panel B). Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. In any given month, stocks are independently sorted into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into three portfolios based on either their market capitalization (Size) in the previous month or based on their return on assets (ROA) in year t-2. Stocks at the intersection of the two sorts are grouped together to form portfolios based on shipping costs and either Size or ROA (Panel A), and based on weight-to-value and either Size or ROA (Panel B). We then regress a given portfolio's return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), the value factor (high minus low), the profitability factor (robust minus weak), and the investment factor (conservative minus aggressive) all obtained from Kenneth French's website. Portfolios returns are either equally-weighted (Columns 1 to 6) or value-weighted (Columns 7 to 12). Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Panel A, and 1990-2015 in Panel B.

Panel A: Shipping cost portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
	Size terciles						Size terciles					
T1	21.786***	14.168***	10.141***	6.705**	5.499*	-16.287***	14.993***	4.739*	1.734	1.341	-1.963	-16.955***
	(4.744)	(3.563)	(3.220)	(3.075)	(2.908)	(4.182)	(4.237)	(2.861)	(2.716)	(2.836)	(2.375)	(4.098)
T2	10.001***	1.928	1.029	-1.969	-6.132***	-16.133***	10.133***	2.069	0.927	-2.128	-5.773***	-15.906***
	(2.743)	(2.322)	(1.852)	(1.801)	(1.533)	(3.469)	(2.709)	(2.356)	(1.756)	(1.786)	(1.452)	(3.403)
T3	8.047***	1.626	1.516	-0.921	-3.350***	-11.397***	2.951**	1.981	1.749	-0.089	-1.024	-3.975**
	(2.068)	(1.329)	(1.703)	(1.334)	(1.252)	(2.837)	(1.446)	(1.557)	(1.742)	(1.590)	(1.241)	(1.999)
	ROA terciles						ROA terciles					
T1	24.675***	19.762***	15.728***	9.970**	7.381	-17.294***	17.237***	8.140*	7.092*	3.727	-0.506	-17.743***
	(7.015)	(5.370)	(4.763)	(3.967)	(4.519)	(5.746)	(6.300)	(4.363)	(4.050)	(3.445)	(3.703)	(5.573)
T2	11.258***	6.846*	2.410	-2.665	-4.631**	-15.889***	11.109***	6.392*	2.350	-3.819**	-4.813**	-15.923***
	(4.248)	(3.531)	(2.852)	(1.956)	(2.205)	(5.119)	(4.033)	(3.574)	(2.752)	(1.777)	(2.000)	(4.762)
T3	8.707***	4.753**	2.098	-2.515	-3.226*	-11.933***	4.421**	8.042***	0.037	-2.446	-0.055	-4.475
	(2.726)	(2.382)	(1.937)	(1.608)	(1.702)	(3.540)	(2.048)	(2.468)	(2.101)	(1.496)	(1.470)	(2.872)

Panel B: Weight-to-value portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
	Size terciles						Size terciles					
T1	15.765***	9.141***	6.200*	4.827	1.326	-14.439***	9.730***	0.229	7.451**	5.860*	-6.362**	-16.091***
	(3.620)	(3.287)	(3.347)	(2.962)	(3.681)	(4.502)	(2.340)	(2.564)	(3.103)	(3.337)	(2.793)	(4.091)
T2	10.889***	5.202***	4.795***	1.091	-1.315	-12.204***	6.912***	-1.911	-1.483	-2.875	-1.241	-8.153***
	(2.120)	(1.867)	(1.845)	(1.719)	(1.553)	(2.730)	(2.420)	(2.051)	(2.148)	(2.520)	(1.568)	(3.070)
T3	6.836***	5.416***	2.943*	0.385	-2.088*	-8.924***	1.170	4.376**	1.619	0.368	-0.979	-2.149
	(1.721)	(1.670)	(1.524)	(1.498)	(1.245)	(2.253)	(1.755)	(2.174)	(2.277)	(1.643)	(1.428)	(2.309)
	ROA terciles						ROA terciles					
T1	17.964***	13.889***	12.385***	5.400	6.477	-11.487**	9.244***	1.270	10.039**	-2.940	-0.098	-9.343**
	(5.236)	(5.289)	(4.727)	(3.895)	(4.879)	(5.773)	(2.784)	(3.501)	(4.055)	(5.090)	(3.431)	(4.517)
T2	12.345***	11.657***	6.739***	1.595	-0.781	-13.126***	8.064**	7.469**	1.309	-5.411**	0.056	-8.008*
	(2.561)	(2.205)	(2.403)	(2.036)	(2.380)	(3.380)	(3.159)	(3.414)	(2.571)	(2.466)	(2.045)	(4.142)
T3	7.480***	6.605***	4.808**	0.113	-2.006	-9.486***	2.812	8.624***	-0.206	-1.551	-1.561	-4.373
	(2.629)	(2.502)	(2.246)	(1.808)	(1.511)	(3.118)	(2.222)	(2.946)	(2.553)	(1.690)	(1.810)	(3.403)

Table 8
Chinese Import Growth Betas - conditional on size and profitability

This table presents Chinese import growth betas of each shipping costs portfolios (Columns 1 to 6) and weight-to-value portfolios (Columns 7 to 12). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. In any given month, stocks are independently sorted into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into three portfolios based on either their market capitalization (Size) in the previous month or based on their return on assets (ROA) in year t-2. Stocks at the intersection of the two sorts are grouped together to form portfolios based on shipping costs and either Size or ROA (Columns 1 to 6), and based on weight-to-value and either Size or ROA (Columns 7 to 12). We then compute Chinese import growth betas separately for each (double-sorted) portfolio as the coefficient β of the following OLS regression estimated at the monthly frequency over the sample period: $R^e_{J,t} = \beta_J \cdot \text{ChImpGr}_t + \alpha_J + u_t$, where R^{EW}_t is the equally-weighted portfolio excess return in month t and ChImpGr_t is the growth rate of Chinese imports to the U.S. between month t and the same month in the previous year. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1974-2015 in Columns 1 to 6, and 1989-2015 in Columns 7 to 12.

Chinese (Univariate) Import Growth Betas

	Shipping cost portfolios						Weight-to-value portfolios					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
All	-0.677**	-0.467	-0.425	-0.270	-0.265	0.376*	-0.737*	-0.353	-0.373	-0.257	-0.224	0.406
	(0.333)	(0.308)	(0.280)	(0.254)	(0.218)	(0.219)	(0.439)	(0.405)	(0.382)	(0.294)	(0.276)	(0.301)
	Size terciles						Size terciles					
T1	-0.840**	-0.729**	-0.634**	-0.365	-0.510*	0.370	-0.960*	-0.516	-0.445	-0.276	-0.491	0.544
	(0.403)	(0.367)	(0.314)	(0.300)	(0.282)	(0.259)	(0.532)	(0.488)	(0.427)	(0.365)	(0.376)	(0.346)
T2	-0.628*	-0.468	-0.352	-0.247	-0.346	0.283	-0.703	-0.291	-0.388	-0.249	-0.333	0.301
	(0.366)	(0.329)	(0.301)	(0.278)	(0.241)	(0.256)	(0.475)	(0.426)	(0.412)	(0.321)	(0.307)	(0.356)
T3	-0.467	-0.203	-0.235	-0.225	-0.116	0.353	-0.424	-0.313	-0.285	-0.202	-0.137	0.277
	(0.296)	(0.290)	(0.269)	(0.243)	(0.208)	(0.219)	(0.391)	(0.375)	(0.373)	(0.274)	(0.264)	(0.297)
	ROA terciles						ROA terciles					
T1	-0.806**	-0.644*	-0.743**	-0.337	-0.249	0.539*	-0.938*	-0.598	-0.612	-0.408	-0.166	0.688*
	(0.395)	(0.387)	(0.349)	(0.337)	(0.309)	(0.280)	(0.513)	(0.509)	(0.462)	(0.419)	(0.390)	(0.358)
T2	-0.499*	-0.303	-0.186	-0.253	-0.264	0.181	-0.480	-0.073	-0.231	-0.105	-0.303	0.091
	(0.289)	(0.274)	(0.247)	(0.247)	(0.225)	(0.215)	(0.393)	(0.349)	(0.344)	(0.293)	(0.291)	(0.297)
T3	-0.436*	-0.288	-0.381	-0.219	-0.234	0.235	-0.433	-0.193	-0.380	-0.256	-0.219	0.220
	(0.244)	(0.261)	(0.238)	(0.231)	(0.197)	(0.165)	(0.324)	(0.343)	(0.325)	(0.260)	(0.244)	(0.220)

Table 9

Shipping cost and and weight-to-value portfolios - Returns, conditional on US trade elasticities (σ)

This table presents equally-weighted excess returns (α) over a five-factor Fama-French model of either shipping costs portfolios (Panel A) or weight-to-value portfolios (Panel B). Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. In any given month, stocks are independently sorted into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into two portfolios based on their industry US trade elasticities (σ). US trade elasticities are estimated by Broda and Weinstein (2006) from 1990 to 2001 at the commodity level, and aggregated at the four-digit SIC based on total imports over 1990-2001. Stocks at the intersection of the two sorts are grouped together to form portfolios based on either shipping costs (Panel A), or weight-to-value (Panel B) and US trade elasticities. We then regress a given portfolio's return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), and the value factor (high minus low), all obtained from Kenneth French's website. Portfolios returns are either equally-weighted (Columns 1 to 6) or value-weighted (Columns 7 to 12). Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Columns 1 to 6, and 1990-2015 in Columns 7 to 12.

	Panel A: Shipping costs portfolios											
	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
Low σ industries	3.523	8.671***	6.535***	0.308	-0.841	-4.365*	-4.146**	2.222	1.780	-0.997	-2.469**	1.677
	(2.746)	(2.951)	(1.847)	(1.766)	(1.504)	(2.582)	(1.983)	(2.032)	(1.533)	(1.632)	(1.158)	(1.926)
High σ industries	13.374***	5.418**	4.421*	3.651*	-2.372	-15.746***	5.750***	3.312	2.120	0.897	-2.401	-8.151***
	(3.282)	(2.218)	(2.425)	(2.104)	(2.231)	(4.284)	(1.829)	(2.078)	(2.203)	(2.286)	(2.383)	(2.941)
	Panel B: Weight-to-value portfolios											
	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
Low σ industries	2.616	12.924***	6.309**	0.339	-0.160	-2.776	-1.543	7.324**	0.647	-2.584	-2.091	-0.549
	(4.238)	(3.821)	(2.791)	(1.932)	(2.320)	(3.720)	(2.643)	(3.090)	(2.682)	(2.122)	(1.270)	(2.703)
High σ industries	16.271***	10.647***	7.877**	3.726	-0.903	-17.174***	5.806**	8.217***	1.062	-3.108	1.001	-4.806
	(4.622)	(4.099)	(3.428)	(3.048)	(2.806)	(5.843)	(2.618)	(2.783)	(2.437)	(2.757)	(2.232)	(3.825)

Table 10
Shipping cost and and weight-to-value portfolios - Returns, conditional on Pareto parameter (γ)

This table presents equally-weighted excess returns (α) over a five-factor Fama-French model of either shipping costs portfolios (Panel A) or weight-to-value portfolios (Panel B). Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. In any given month, stocks are independently sorted into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into two portfolios based on their industry Pareto tail parameter (γ) in the previous year. We estimate the Pareto parameter separately for each industry-year as the estimated coefficient γ of the following OLS regression: $ln(SIZE) = -\gamma ln(Rank) + constant$, where for each year and 4-digit industries, firms are ranked in descending order according to their total firm market value (Compustat item CSHO $\times$ PRCC_F+AT-CEQ). Stocks at the intersection of the two sorts are grouped together to form portfolios based on either shipping costs (Columns 1 to 6), or weight-to-value (Columns 7 to 12) and the Pareto tail parameter. We then regress a given portfolio's return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), and the value factor (high minus low), all obtained from Kenneth French's website. Portfolios returns are either equally-weighted (Columns 1 to 6) or value-weighted (Columns 7 to 12). Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Columns 1 to 6, and 1990-2015 in Columns 7 to 12.

Panel A: Shipping costs portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
Low γ industries T1	10.135***	6.338***	5.371**	-0.985	-0.027	-10.162***	2.157	2.130	2.738	-2.379	-0.250	-2.407
	(2.372)	(2.077)	(2.339)	(1.759)	(1.418)	(2.791)	(1.424)	(2.075)	(2.263)	(1.773)	(1.383)	(1.965)
High γ industries	16.076***	6.483**	4.130*	2.796	-2.944	-19.020***	10.366***	0.986	-0.934	-0.318	-4.129**	-14.495***
	(3.668)	(2.517)	(2.169)	(2.002)	(1.934)	(4.420)	(3.266)	(2.168)	(1.613)	(1.697)	(1.674)	(4.257)

Panel B: Weight-to-value portfolios

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
Low γ industries	12.762***	9.882***	7.319**	1.395	-0.124	-12.886***	3.869*	11.151***	-0.775	-2.215	0.784	-3.085
	(3.385)	(3.387)	(3.006)	(2.191)	(1.957)	(3.806)	(2.201)	(3.237)	(3.001)	(1.780)	(1.539)	(3.014)
High γ industries	17.242***	11.774***	7.760**	1.143	-1.602	-18.844***	11.919***	4.560	2.052	-4.895**	-2.553	-14.471***
	(5.392)	(3.861)	(3.110)	(2.386)	(2.558)	(5.832)	(3.347)	(2.791)	(2.345)	(1.995)	(2.085)	(4.783)

Table 11
Calibrated parameters

This table presents values of the parameters for our model of international trade with asset pricing. Dynamic parameters are calibrated at a quarterly frequency. We also report whether the parameters are predetermined from the literature or our own estimates or calibrated to match specific moments of the data. Sources for aggregate quantities for China and the USA are from the world bank (data.worldbank.org/indicator). We use quantities as of 2015 to be conservative.

Parameter	Symbol	Value	Source
Preferences (dynamic):			
Subjective Discount rate	β	0.99	Bansal and Yaron (2004)
Elasticity of intertemporal substitution	ψ	1.5	Bansal and Yaron (2004), Ghironi and Melitz (2005)
Relative risk aversion	ν	20	
Industry Organization:			
Manufacturing expenditure shares	$a_0, a_0^\star$	0.1 - 0.9	
Elasticity of consumer demand	σ_J	3.8	Broda and Weinstein (2006), Ghironi and Melitz (2005)
Industry preferences	η_J	0.5	
Elasticity across industries	θ	1.2	Ghironi and Melitz (2005)
Pareto tail parameter	γ_J	3.4	Ghironi and Melitz (2005)
Production Technology:			
Labor supply	$L, L^\star$	1 - 3	Ratio of working age population (China to USA)
Mass of firms in each industry	M_J	1	Average import penetration
	$M_J^\star$	30 - 15	
Trade:			
Iceberg costs	τ_J	1 - 1.5	Ghironi and Melitz (2005)
Exporting fixed costs	$f_J, f_J^\star$	$5 - 3 \cdot 10^{-5}$	Fraction of exporters
Aggregate Fluctuations:			
Domestic productivity process	μ_A	7	Ratio of GDP per capita (USA to China)
	σ_A	1.6%	USA GDP
	ρ_A	0.976	USA GDP
Foreign productivity process	$\mu_{A^\star}$	1	
	$\sigma_{A^\star}$	6%	China Import to the USA
	$\rho_{A^\star}$	0.961	China Import to the USA

Table 12
Model Simulation: Key Moment Conditions

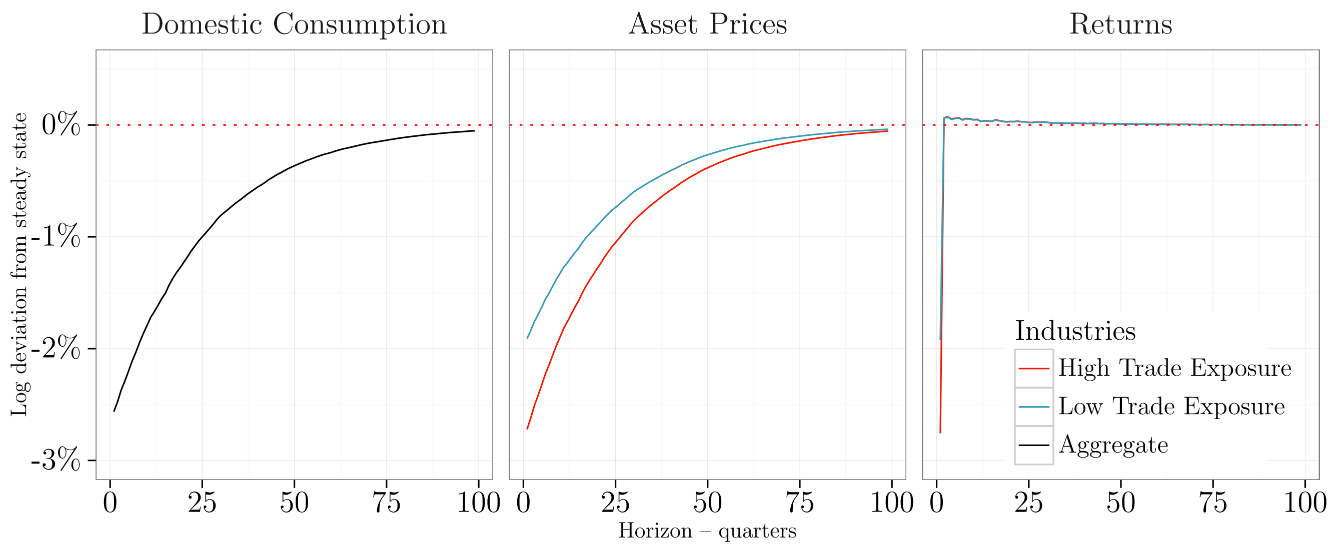
We report the main moments of key quantities of our model. Average and standard deviation and the response to either foreign or domestic shock $(\varepsilon_A, \varepsilon_A^\star)$. The model is simulated for one million periods under the shock processes described in the calibration table 11. Italic values are derived from our own empirical estimates in the actual data.

Quantities by Sectors				
	High exposure industry		Low exposure industry	
Import Penetration ($\mathcal{I}_J$)				
Average	24.5%	*(25%)*	12%	*(11%)*
Std. deviation	12%	*(11%)*	3.5%	*(4%)*
Cov($A^\star, \cdot$)	0.52	*(0.66)*	0.13	*(-0.11)*
Cov($A, \cdot$)	-1.15		-0.35	
Domestic Profits ($\pi_{D,J}$)				
Cov($A^\star, \cdot$)	-1.00		-0.49	
Cov($A, \cdot$)	2.3		1.1	
Fraction of Exporters (ζ_J)				
Average	6%	*[5% - 30%]*	4.5%	*[5% - 30%]*
Aggregate Quantities				
	Aggregate Consumption (C_t)		Risk-free rate (annualized)	
Average	-		3.3%	*(4.9%)*
Std. deviation	7%	*(2%)*	0.6%	*(3.2%)*
Cov($A^\star, \cdot$)	-0.31		-5.5	
Cov($A, \cdot$)	0.78		2.0	
Average Excess Returns				
	High exposure industry		Low exposure industry	
Domestic Firms				
Average excess returns	1.29%	*(19.6%)*	0.92%	*(11.5%)*
Std. deviation	11%	*(10%)*	8%	*(7%)*
Cov($\varepsilon_{A^\star}, \cdot$)	-5.07	*(-1.013)*	-3.6	*(-0.524)*
Cov($\varepsilon_A, \cdot$)	0.25		0.16	
Average Exporters				
Average excess returns	0.94%	*(19.6%)*	0.76%	*(11.5%)*
Std. deviation	8.1%		6.5%	
Cov($\varepsilon_{A^\star}, \cdot$)	-3.6	*(-0.05)*	-2.86	*(-0.326)*
Cov($\varepsilon_A, \cdot$)	0.105		0.06	

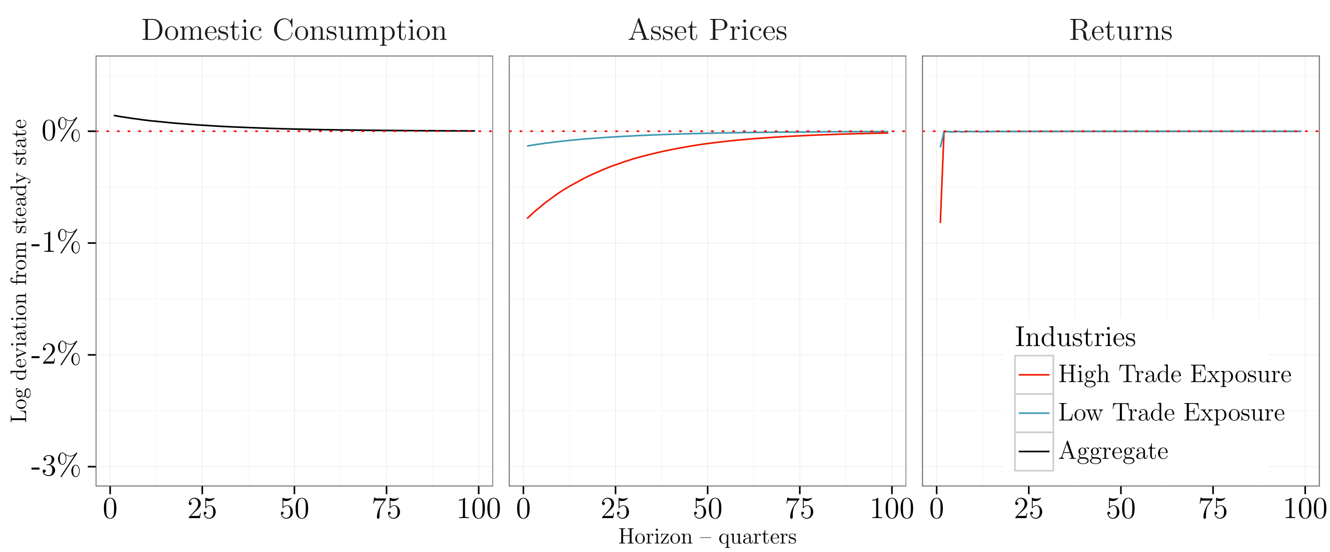
Figure 1

Impulse Response: Shock to $A^{\star}$ with and without risk-sharing

(a) IRF in financial autarky (no risk-sharing)



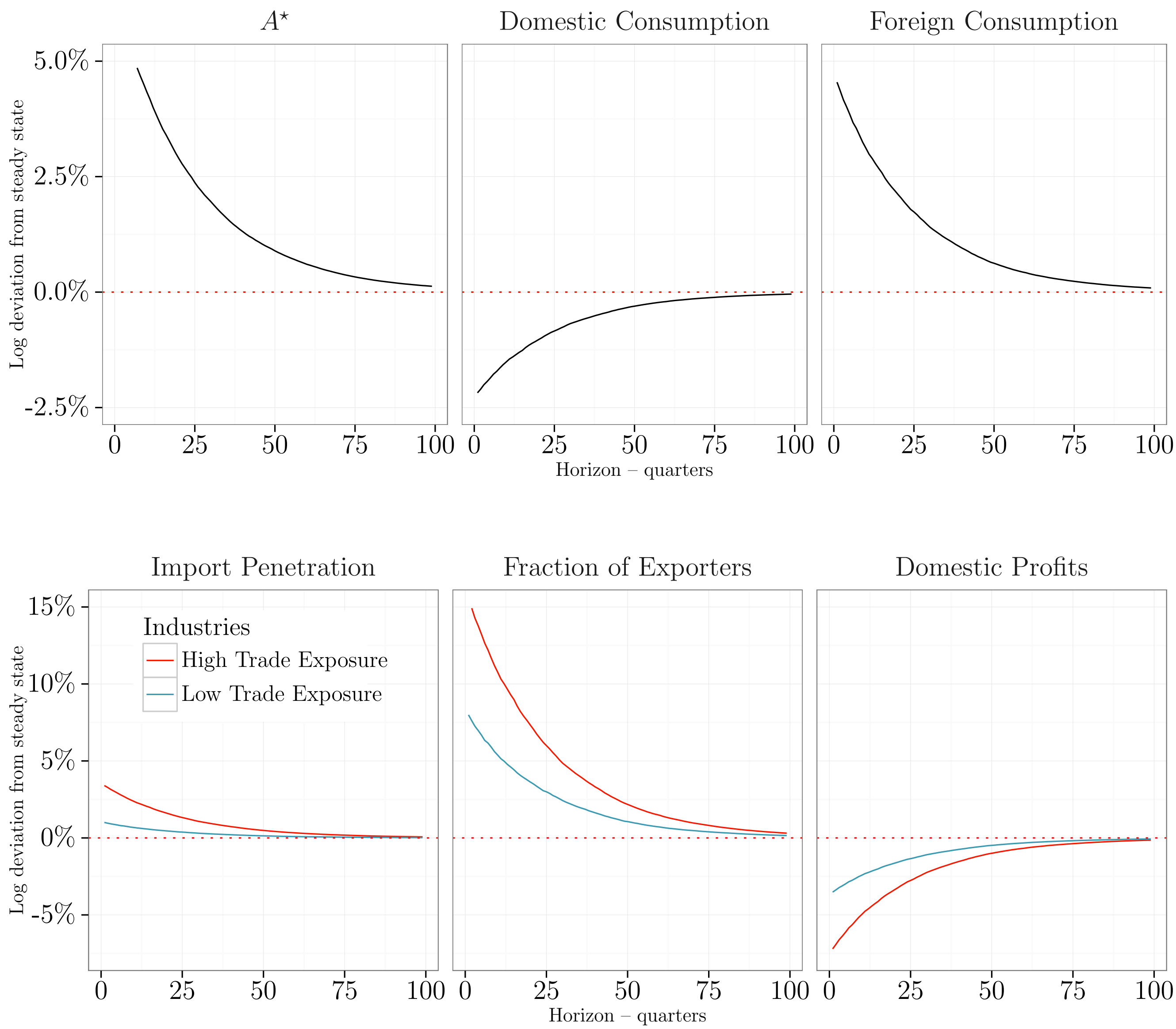
(b) IRF with perfect risk-sharing



We plot the Impulse Response Function to a shock $\varepsilon^{A^{\star}}$ from 500 model simulations. Quantities are log-deviation from their non-stochastic steady-state values. Domestic consumption and foreign consumption are C_t and $C_t^{\star}$ in the model, respectively. Import penetration is $\mathcal{I}_J$, the fraction of exporters is ζ_J and domestic profits is $\pi_{D,J}$. Red lines correspond to industries with low trade costs that are more exposed to foreign competition. Blue lines are industries with higher trade costs.

Figure 2

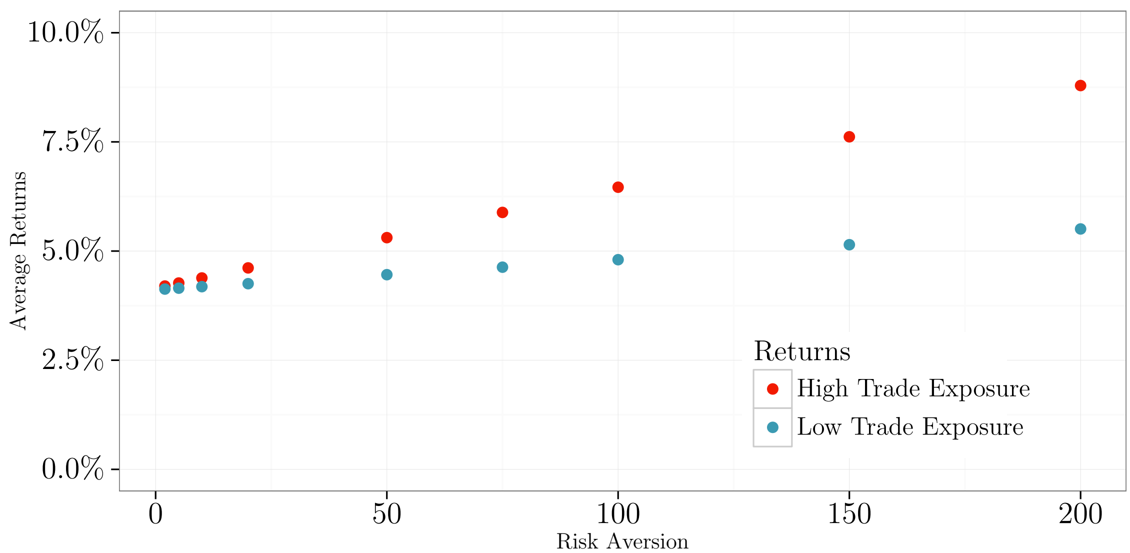
Impulse Response: Shock to $A^{\star}$



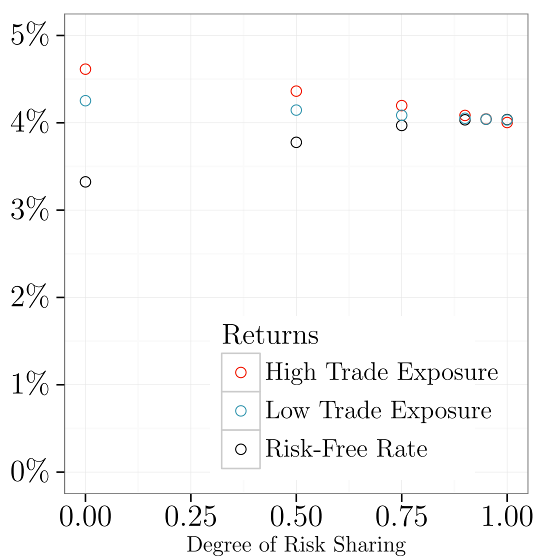
We plot the Impulse Response Function to a shock $\varepsilon^{A^{\star}}$ from 500 model simulations. Quantities are log-deviation from their non-stochastic steady-state values. Domestic consumption and foreign consumption are C_t and $C_t^{\star}$ in the model, respectively. Import penetration is $\mathcal{I}_J$, the fraction of exporters is ζ_J and domestic profits is $\pi_{D,J}$. Red lines correspond to industries with low trade costs that are more exposed to foreign competition. Blue lines are industries with higher trade costs.

Figure 3
Sensitivity Analysis

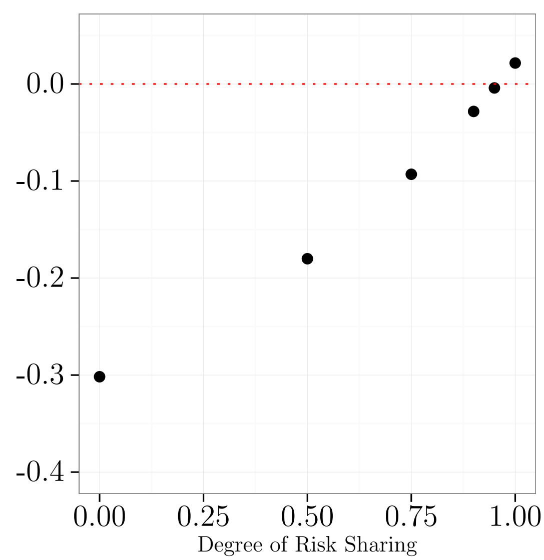
(a) Risk Premium and Risk Aversion



(b) Risk Premium and Risk Sharing



(c) Consumption Response and Risk Sharing



In panel 3a we simulate the model for one million of periods and estimate average returns for different values of the risk aversion coefficient. We leave all the other parameters unchanged (even the IES). In panel 3b we repeat these simulations for different value of the risk sharing parameter α between zero and one. We include the risk-free rate to illustrate how returns exposed to trade act as a hedge with sufficient risk sharing. Finally, from these simulations we also represent the elasticity of consumption to shocks to foreign productivity $A^{\star}$.

Online Appendix

The Globalization Risk Premium

This Online Appendix includes the full derivation of the model and details about the calibration (Appendix A), as well as a series of robustness tables (Appendix B).

A Model

A.1 Model Derivation

A.1.1 Static Demand

We proceed in three steps due to the structure of the demand system. First we derive respective demand for differentiated good sectors and the homogeneous good sector. The upper-tier optimization program for consumers is

$$\max_{C_T, c_0} c_0^{1-a_0} \cdot C_T^{a_0}, \quad \text{s.t.} \quad P_T C_T + p_0 c_0 \le Y,$$

where C_T is the consumption index aggregated from consumption in the $\mathcal{J}$ industries, P_T the price index for this aggregator, p_0 the price of the homogeneous good is p_0 and Y is the total income of consumers. From first order conditions we derive demand for each type of goods and the aggregate price index P:

$$\begin{aligned} P &= \left(\frac{P_T}{a_0}\right)^{a_0} \left(\frac{p_0}{1-a_0}\right)^{1-a_0}, \qquad (A.1) \\ c_0 &= (1-a_0)\frac{PC}{p_0}, \\ C_T &= a_0 \frac{PC}{P_T}. \end{aligned}$$

The second tier of optimization decides allocation across the $\mathcal{J}$ industries. The aggregation over industry consumption index is constant elasticity of substitution with elasticity θ. The optimization problem:

$$\max_{\{C_J\}} \left(\sum_J \eta_J^{\frac{1}{\theta}} C_J^{\frac{\theta-1}{\theta}}\right)^{\frac{\theta}{\theta-1}} \quad \text{s.t} \quad \sum_J P_J C_J \le P_T C_T,$$

where the industry price levels are $\{P_J\}$, and $\{\eta_J\}$ are industry taste parameters. The optimal allocations are:

$$C_J = \eta_J \left(\frac{P_J}{P_T}\right)^{-\theta} \cdot C_T.$$

The price index for manufacturing, aggregated, is:

$$P_T = \left[\sum_J \eta_J P_J^{1-\theta}\right]^{\frac{1}{1-\theta}}. \qquad (A.2)$$

Finally we derive the variety level demand given consumption in each sector, $c_J(\omega)$. The problem at the sectoral level in industry J is:

$$\max_{c_J(\omega)} \left[\int_{\Omega_J} c_J(\omega)^{\frac{\sigma_J-1}{\sigma_J}} d\omega\right]^{\frac{\sigma_J}{\sigma_J-1}} \quad \text{s.t.} \quad \int_{\Omega_J} p_J(\omega) c_J(\omega) d\omega \le P_J C_J.$$

From first order conditions, we derive the industry price index and the individual variety demand:

$$P_J = \left[\int_{\Omega_J} p_J(\omega)^{1-\sigma_J} d\omega\right]^{\frac{1}{1-\sigma_J}},$$
$$c_J(\omega) = \left(\frac{p_J(\omega)}{P_J}\right)^{-\sigma_J} \cdot C_J.$$

A.1.2 Dynamic Demand

We extend the intertemporal preferences from the main body of the paper to allow for a separation of the intertemporal elasticity of substitution (IES) and the coefficient of relative risk aversion (CRRA). We use preferences of the Epstein and Zin (1989) type. The representative household maximizes her continuation utility J_t over sequences of the consumption index C_t:

$$J_t = \left[(1-\beta)C_t^{1-\psi} + \beta \left(\mathsf{R}_t(J_{t+1})\right)^{1-\psi}\right]^{\frac{1}{1-\psi}}$$

where β is the time-preference parameter and ψ is the inverse of the elasticity of inter-temporal substitution (EIS). $\mathsf{R}_t(J_{t+1}) = [\mathbf{E}_t\{J_{t+1}^{1-\nu}\}]^{1/(1-\nu)}$ is the risk-adjusted continuation utility, where ν is the coefficient of relative risk aversion. I use Epstein and Zin (1989) preferences to disentangle the risk characteristics of households across states, and across time.

A.1.3 Supply

Sector 0 — We assume sector 0 produces an homogenous good with linear technology in labor and unit productivity. This sector is perfectly competitive such that it sets prices at marginal cost and we have $p_0 = w$. In each country we take this good as the numeraire such that we have $p_0 = w = 1$. Moreover since all firms in sector 0 are competitive there are no revenues to be redistributed from the sector.

Other sectors — Firms in the other sectors are operating in a monopolistic competition setting and set their prices at a markup over marginal cost. Firms face isoelastic demand curves in each industry, with elasticity σ_J, hence they set their prices $p_J(\varphi)$, at a markup $\sigma_J/(\sigma_J - 1)$ over their marginal costs. In that case we write both prices on the domestic and export market as:

$$p_J(\varphi) = \frac{\sigma_J}{\sigma_J - 1} \cdot \frac{1}{A\varphi}$$
$$p_{X,J}(\varphi) = \tau_J \cdot p_J(\varphi),$$

In what follows we will write markups as $\mu_J = \sigma_J/(\sigma_J - 1)$. Firm profits also depend on their status as an exporter. If productivity is too low, a firm might not find it optimal to export and pay the flow fixed costs f_J. Firm profit is increasing in their idiosyncratic productivity, hence there exists a productivity cutoff in each industry under which a firm decides not to export: $\varphi_{X,J} = \min_\varphi\{\varphi | \varphi \text{ is an exporter}\}$. In that case real profits at the firm level are:

$$
\begin{aligned}
\pi_{D,J}(\varphi) &= \frac{p_J(\varphi)}{\sigma_J} \cdot \left(\frac{p_J(\varphi)}{P_J}\right)^{-\sigma_J} \cdot \left(\frac{P_J}{P_T}\right)^{-\theta} \cdot \left(\frac{P_T}{P}\right)^{-1} \cdot \eta_J a_0 \cdot C \\
&= \frac{p_J(\varphi)}{\sigma_J} \cdot \left(\frac{p_J(\varphi)}{P_J}\right)^{-\sigma_J} \cdot C_J, \\
\pi_{X,J}(\varphi) &= \frac{p_{X,J}(\varphi)}{\sigma_J} \cdot \left(\frac{p_{X,J}(\varphi)}{P_J^\star}\right)^{-\sigma_J} \cdot \left(\frac{P_J^\star}{P_T^\star}\right)^{-\theta} \cdot \left(\frac{P_T^\star}{P^\star}\right)^{-1} \cdot \eta_J^\star a_0^\star \cdot C^\star - \frac{f_J}{A} \\
&= \frac{p_{X,J}(\varphi)}{\sigma_J} \cdot \left(\frac{p_{X,J}(\varphi)}{P_J^\star}\right)^{-\sigma_J} \cdot C_J^\star - \frac{f_J}{A},
\end{aligned}
$$

where P_J is the industry price index for the composite good in industry J consumed in the domestic country. To find the industry price index we need to determine the mass of firms from the foreign country exporting in industry J: $M_{X,J}^\star$. Given the productivity cutoff for exporters from the foreign country, $\varphi_{X,J}^\star$, the fraction of exporters, denoted $\zeta_J^\star$ is simply:

$$
\zeta_J^\star := \Pr\{\tilde{\varphi} > \varphi_{X,J}^\star\} = \left(\frac{\varphi_{X,J}^\star}{\underline{\varphi}_J^\star}\right)^{-\gamma_J}
$$

Now the price index in industry J reflects the effect of an increase in competition from the foreign country leading to lower industry level prices:

$$
P_J = \left(M_J \int_{\Omega_{D,J}} p_J(\varphi)^{1-\sigma_J} \mathrm{d}\varphi + (\zeta_J^\star M_J^\star) \int_{\Omega_{X,J}^\star} p_{X,J}^\star(\varphi)^{1-\sigma_J} \mathrm{d}\varphi\right)^{\frac{1}{1-\sigma_J}},
$$

where $\Omega_{D,J}$ is the set of firms producing in the domestic economy, that is $[\underline{\varphi}_J, +\infty[$ for the domestic case; and $\Omega_{X,J}^\star$ is the set of firms from the foreign country exporting to the domestic country in industry J, that is in our case: $[\varphi_{X,J}^\star, +\infty[$. Given the exporters' profits, we derive the productivity cutoffs for exporters defined by: $\varphi_{X,J} = \min\{\varphi | \pi_{X,J}(\varphi) > 0\}$. We have the following expression for the cutoff in the domestic country (the foreign country cutoffs are symmetric):

$$
(\varphi_{X,J})^{\sigma_J - 1} = f_J \sigma_J \left(\tau_J \frac{\sigma_J}{\sigma_J - 1}\right)^{\sigma_J - 1} \cdot A^{-\sigma_J} \cdot (P_J^\star)^{-\sigma_J} (C_J^\star)^{-1} \tag{A.3}
$$

$$
(\varphi_{X,J}^\star)^{\sigma_J - 1} = f_J^\star \sigma_J \left(\tau_J^\star \frac{\sigma_J}{\sigma_J - 1}\right)^{\sigma_J - 1} \cdot (A^\star)^{-\sigma_J} \cdot P_J^{-\sigma_J} C_J^{-1} \tag{A.4}
$$

Aggregation of Supply — As in Melitz (2003), instead of keeping track of the distribution of production and prices, it is sufficient to focus on two average producers, first for the whole domestic market $\bar{\varphi}_J$ and second restricted to exporting firms $\bar{\varphi}_{X,J}$. These quantities are sufficient to define the equilibrium of Section 3.2:

$$\bar{\varphi}_J := \left[\int_{\underline{\varphi}_J}^{\infty} \varphi^{\sigma_J - 1} \mathrm{d}G_J(\varphi)\right]^{\frac{1}{\sigma_J - 1}} = \nu_J \cdot \underline{\varphi}_J$$

$$\bar{\varphi}_{X,J} := \left[\int_{\varphi_{X,J}}^{\infty} \varphi^{\sigma_J - 1} \mathrm{d}G_J(\varphi)\right]^{\frac{1}{\sigma_J - 1}} = \nu_J \cdot \varphi_{X,J},$$

where ν_J, given by $\nu_J = \left(\frac{\gamma_J}{\gamma_J - (\sigma_J - 1)}\right)^{\frac{1}{\sigma_J - 1}}$, depends solely on the elasticity of substitution, σ and the tail parameter of the distribution, γ.

Hence average profits for domestic firms in industry J are: $\langle \pi_{D,J} \rangle = \pi_{D,J}(\bar{\varphi}_J)$, and for exporters $\langle \pi_{X,J} \rangle = \pi_{X,J}(\bar{\varphi}_{X,J})$. Given the average profits, total profits for each industry are:

$$\Pi_J = M_J \cdot \langle \pi_J \rangle := M_J \left[\pi_{D,J}(\bar{\varphi}_J) + \zeta_J \pi_{X,J}(\bar{\varphi}_{X,J})\right] \tag{A.5}$$

Aggregation allows us to simplify the expression for industry price index P_J:

$$\begin{aligned} P_J &= \left(M_J \cdot p_J(\bar{\varphi}_J)^{1-\sigma_J} + \zeta_J^{\star} M_J^{\star} \cdot p_{X,J}^{\star}(\bar{\varphi}_{X,J})^{1-\sigma_J}\right)^{\frac{1}{1-\sigma_J}} \\ &= \left(M_J \cdot \left(\frac{\mu_J}{A \bar{\varphi}_J}\right)^{1-\sigma_J} + \zeta_J^{\star} M_J^{\star} \cdot \left(\frac{\mu_J \tau_J^{\star}}{A^{\star} \bar{\varphi}_{X,J}}\right)^{1-\sigma_J}\right)^{\frac{1}{1-\sigma_J}} \end{aligned}$$

A.1.4 Equilibrium

Given the aggregation properties of the model, we rewrite the aggregate budget constraint. The representative household holds all domestic firms in equilibrium and receives dividends from these holdings:

$$PC \leq L + \sum_J \Pi_J + \alpha \left(\frac{M_J}{M_J + M_J^{\star}} \Pi_J^{\star} - \frac{M_J^{\star}}{M_J + M_J^{\star}} \Pi_J\right),$$

where $0 < \alpha < 1$ controls the level of risk sharing across countries in the economy.

A.2 Elasticities

A.2.1 Notation

We define some constants that are useful in developing some of the proofs. First we define import penetration as:

$$\mathcal{I}_J = \frac{M_J^{\star} \zeta_J^{\star}\, p_{X,J}^{\star}(\bar{\varphi}_{X,J}^{\star})}{P_J^{1-\sigma_J}}$$

It represents the marginal impact of foreign firms on the domestic price index for a given industry. Given our definition of Γ_J, import penetration is bounded: $\mathcal{I}_J \in [0, 1]$.

The operating leverage of exporters is due to the probability of losing their status after an adverse productivity shock; we define:

$$\ell_J(\varphi) = \frac{1}{\left(\frac{\varphi}{\varphi_{X,J}}\right)^{\sigma_J - 1} - 1}$$

A.2.2 Derivations

We write with the convention that the elasticities of variable X with respect to domestic shock and foreign shock are $\mathcal{E}(X)$ and $\mathcal{E}^\star(X)$ respectively.

Aggregate Price indices, P and P_T — The effect of competition are transmitted through changes in the price index P_J. First we look at the changes in the aggregate price indices. Recall formula A.2, we derive the elasticity for a change in dummy variable x as:

$$\mathcal{E}_x(P_T) = \frac{\partial \log P_T}{\partial \log x} = \sum_J \eta_J \left(\frac{P_T}{P_J}\right)^{\theta - 1} \mathcal{E}_x(P_J)$$

We derive a similar formula for the aggregate price index (from equation A.1):

$$\mathcal{E}_x(P) = \frac{\partial \log P}{\partial \log x} = a_0 \mathcal{E}_x(P_T).$$

Manufacturing Consumption — We start with the more manufacturing index, C_T:

$$\mathcal{E}(C_T) = (1 - a_0)\left(-\mathcal{E}(P_T)\right) + \mathcal{E}(C) = \left(a_0^{-1} - 1\right)\left(-\mathcal{E}(P)\right) + \mathcal{E}(C),$$
$$\mathcal{E}^\star(C_T) = (1 - a_0)\left(-\mathcal{E}^\star(P_T)\right) + \mathcal{E}^\star(C) = \left(a_0^{-1} - 1\right)\left(-\mathcal{E}^\star(P)\right) + \mathcal{E}^\star(C).$$

Moving on to the industry index, C_J:

$$\mathcal{E}(C_J) = \theta\left(\mathcal{E}(P_T) - \mathcal{E}(P_J)\right) + (1 - a_0)\left(-\mathcal{E}(P_T)\right) + \mathcal{E}(C),$$
$$\mathcal{E}^\star(C_J) = \theta\left(\mathcal{E}^\star(P_T) - \mathcal{E}^\star(P_J)\right) + (1 - a_0)\left(-\mathcal{E}^\star(P_T)\right) + \mathcal{E}^\star(C) \tag{A.6}$$

And finally the variety demand:

$$\mathcal{E}\left(c_J(\varphi)\right) = \sigma_J\left(1 + \mathcal{E}(P_J)\right) + \mathcal{E}(C_J),$$
$$\mathcal{E}^\star\left(c_J(\varphi)\right) = \sigma_J \mathcal{E}^\star(P_J) + \mathcal{E}^\star(C_J).$$

Productivity Cutoff — Using the definition of $\varphi_{X,J}$ from the zero-profit cutoff condition, $\pi_{X,J} = 0$ (see equations A.3-A.4), we have

$$\varphi_{X,J} = (f_J \sigma_J)^{\frac{1}{\sigma_J - 1}} \left(\tau_J \frac{\sigma_J}{\sigma_J - 1}\right)^{-1} \cdot (A P_J^\star)^{-\frac{\sigma_J}{\sigma_J - 1}} (C_J^\star)^{-\frac{1}{\sigma_J - 1}}$$
$$\propto (A P_J^\star)^{-\frac{\sigma_J}{\sigma_J - 1}} (C_J^\star)^{-\frac{1}{\sigma_J - 1}}.$$

where the coefficient of proportionality does not depend on A or $A^\star$.

We derive the foreign shock elasticity of the cutoff:

$$\mathcal{E}^\star(\varphi_{X,J}) = \frac{\sigma_J}{\sigma_J - 1}\left(-\mathcal{E}^\star(P_J^\star)\right) - \frac{1}{\sigma_J - 1}\mathcal{E}^\star(C_J^\star), \tag{A.7}$$

where the first term increases the cutoff due to an increase in competition, and the second lowers it due to an increase in demand. Now the domestic elasticity cutoff:

$$\mathcal{E}(\varphi_{X,J}) = -\frac{\sigma_J}{\sigma_J - 1}\left(1 + \mathcal{E}(P_J^\star)\right) - \frac{1}{\sigma_J - 1}\mathcal{E}(C_J^\star), \tag{A.8}$$

where the first term lowers the cutoff due to productivity gains in the domestic sector, dampened by an increase in competition and the second term comes from an increase in demand. And finally the foreign cutoff:

$$\mathcal{E}^\star(\varphi_{X,J}^\star) = -\frac{\sigma_J}{\sigma_J - 1}\left(1 - \mathcal{E}^\star(P_J)\right) - \frac{1}{\sigma_J - 1}\mathcal{E}^\star(C_J), \tag{A.9}$$

Given the distribution of cutoff and the definition for the fraction of firms exporting ζ_J, we directly write the elasticity:

$$\mathcal{E}(\zeta_J) = \frac{\partial \log \zeta_J}{\partial \log A} = -\gamma_J \cdot \mathcal{E}(\varphi_J^{\mathcal{X}}) \tag{A.10}$$

Industry Prices — Most of the price effects go through industry prices, that reflect the competitiveness of an industry. Both elasticities to a country's own productivity or to foreign productivity are important here. First we recall the definition of the industry price index in a domestic industry:

$$P_J = \left(M_J\ p_J(\bar{\varphi}_J)^{1-\sigma_J} + \zeta_J^\star M_J^\star\ \left(p_{X,J}^\star(\nu_J\varphi_{X,J})\right)^{1-\sigma_J}\right)^{\frac{1}{1-\sigma_J}}$$

Now we are able to compute elasticities:

$$\mathcal{E}(P_J) = \frac{\partial \log P_J}{\partial \log A} = -\frac{M_J p_J(\bar{\varphi}_J)^{1-\sigma_J}}{P_J^{1-\sigma_J}} = -\frac{M_J\ p_J(\bar{\varphi}_J)^{1-\sigma_J}}{M_J\ p_J(\bar{\varphi}_J)^{1-\sigma_J} + \zeta_J^\star M_J^\star\ p_{X,J}^\star(\bar{\varphi}_{X,J}^\star)^{1-\sigma_J}},$$

which corresponds to the marginal impact of the domestic industry to local industry prices. It is decreasing in import penetration, as the share of domestic goods decrease and domestic firms impact gets diluted. The elasticity with respect to foreign markets reflect the opposite mechanism:

$$\begin{aligned}\mathcal{E}^\star(P_J) = \frac{\partial \log P_J}{\partial \log A^\star} &= \frac{M_J^\star \zeta_J^\star\ p_{X,J}^\star(\bar{\varphi}_{X,J}^\star)^{1-\sigma_J}}{P_J^{1-\sigma_J}} \cdot \left[\frac{\partial \log p_{X,J}^\star}{\partial \log \varphi_{X,J}^\star}\frac{\partial \log \varphi_{X,J}^\star}{\partial \log A^\star} + \frac{1}{1-\sigma_J}\frac{\partial \log \zeta_J^\star}{\partial \log A^\star}\right] \\ &= -\mathcal{I}_J \cdot \left[1 + \left(\frac{\gamma_J}{\sigma_J - 1} - 1\right)\left(-\mathcal{E}^\star(\varphi_{X,J}^\star)\right)\right]\end{aligned} \tag{A.11}$$

Using the expression for $\mathcal{E}^\star(\varphi_{X,J}^\star)$ from equation A.9, we have:

$$\mathcal{E}^\star(P_J) = -\mathcal{I}_J \cdot \left[1 + \frac{\sigma_J}{\sigma_J - 1}\left(\frac{\gamma_J}{\sigma_J - 1} - 1\right) \cdot \left(1 - \mathcal{E}^\star(P_J)\right) + \frac{1}{\sigma_J - 1}\left(\frac{\gamma_J}{\sigma_J - 1} - 1\right) \cdot \mathcal{E}^\star(C_J)\right)$$

For analytical convenience we define $\kappa_J = \gamma_J/(\sigma_J - 1) - 1$. Since we assume that $\gamma_J > \sigma_J - 1$, we have in the $\kappa_J > 0$. We express the elasticity as a function of import penetration and the elasticity of consumption:

$$\mathcal{E}^\star(P_J) = -\frac{\mathcal{I}_J}{1-\kappa_J\frac{\sigma_J}{\sigma_J-1}\mathcal{I}_J}\cdot\left(1+\kappa_J\frac{\sigma_J}{\sigma_J-1}+\frac{\kappa_J}{\sigma_J-1}\mathcal{E}^\star(C_J)\right)$$
$$= -\frac{\mathcal{I}_J}{1-\kappa_J\frac{\sigma_J-\theta}{\sigma_J-1}\mathcal{I}_J}\cdot\left(1+\kappa_J\frac{\sigma_J}{\sigma_J-1}+\frac{\kappa_J}{\sigma_J-1}\cdot(\theta\mathcal{E}^\star(P_T)+\mathcal{E}^\star(C_T))\right)$$

Expanding for the elasticities of P_T and C_T:

$$\mathcal{E}^\star(P_J) = -\frac{\mathcal{I}_J}{1-\kappa_J\frac{\sigma_J-\theta}{\sigma_J-1}\mathcal{I}_J}\cdot\left(1+\kappa_J\frac{\sigma_J}{\sigma_J-1}+\frac{\kappa_J}{\sigma_J-1}\cdot\left((1+a_0^{-1}(\theta-1))\mathcal{E}^\star(P)+\mathcal{E}^\star(C)\right)\right). \quad \text{(A.12)}$$

Aggregate Profits — We consider two possible redistribution of profits: (a) financial autarky as in Ghironi and Melitz (2005); (b) perfect risk-sharing. We show in the calibration the effect of a change in foreign productivity $A^\star$ can have negative effects on the wealth of the domestic consumer, under financial autarky. The wealth effects are positive when there is perfect risk-sharing.

The profits from operating in the domestic economy are shared between domestic firms, receiving profits $\Pi_{D,J}$, and foreign firms, receiving profits $\Pi_{X,J}$. We write profits from the domestic economy as follows:

$$\Pi_{dom} = \sum_J M_J\pi_{D,J}(\bar{\varphi}_J)+\zeta_J^\star M_J^\star\pi^\star_{X,J}(\bar{\varphi}^\star_{X,J})$$
$$= \left(\sum_J\frac{\eta_J}{\sigma_J}P_J^{1-\theta}\right)\cdot P_T^{\theta-1}a_0PC.$$

In the case where markups are equalized across industries, as $\sigma_J=\sigma$, there are no distortions and firms capture a fixed share of output:

$$\Pi_{dom} = \frac{a_0}{\sigma}PC$$

Total profits are given by $\Pi_{\text{world}} = \frac{a_0}{\sigma}(PC+P^\star C^\star)$. In response to positive shocks to $A^\star$, both the domestic and the foreign price index decrease, as they are both increasing functions of industry prices $(P_J, P_J^\star)$.

A.3 Proofs

A.3.1 Proof of Lemmas, prerequisite to Proposition 1

The series of lemma decompose total profits in two parts. First we derive the elasticity of domestic profits to productivity in lemma 2, then we derive the elasticity of foreign profits in lemma 3.

Lemma 2. *The elasticity of domestic profits to foreign labor productivity is*

$$\mathcal{E}^\star(\pi_{D,J}(\varphi)) = \underbrace{-(\sigma_J-\theta)\cdot(-\mathcal{E}^\star(P_J))}_{\textit{Competition effect}}+\underbrace{\frac{1-a_0-\theta}{a_0}\cdot(-\mathcal{E}^\star(P))+\mathcal{E}^\star(C)}_{\textit{Expenditure effects}}.$$

Moreover ignoring the expenditure effects we can expand the competition effect as follows

$$\mathcal{E}^\star(\pi_{D,J}(\varphi)) \simeq -(\sigma_J - \theta) \cdot \frac{M_J^\star \zeta_J^\star p_{X,J}^\star (\bar{\varphi}_{X,J}^\star)^{1-\sigma_J}}{P_J^{1-\sigma_J}} \cdot \left[1 + \left(\frac{\gamma_J}{\sigma_J - 1} - 1\right)\left(-\mathcal{E}^\star(\varphi_{X,J}^\star)\right)\right].$$

To understand the lemma we decompose firm profits into three parts

$$\pi_{D,J}(\varphi) = \underbrace{\frac{p_J(\varphi)}{\sigma_J}}_{\text{Unit profit}} \cdot \underbrace{\left(\frac{p_J(\varphi)}{P_J}\right)^{-\sigma_J}}_{\text{Local variety demand}} \cdot \underbrace{C_J}_{\text{Industry expenditure}}$$

A shock to foreign labor productivity affects two quantities: variety demand and total industry expenditures. Foreign competition lowers the industry price index, increasing total industry expenditures. However relative local variety demand decreases as local goods are now more expensive relative to the industry average. Given that the elasticity of substitution is higher within industries than across ($\sigma_J > \theta$), the second effect dominates and demand for domestic goods decreases. Finally foreign labor productivity also affects aggregate demand, through price effects as described above, and also through wealth effects. We discuss this channel below when we address the effects on marginal utility. In what follows we denote $\mathcal{E}(x)$ the elasticity of variable x with respect to A, and $\mathcal{E}^\star(x)$ the elasticity of x with respect to $A^\star$.

Proof. We start with the expression of domestic profits:

$$\pi_{D,J}(\varphi) = \frac{1}{\sigma_J} p_J(\varphi)^{1-\sigma_J} P_J^{\sigma_J} C_J.$$

Only two elements of domestic profits depend on foreign productivity: industry prices P_J and industry consumption C_J. Using our former derivations in equations A.6, we have

$$\mathcal{E}^\star(\pi_{D,J}(\varphi)) = (\sigma_J - \theta)\mathcal{E}^\star(P_J) + \frac{1 - a_0 - \theta}{a_0}\left(-\mathcal{E}^\star(P)\right) + \mathcal{E}(C).$$

First using expression A.11, we obtain the desired formula:

$$\mathcal{E}^\star(\pi_{D,J}(\varphi)) = -(\sigma_J - \theta) \cdot \mathcal{I}_J \cdot \left[1 + \left(\frac{\gamma_J}{\sigma_J - 1} - 1\right)\left(-\mathcal{E}^\star(\varphi_{X,J}^\star)\right)\right] + \frac{1 - a_0 - \theta}{a_0}\left(-\mathcal{E}^\star(P)\right) + \mathcal{E}(C).$$

Using equation A.12 we expand for the elasticity of industry prices to foreign productivity:

$$\begin{aligned}\mathcal{E}^\star(\pi_{D,J}(\varphi)) = {} & -(\sigma_J - \theta) \cdot \frac{\mathcal{I}_J}{1 - \kappa_J \frac{\sigma_J - \theta}{\sigma_J - 1}\mathcal{I}_J} \cdot \left(1 + \frac{\kappa_J}{\sigma_J - 1}\right) \\ & - \left(\frac{1 - a_0 - \theta}{a_0} + \frac{\mathcal{I}_J}{1 - \kappa_J \frac{\sigma_J - \theta}{\sigma_J - 1}\mathcal{I}_J} \frac{\kappa_J}{\sigma_J - 1}\left(1 + a_0^{-1}(\theta - 1)\right)\right) \cdot \mathcal{E}^\star(P) + \left(1 + \frac{\mathcal{I}_J}{1 - \kappa_J \frac{\sigma_J - \theta}{\sigma_J - 1}\mathcal{I}_J}\right) \cdot \mathcal{E}^\star(C),\end{aligned}$$

which is exactly what we are after. ∎

Now we turn to profits in the foreign country by domestic firms:

Lemma 3. *If a firm with productivity φ does export, its elasticity of exporting profits to foreign pro-*

ductivity is

$$\mathcal{E}^\star(\pi_{X,J}(\varphi)) = \Bigg(\underbrace{\mathcal{E}^\star(C_J^\star)}_{\textit{Industry expenditure}} \quad - \quad \underbrace{\sigma_J \cdot (-\mathcal{E}^\star(P_J^\star))}_{\textit{Competition effect}} \Bigg) \cdot \underbrace{(1+\ell_J(\varphi))}_{\textit{leverage}}.$$

Proof. We start with the expression of export profits:

$$\pi_{X,J}(\varphi) = \frac{1}{\sigma_J}\left(p_{X,J}(\varphi)^{1-\sigma_J} - p_{X,J}(\varphi_{X,J})^{1-\sigma_J}\right)(P_J^\star)^{\sigma_J} C_J^\star$$

Elasticity with respect to foreign productivity $A^\star$:

$$\mathcal{E}^\star(\pi_{X,J}(\varphi)) = \sigma_J \mathcal{E}^\star(P_J^\star) + \mathcal{E}^\star(C_J^\star) - (\sigma_J - 1)\left[\left(\frac{\varphi}{\varphi_{X,J}}\right)^{\sigma_J - 1} - 1\right]^{-1} \mathcal{E}^\star(\varphi_{X,J})$$

We recall, $\ell_J(\varphi) = \left[\left(\frac{\varphi}{\varphi_{X,J}}\right)^{\sigma_J-1} - 1\right]^{-1}$ and using equation (A.7):

$$\mathcal{E}^\star(\pi_{X,J}(\varphi)) = (\mathcal{E}^\star(C_J^\star) + \sigma_J \mathcal{E}^\star(P_J^\star)) \cdot (1 + \ell(\varphi)),$$

which is what we were after. ∎

Finally we parse these together and derive the elasticity of total profits:

Lemma 4. *Given the definition of the average profit level of an industry in equation (A.5), the elasticity of total profits to the foreign productivity shock is*

$$\mathcal{E}^\star(\langle \pi_J \rangle) = \frac{\langle \pi_{D,J} \rangle}{\langle \pi_J \rangle} \cdot \mathcal{E}^\star(\langle \pi_{D,J} \rangle) \; + \; \frac{\zeta_J \langle \pi_{X,J} \rangle}{\langle \pi_J \rangle} \cdot (\mathcal{E}^\star(\langle \pi_{X,J} \rangle) + \mathcal{E}^\star(\zeta_J)).$$

Proof. First we recall total average profits for domestic firms:

$$\langle \pi_J \rangle = \pi_{D,J}(\bar{\varphi}_J) + \zeta_J \pi_{X,J}(\nu_J \varphi_{X,J})$$

We have solved for the elasticities of $\pi_{D,J}$ (see Lemma 2) and ζ_J (see equation A.10). Now we focus on average export profits:

$$\pi_{X,J}(\nu_J \varphi_{X,J}) = \frac{1}{\sigma_J}\left(\frac{\tau_J}{A}\right)^{1-\sigma_J}\left(\nu_J^{\sigma_J - 1} - 1\right) \cdot \varphi_{X,J}^{\sigma_J - 1} (P_J^\star)^{\sigma_J} C_J^\star$$

such that the elasticity is:

$$\mathcal{E}^\star(\langle \pi_{X,J} \rangle) = \sigma_J \mathcal{E}^\star(P_J^\star) + \mathcal{E}^\star(C_J^\star) - (\sigma_J - 1)\left(-\mathcal{E}^\star(\varphi_{X,J})\right),$$

where the last term comes from the elasticity of the productivity of the cutoff that determines the average export profit level. And the total effects on average export profits:

$$\begin{aligned} \mathcal{E}^\star(\zeta_J \cdot \langle \pi_{X,J} \rangle) &= \sigma_J \mathcal{E}^\star(P_J^\star) + \mathcal{E}^\star(C_J^\star) + (\gamma_J - (\sigma_J - 1)) \cdot (-\mathcal{E}^\star(\varphi_{X,J})) \\ &= -\frac{\gamma_J}{\sigma_J - 1}(\sigma_J - \theta) \cdot \mathcal{E}^\star(P_J^\star) + \frac{\theta + a_0 - 1}{a_0}\mathcal{E}^\star(P^\star) + \mathcal{E}^\star(C^\star)., \end{aligned}$$

which is what we are interested in. ∎

A.3.2 Proof of Proposition 1

The proposition contains several statements. We prove them in order.

Differences in variable trade costs — First we recall the definition of import penetration as of foreign firms into domestic industry J:

$$\mathcal{I}_J := \frac{M_J^\star \zeta_J^\star \, p_{X,J}^\star(\bar{\varphi}_{X,J}^\star)}{P_J^{1-\sigma_J}}$$

Given $\zeta_J^\star$ and $p_{X,J}^\star$ are proportional to $\tau_J^{-\gamma_J}$ and τ_J respectively, then $\partial \mathcal{I}_J / \partial \tau_J < 0$.
The average elasticity of profits can be rewritten as:

$$\begin{aligned}\mathcal{E}^\star(\langle \pi_J \rangle) =& \sigma_J \left(\alpha_D \mathcal{E}^\star(P_J) + \alpha_X \mathcal{E}^\star(P_J^\star)\right) \; + \; \left(\alpha_D \mathcal{E}^\star(C_J) + \alpha_X \mathcal{E}^\star(C_J^\star)\right) \\ &+ \alpha_X \left((\gamma_J - (\sigma_J - 1)) \cdot (-\mathcal{E}^\star(\varphi_{X,J}))\right)\end{aligned}$$

where $\alpha_{D,J}$ represents the share of profits from the domestic market $\langle \pi_{D,J} \rangle / \langle \pi_J \rangle$ and $\alpha_{X,J} = 1 - \alpha_{D,J}$ is the share of export profits. Substituting for the elasticity of $\varphi_{X,J}$ gives:

$$\begin{aligned}\mathcal{E}^\star(\langle \pi_J \rangle) =& \sigma_J \left(\alpha_{D,J} \mathcal{E}^\star(P_J) + \alpha_{X,J} \frac{\gamma_J}{\sigma_J - 1} \mathcal{E}^\star(P_J^\star)\right) \\ &+ \alpha_{D,J} \mathcal{E}^\star(C_J) + \alpha_{X,J} \frac{\gamma_J}{\sigma_J - 1} \mathcal{E}^\star(C_J^\star),\end{aligned} \tag{A.13}$$

The first term summarises the negative effect of an increase in competition in the foreign and domestic market while the other terms show the dampening (positive) effect of increase demandfor the exporting market. The effect of foreign productivity across industries with $\tau_1 > \tau_2$, is ambiguous on average profits. Ignoring the second term (which is positive), we show why this is the case.

The negative competition effects of import penetration are higher for firms with low shipping costs. However lower shipping costs also tilt the average profits towards export profits and reduces the role of import penetration. As changing shipping costs affects the competition channel in two opposing directions, only the relative magnitude of the two forces will characterize the comparative statics exercise. In our calibration we see average profits elasticities do not vary monotonously with shipping costs. Hence we focus on a subset of firms for which a sharp characterization of elasticities with respect to shipping costs is possible.

Specifically we take small firms. In that case, profit elasticity is simply the first part as there is no exporting channel. In that case it suffices to infer from Lemma 2, that the elasticity of profit is proportional to import penetration $\mathcal{I}_J$. ∎

Differences in demand elasticity — First we recall the expression for average profit elasticity in (A.13). The first term exposes the displacement effect. It is clearly greater for higher level of σ_J. Hence in more demand elastic industries, cash-flow elasticity is higher. ∎

Differences in firm distribution — Given a productivity cutoff $\varphi_{X,J}$, the fraction of firms exporting is $\zeta_J \propto (\varphi_{X,J})^{-\gamma_J}$. For a more dispersed size firm distribution, the fraction of exporters is smaller hence decreasing the impact of the elasticity of export profits on total average profits: lower

$\alpha_{X,J}$. We reformulate equation (A.13):

$$\mathcal{E}^\star(\langle \pi_J \rangle) = \alpha_{D,J}\left(\sigma_J \mathcal{E}^\star(P_J) + \mathcal{E}^\star(C_J)\right) \\ + \alpha_{X,J}\frac{\gamma_J}{\sigma_J - 1}\left(\sigma_J \mathcal{E}^\star(P_J^\star) + \mathcal{E}^\star(C_J^\star)\right).$$

Since the last part affects compensating profits from exports, we look at the effect of a change in γ_J on that last part. A first order approximation of the effect of a change in γ_J on the elasticity of average profits is given by:

$$\begin{aligned} \partial_{\gamma_J}\mathcal{E}^\star(\langle \pi_J \rangle) &\simeq \left[\alpha_{X,J} + \partial_{\gamma_J}\alpha_{X,J}\cdot\gamma_J\right]\cdot\frac{1}{\sigma_J - 1}\left(\sigma_J \mathcal{E}^\star(P_J^\star) + \mathcal{E}^\star(C_J^\star)\right) \\ &\simeq \left[1 - \gamma_J \log(\varphi_{X,J})\right]\cdot\frac{\alpha_{X,J}}{\sigma_J - 1}\left(\sigma_J \mathcal{E}^\star(P_J^\star) + \mathcal{E}^\star(C_J^\star)\right). \end{aligned}$$

If $\gamma_J > \log(\varphi_{X,J})$ the effect is unambiguously negative: the decrease in the fraction of exporters is not compensated by the the added mass at the extensive margin of export. ∎

A.3.3 Proof of Proposition 2

Differences in firm productivity — As described in Section 2, we assume there is a risk premium for low-shipping-cost industries, and that the risk premium difference between low-shipping-cost industries and high-shipping-costs industries is larger for small firms than for large firms. Those results are without loss of generality; however they make the proof more constructive.[25]

We note returns on high and low-shipping-costs industries using H and L respectively. Similarly we write returns of small (big) firms using S and B respectively. From Section 2, we have the following results: $\mathbf{E}\{R^L\} > \mathbf{E}\{R^H\}$. We rewrite this inequality as $(\beta^L - \beta^H)\lambda > 0$, where (β^L, β^H) are the covariance of returns with the pricing kernel (betas) and λ is the price of risk. So far we have shown that firms in low-shipping-costs industries have larger cash-flow beta in absolute value than in high-shipping-costs industries: the covariance of their cash-flows with the SDF is higher. This translates into their returns covariance with the SDF being higher, in absolute value: $|\beta_L| > |\beta_H|$ The sign of their betas thus is the same as the price of risk.

Using the cross-section of firms within industries identifies the sign of λ. As small firms have productivity below the export cutoff, they do not export. Their sole exposure to aggregate shocks $A^\star$ goes through displacement of domestic rents. If two industries are such that $\mathcal{I}_1 > \mathcal{I}_2$, due to heterogeneous $\tau_1 < \tau_2$ for example, then we have:

$$\frac{\partial|\mathcal{E}^\star(\pi_{D,J})|}{\partial \mathcal{I}_J} > 0$$

This in turn translates into a difference for realized returns: $\partial_{A^\star} R^{\text{LS}} < \partial_{A^\star} R^{\text{HS}} < 0$. If the price of risk is positive ($A^\star$ is a good shock), then $\partial_{A^\star} C > 0$ and marginal utility falls: $\partial_{A^\star} S < 0$. In that case small firms in low-shipping-cost industries will earn lower risk premium than their high-shipping-costs counterpart. This is due to their lower covariance with the SDF. Empirically we find the opposite to be true, leading us to infer a negative price of risk of $A^\star$ shocks. ∎

Differences in demand elasticity — The argument follows the one above. Let us assume there are two sets of industries are such that $\sigma_h > \sigma_l$. We have shown expected returns across industries with different shipping costs are different: higher shipping costs industries have lower expected returns

[25] Our proof only relies on the results from Section 2, that firms in industries more exposed to trade have higher expected returns, namely that the price of risk is non-zero: $\lambda \neq 0$.

and lower shipping costs industries. Moreover from Equation (A.13) we infer the following industry difference: the negative elasticity effect of foreign productivity on average domestic profits is amplified by the elasticity of substitution and the positive effects are dampened such that $\partial_\sigma \mathcal{E}^\star(\langle \pi_J \rangle) < 0$. If the price of risk of shocks to $A^\star$ is positive then, a greater elasticity of substitution will dampen risk premium commanded in low shipping costs industries (respective to high shipping costs): $\partial_\sigma \partial_\tau \mathcal{E}^\star(\langle \pi_J \rangle) < 0$. In that case a higher elasticity of substitution amplifies the hedging properties of cash-flows. This leads to lower risk premium across industries based on shipping costs. Observing the direction of the risk premium across these two sets of industries thus determine the sign of the price of risk. $\blacksquare$

Differences in firm distribution — We start from equation A.13 and the third part of the proof for Proposition 1. We show that if γ_J is large enough the ex-ante selection effect is not compensated by entry at the extensive margin. If that is the case as we assume, we show industries with large γ have lower (algebraically) elasticity of exports to foreign productivity. The reasoning used for differences in demand elasticities follow: if we find the differences are more pronounced within high γ industries, then it must be that the price of risk is negative, as γ amplifies the negative effects of trade shocks. $\blacksquare$

A.4 Other Results

A.4.1 Elasticity to the domestic shock

In this Section we show what would be the response of profit to the domestic shock. The main result is that a model with only domestic productivity shock would result in larger firms (exporters) with higher risk premia than small firms. Large firms' profits would be more procyclical that small firms due to the boost in export profits. Given the formula for profit we deduce the elasticity to domestic profits:

$$\mathcal{E}(\pi_{D,J}(\varphi)) = (\sigma_J - 1) - (\sigma_J - \theta)(1 - \mathcal{I}_J) + \frac{\theta + a_0 - 1}{a_0} \mathcal{E}(P) + \mathcal{E}(C).$$

The first term corresponds to the direct increase in market share after a productivity bump for domestic firms; the second dampens the role of this increase; $1 - \mathcal{I}_J$ represents the prominence of domestic firms for the domestic economy (the complement of import penetration). Productivity gains are less relevant if all firms do benefit from it. The two last terms come from the consequence for aggregate prices and consumption. Next we show similar results for export profits:

$$\mathcal{E}(\pi_{X,J}(\varphi) = (\sigma_J - 1) + \sigma_J \mathcal{E}(P_J^\star) + \mathcal{E}(C_J^\star) - (\sigma_J - 1)\ell_J(\varphi)\mathcal{E}(\varphi_{X,J}).$$

Using the expression for the cutoff elasticity from A.8 we have the final form

$$\mathcal{E}(\pi_{X,J}(\varphi)) = \sigma_J (1 + \ell_J(\varphi)) - 1 + (1 + \ell_J(\varphi)) \cdot (\sigma_J \mathcal{E}(P_J^\star) + \mathcal{E}(C_J^\star))$$

Finally average profits for the industry do include the extensive margin:

$$\mathcal{E}(\zeta_J \langle \pi_{X,J} \rangle) = \left(\frac{\gamma_J}{\sigma_J - 1} - 1 \right) + \frac{\gamma_J}{\sigma_J - 1} \left(\sigma_J \mathcal{E}(P_J^\star) + \mathcal{E}(C_J^\star) \right).$$

This first term is positive and summarises competitive the increase in productivity for competition and the export decision. The last two terms summarize the response in the foreign economy with an increase in competition through prices and the change in demand, which depends on the risk-sharing arrangement.

A.4.2 Real exchange rate in the model

Nominal exchange rate is normalized to one in our model. However due to movements in the composition of firms producing for one country or another, there are movements in real exchange rates. We write the real exchange rate as: $F = P^\star/P$, that is the relative price of goods in the foreign country relative to the domestic country. In figures A.2, we represent the response of the exchange rate for the tradable good sector as well as the aggregate exchange rate. We find that as competitivity in the foreign economy increases due to a decline in the real wage (increase in $A^\star$), the exchange rate $P^\star/P$ declines. The price of goods in the foreign country declines by more than goods in the home country, due to a composition effect in the aggregate good of each economy: more foreign firms produce for the foreign consumption index, thus its price declines by more. In response to a shock to domestic productivity, the exchange rate does not move significantly. This is due to the relative size of the domestic economy that is smaller than the foreign economy in terms of consumption good production. We also simulate the real exchange rate in the economy with risk-sharing ($\alpha = 1$) and we do find the same results qualitatively and quantitatively. The different between both impulse response function is not economically significant.

A.4.3 Bond trading in the model

As in Ghironi and Melitz (2005) we allow for international trade in bonds. Allowing for trading in bonds across countries is important for two main reasons. First bond trading allows for some intertemporal smoothing across countries, a dimension that is missing from our ex-ante risk-sharing arrangement, where $\alpha = 1$. Now consumers in each country are able to trade dynamically risk-free claims across country. Hence it is important to understand if completing markets through bond trading will affect our results. Second by introducing bonds, we are able to study the balance of current accounts of each country in response to productivity shocks. This will shed light on the role of the risk induced by international trade on current account deficits (or surplus).

Bond Trading Setup. Agents are able to trade domestic and foreign bonds. We assume that bonds issued provide a risk-free, real return in units of aggregate consumption for each country. To remedy to the indeterminacy of of net foreign assets, we follow the extant literature and introduce a convex cost in bond trading: agents must pay fees to financial intermediaries when adjusting their bond holdings. This specification pins down uniquely the quantity of bonds in steady state and leads to stationary dynamics in response to shocks.

The budget constraint with bond trading for the domestic representative agent is now:

$$
\begin{aligned}
P_t \cdot B_{D,t+1} + P_t F_t \cdot B_{X,t+1} + P_t \cdot \frac{\eta_D}{2} B_{D,t+1}^2 + P_t F_t \cdot \frac{\eta_X}{2} B_{X,t+1}^2 + P_t C_t \\
\leq (1+r_t) P_t B_t + (1+r_t^\star) F_t P_t B_{X,t} + T_t^f + L + \Pi_t(\alpha)
\end{aligned}
$$

Here we do assume that any intermediaries that do collect rents from bond trading rebate the fees to the households lump-sum, as T_t^f. Now we are able to define domestic and foreign current accounts as the change in asset holdings from t to $t+1$. That is the current account in each country is:

$$
\begin{aligned}
\text{CA}_t &= B_{D,t} - B_{D,t-1} + (B_{X,t} - B_{X,t-1}) \cdot F_t \\
\text{CA}_t^\star &= B_{D,t}^\star - B_{D,t-1}^\star + (B_{X,t} - B_{X,t-1})/F_t.
\end{aligned}
$$

Home and foreign current accounts add to zero when expressed in units of the same consumption basket, that is the world supply of bonds is still zero:

$$B_D + B_X^\star = 0$$
$$B_D^\star + B_X = 0$$

With the introduction of four new variables corresponding to the quantity of bonds traded, we need two new equations added to this market clearing condition. There are now two Euler equations for the risk-free rate in each country. The fees introduced yields a relation between the price of bonds and the quantity traded in equilibrium, breaking the indeterminacy. We know have the following four Euler equations:

$$1 + \eta_D B_{D,t+1} = (1 + r_{t+1})\mathbf{E}\{S_{t,t+1}\}$$
$$1 + \eta_X B_{X,t+1} = (1 + r_{t+1}^\star)\mathbf{E}\left\{S_{t,t+1}\frac{F_{t+1}}{F_t}\right\}$$
$$1 + \eta_D B_{D,t+1}^\star = (1 + r_{t+1}^\star)\mathbf{E}\{S_{t,t+1}^\star\}$$
$$1 + \eta_X B_{X,t+1}^\star = (1 + r_{t+1})\mathbf{E}\left\{S_{t,t+1}^\star\frac{F_t}{F_{t+1}}\right\}$$

As in Ghironi and Melitz (2005) we use a parameter of $\eta = 0.0025$ and quadratic adjustment costs to generate sationarity in our model in response to both shocks.

Bond Trading Results. After introducing international bond trading, we find no (significant) effect on the risk premium earned by firms in industries exposed to trade. Hence we omit the figures and tables for this version of the model. The reason is that bond trading does "complete markets" but not in the direction of our agents' hedging demands. The intertemporal savings decision across country does not protect against the risk of foreign productivity shocks. Hence our model with bond trading and our risk-sharing arrangement still accounts for a negative risk premium earned on trade exposed industries.

Introducing bonds we find that after a foreign productivity shock, the demand for savings increase in the foreign economy, leading to initial negative foreign balances. The foreign country is borrowing to finance its production sector, that is now more productive. Foreign households do increase their initial borrowing to finance firms but the borrowing is quickly reversed.

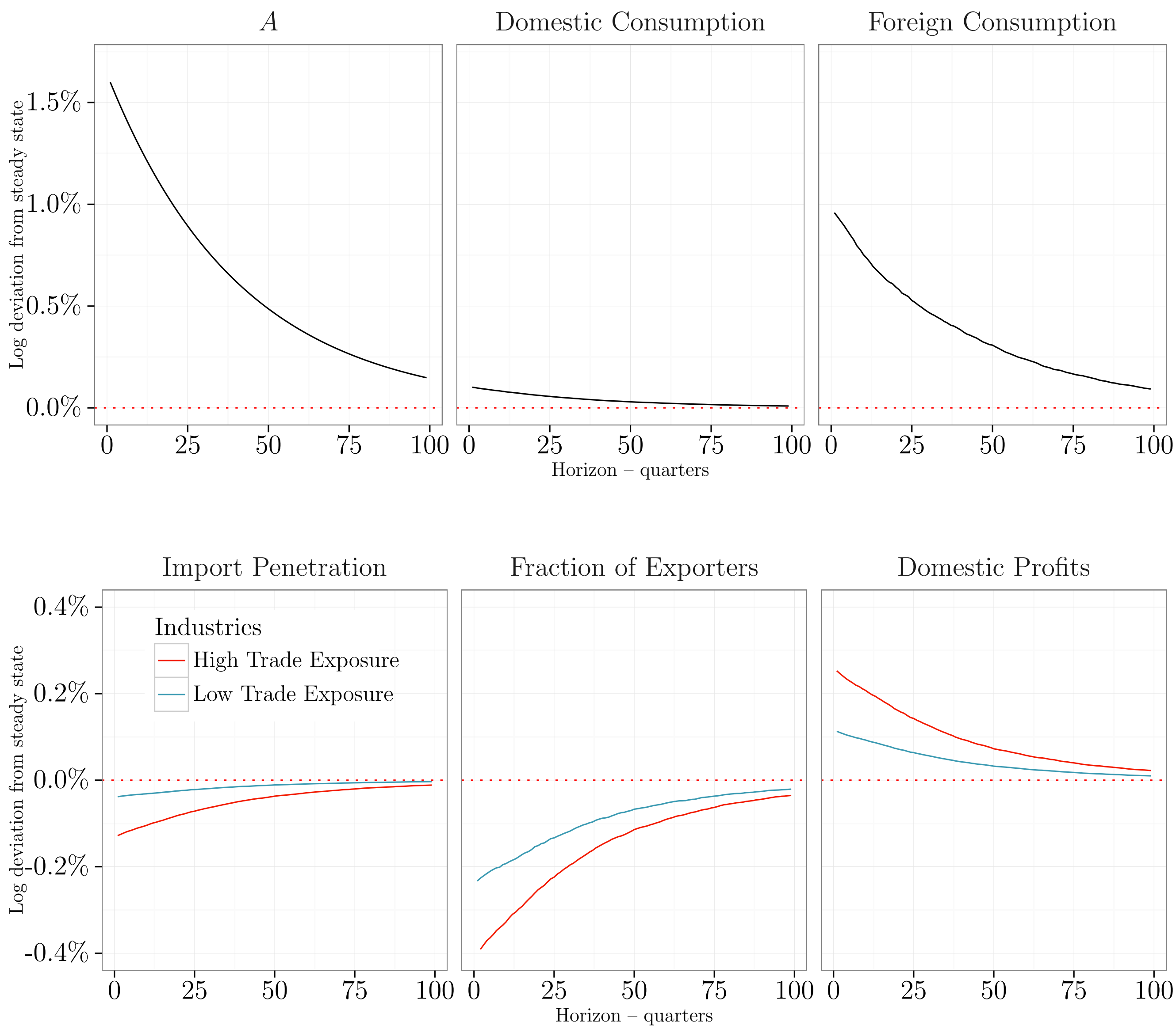
Table A.1
Summary of the model

In this table we summarize all the equilibrium equation required to solve the model and derive firms' valuations.

Variable		#	Equation
Quantities:			
Aggregate consumption	$C, C^{\star}$	2	$\rfloor,^{1-a_0} C_T^{a_0}$
Tradable consumption	C_T	2	$[\sum_J \eta_J^{1/\theta} C_J^{\frac{\theta-1}{\theta}}]^{\frac{\theta}{\theta-1}}$
Industry consumption	C_J	4	$(P_J/P_T)^{-\theta} C_T$
Export cutoffs	$\varphi_{X,J}$	4	
Mass of Exporters	ζ_J	4	$1 - G_J(\varphi_{X,J})$
Prices:			
Wages	w	2	1
Homogeneous good	p_0	2	1
Local goods	$p_J(\varphi)$	4	$\frac{\sigma_J}{\sigma_J - 1} \frac{1}{A\varphi}$
Export goods	$p_{X,J}(\varphi)$	4	$\tau_J p_J(\varphi)$
Industry goods	P_J	4	$(M_J p_J(\bar{\varphi}_J)^{1-\sigma_J} + (\zeta_J^{\star} M_J^{\star})(p_{X,J}^{\star}(\bar{\varphi}_{X,J}^{\star}))^{1-\sigma_J})^{1/(1-\sigma_J)}$
Aggregate industry	P_T	2	$[\sum_J \eta_J P_J^{1-\theta}]^{1/(1-\theta)}$
Aggregate price index	P	2	$(P_T/a_0)^{a_0}(1/(1-a_0))^{1-a_0}$
Cash-Flows and Asset Prices:			
Profits	$\pi_{D,J}(\varphi)$	4	$\frac{1}{\sigma_J}(p_J(\varphi))^{1-\sigma_J} \; P_J^{\sigma_J} C_J$
	$\pi_{X,J}(\varphi)$	4	$\frac{1}{\sigma_J}(p_{X,J}(\varphi))^{1-\sigma_J} \; (P_J^{\star})^{\sigma_J} \; C_J^{\star} \; - f_J/A$
Valuations	$v_{J,t}(\varphi)$	4	$\beta \mathbf{E}_t S_{t,t+1}(v_{J,t+1}(\varphi) + \pi_{D,J,t+1}(\varphi) + \pi_{X,J,t+1}(\varphi))$

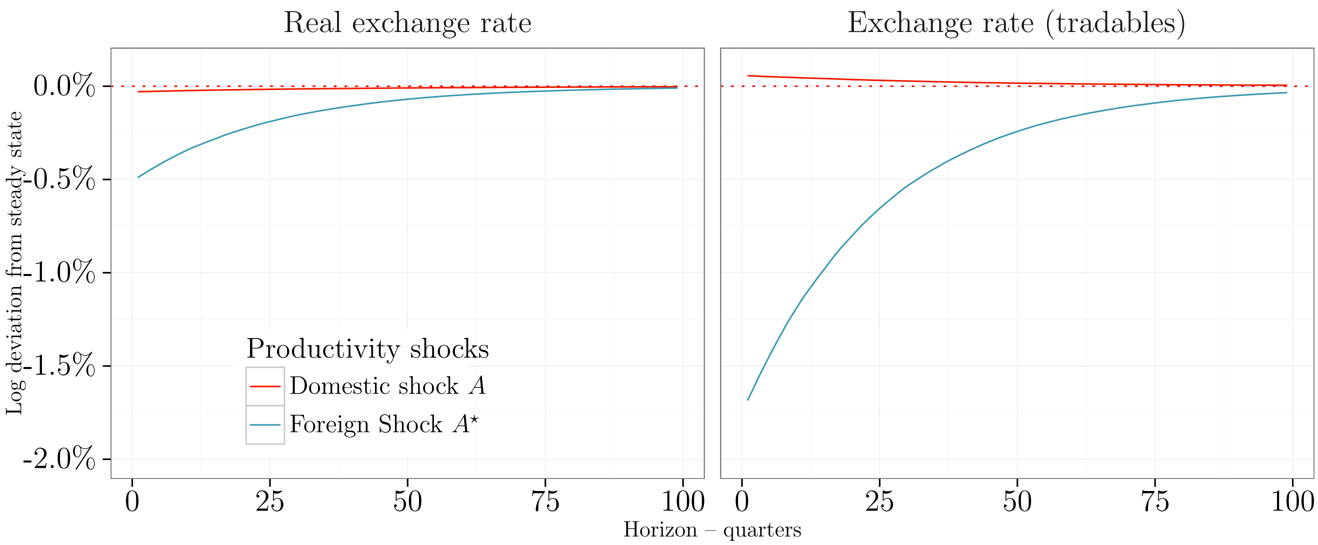
Figure A.1

Impulse Response: Shock to A



We plot the Impulse Response Function to a shock ε^A from 500 model simulations. Quantities are log-deviation from their non-stochastic steady-state values. Domestic consumption and foreign consumption are C_t and $C_t^\star$ in the model, respectively. Import penetration is $\mathcal{I}_J$, the fraction of exporters is ζ_J and domestic profits is $\pi_{D,J}$. Red lines correspond to industries with low trade costs that are more exposed to foreign competition. Blue lines are industries with higher trade costs.

Figure A.2
Impulse Response: Exchange Rates

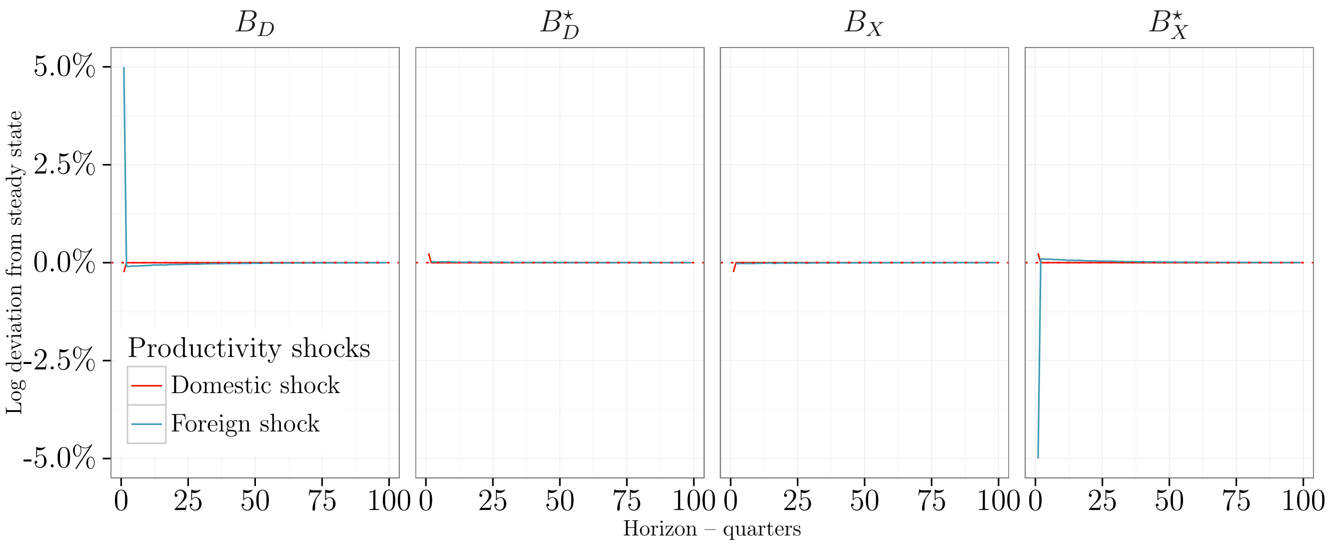


We plot the Impulse Response Function to both a shock ε^A and $\varepsilon^{A^\star}$ from 500 model simulations. Quantities are log-deviation from their non-stochastic steady-state values. Real exchange rate and tradable exchange rates are $P^\star/P$ and $P_T^\star/P_T$ in the model, respectively. We only represent the economy where there is no risk-sharing ($\alpha = 0$). The IRF in the case with risk-sharing is only differs by a small quantitative amount: the response of exchange rates to a foreign shock is dampened slightly by no more than 0.05% on impact.

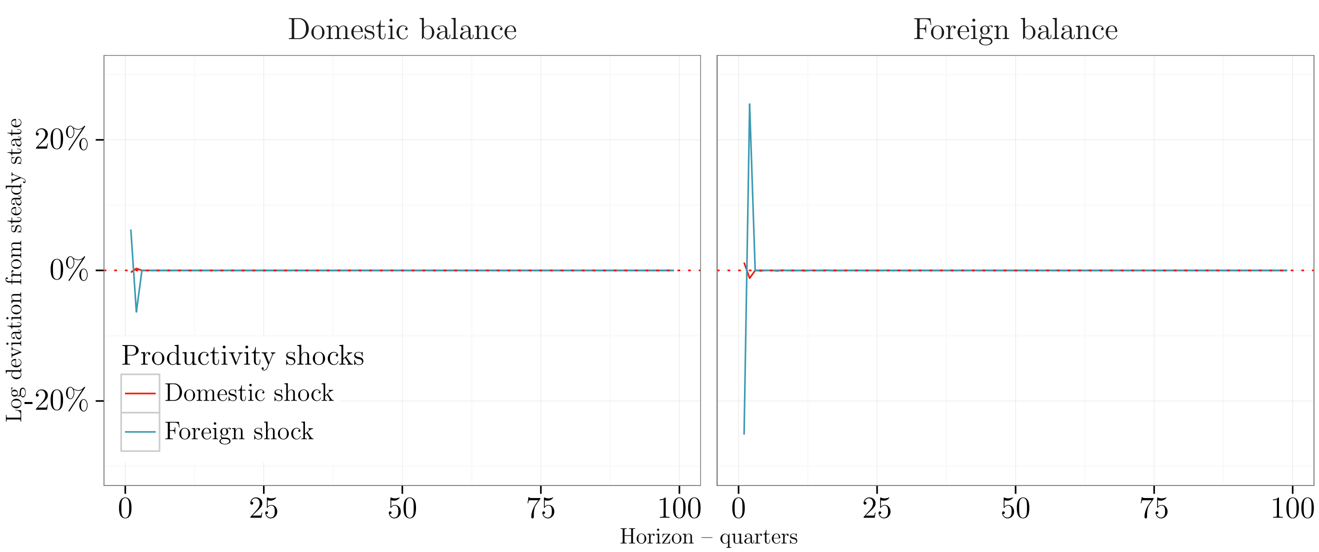
Figure A.3

Impulse Response: Bonds and Current Accounts

(a) Demand for bonds



(b) Current accounts



We plot the Impulse Response Function to a shock ε^A from 500 model simulations. Quantities are log-deviation from their non-stochastic steady-state values. The top panel (Figure A.3a) represents the demand for bonds for domestic households (B_D and B_X) and for foreign households ($B_D^\star$ and $B_X^\star$). The bottom panel (Figure A.3b) represents current accounts as defined in Appendix A.4.3.

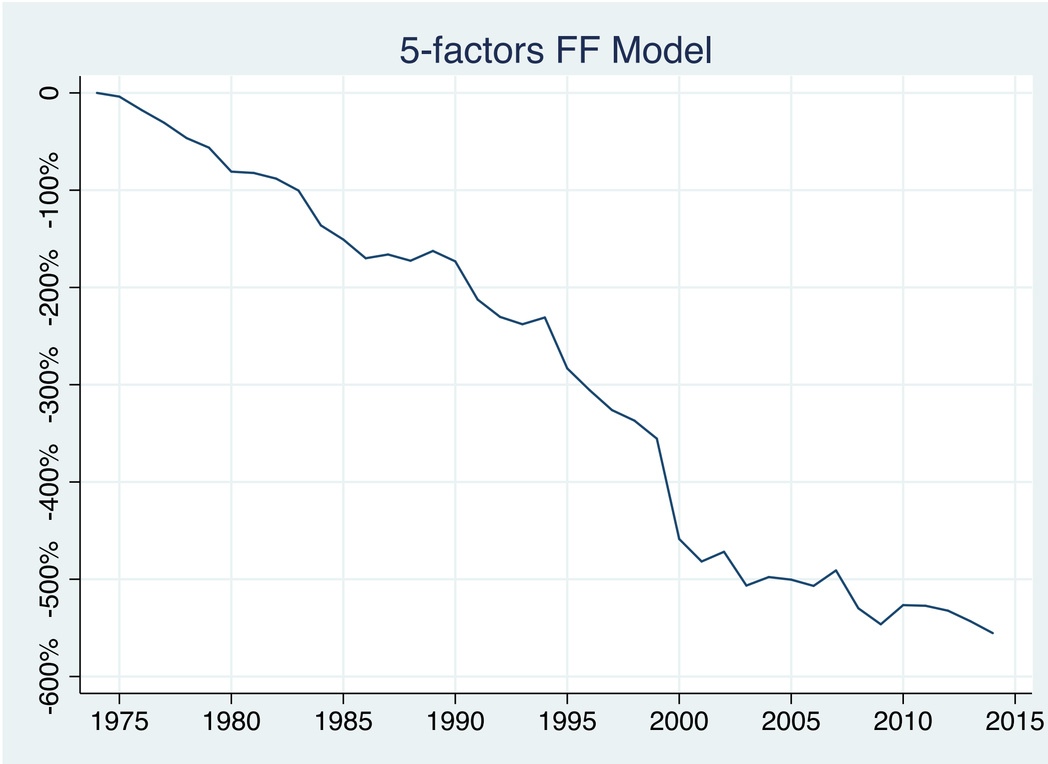


Figure A.4

Calendar-time cumulative abnormal returns of the Hi-Lo Shipping Costs portfolio.
Notes. Abnormal returns are computed after estimating a time-series regression over the sample period of the Hi-Lo portfolio excess return on the Fama-French five factors (the market portfolio minus the risk-free rate, the size factor, and the value factor, the profitability factor, and the investment factor). We plot the cumulative sum of these abnormal returns.

B Robustness tables

Table B.1
Distribution of shipping costs across industries

This table presents the average shipping costs in our sample at the 2-digit SIC codes industry level of aggregation. Shipping costs are measured as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports.

2-digit SIC code	Description	Shipping costs
37	Transportation Equipment	0.016
38	Instruments & Related Products	0.017
36	Electronic & Other Electric Equipment	0.021
21	Tobacco Products	0.021
35	Industrial Machinery & Equipment	0.024
28	Chemical & Allied Products	0.026
39	Miscellaneous Manufacturing Industries	0.035
33	Primary Metal Industries	0.035
34	Fabricated Metal Products	0.042
29	Petroleum & Coal Products	0.044
23	Apparel & Other Textile Products	0.045
31	Leather & Leather Products	0.048
27	Printing & Publishing	0.049
22	Textile Mill Product	0.051
20	Food & Kindred Products	0.054
26	Paper & Allied Products	0.054
30	Rubber & Miscellaneous Plastics Products	0.056
24	Lumber & Wood Products	0.068
32	Stone, Clay, & Glass Products	0.102
25	Furniture & Fixtures	0.103

Table B.2
Shipping costs and tariff portfolios - Returns

This table presents monthly excess returns (α) over a five-factor Fama-French model of shipping costs plus tariffs portfolios. Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Tariffs are measured at the industry-year level as the ratio of customs duties to the Free-on-Board value of imports. In any given month, stocks are sorted into five portfolios based on the sum of their industry shipping costs and tariffs in the previous year. We regress a given portfolio's return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), and the value factor (high minus low), the profitability factor (robust minus weak), and the investment factor (conservative minus aggressive) all obtained from Kenneth French's website. Monthly portfolios returns are either equally-weighted or value-weighted. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is from 1975 to 2015.

	Shipping costs+tariff portfolios - Equally weighted					
	Low	2	3	4	High	Hi-Lo
α	11.004***	7.637***	5.247***	1.113	-1.348	-12.351***
	(2.706)	(1.888)	(1.898)	(1.624)	(1.631)	(3.159)
β^{MKT}	0.993***	0.989***	0.965***	1.073***	1.028***	0.035
	(0.036)	(0.030)	(0.031)	(0.044)	(0.036)	(0.056)
β^{HML}	-0.429***	-0.161*	-0.161**	0.137	0.473***	0.902***
	(0.088)	(0.086)	(0.071)	(0.116)	(0.108)	(0.139)
β^{SMB}	0.950***	1.051***	1.005***	0.871***	0.831***	-0.119
	(0.070)	(0.079)	(0.067)	(0.093)	(0.071)	(0.089)
β^{RMW}	-0.984***	-0.643***	-0.471***	-0.194	0.112	1.096***
	(0.111)	(0.085)	(0.072)	(0.127)	(0.101)	(0.160)
β^{CMA}	0.173	-0.189	0.037	-0.008	-0.109	-0.282
	(0.150)	(0.165)	(0.143)	(0.183)	(0.144)	(0.227)

	Shipping cost+tariff portfolios - Value weighted					
	Low	2	3	4	High	Hi-Lo
α	2.627*	2.956**	2.811*	-0.594	-1.397	-4.024*
	(1.552)	(1.385)	(1.620)	(1.292)	(1.260)	(2.259)
β^{MKT}	0.944***	0.976***	1.041***	1.054***	1.012***	0.068
	(0.049)	(0.039)	(0.024)	(0.041)	(0.024)	(0.053)
β^{HML}	-0.322***	-0.249***	-0.219***	-0.282***	0.225***	0.547***
	(0.078)	(0.059)	(0.066)	(0.104)	(0.063)	(0.119)
β^{SMB}	-0.139**	0.080	0.154***	0.016	0.098***	0.238***
	(0.059)	(0.049)	(0.059)	(0.076)	(0.038)	(0.079)
β^{RMW}	-0.074	-0.342***	-0.431***	-0.101	0.425***	0.499***
	(0.076)	(0.055)	(0.089)	(0.100)	(0.060)	(0.104)
β^{CMA}	0.265*	-0.401***	-0.040	0.419***	0.156*	-0.108
	(0.142)	(0.106)	(0.100)	(0.154)	(0.088)	(0.159)

Table B.3
Weight-to-value portfolios returns - Robustness

This table presents monthly excess returns (α) over a five-factor Fama-French model of weight-to-value ratio portfolios. Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Weight-to-value is measured in Panel A at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports, for all trade involving U.S. exports. Weight-to-value is measured in Panel B at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports, for all imports and exports not involving the U.S. on either side of the trade. In any given month, stocks are sorted into five portfolios based on their industry weight-to-value ratio in the previous year. In any given month, stocks are sorted into five portfolios based on the weight-to-value ratio of their industry in the previous year. We regress a given portfolio's return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), and the value factor (high minus low), the profitability factor (robust minus weak), and the investment factor (conservative minus aggressive) all obtained from Kenneth French's website. Monthly portfolios returns are either equally-weighted or value-weighted. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is from 1975 to 2015.

Panel A: Weight-to-value portfolios (using U.S. exports)

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
α	11.504***	13.483***	9.061***	0.232	-0.336	-11.840***	5.037**	5.704**	0.765	-2.877*	-0.295	-5.332*
	(3.584)	(3.527)	(3.382)	(2.033)	(2.136)	(3.887)	(2.304)	(2.238)	(2.101)	(1.488)	(1.338)	(2.920)
β^{MKT}	1.114***	0.943***	0.860***	0.995***	1.067***	-0.047	1.172***	0.889***	0.995***	1.117***	0.878***	-0.294***
	(0.060)	(0.059)	(0.044)	(0.045)	(0.056)	(0.080)	(0.062)	(0.068)	(0.062)	(0.037)	(0.031)	(0.077)
β^{HML}	-0.316**	-0.414***	-0.278***	0.401***	0.670***	0.986***	-0.517***	-0.701***	-0.311***	0.264***	0.273**	0.790***
	(0.135)	(0.123)	(0.080)	(0.127)	(0.101)	(0.111)	(0.101)	(0.088)	(0.116)	(0.091)	(0.109)	(0.162)
β^{SMB}	0.900***	1.015***	0.984***	0.716***	0.674***	-0.225**	0.108	0.199**	-0.091	0.217***	-0.036	-0.144
	(0.122)	(0.125)	(0.087)	(0.096)	(0.059)	(0.096)	(0.083)	(0.091)	(0.087)	(0.051)	(0.054)	(0.108)
β^{RMW}	-0.927***	-0.937***	-0.632***	-0.189**	0.041	0.968***	-0.399***	-0.322**	0.349***	0.144*	0.201***	0.600***
	(0.138)	(0.156)	(0.121)	(0.090)	(0.080)	(0.135)	(0.099)	(0.138)	(0.134)	(0.079)	(0.060)	(0.119)
β^{CMA}	-0.108	0.130	0.072	-0.153	-0.166	-0.059	-0.158	0.061	0.499**	0.085	0.156	0.313
	(0.227)	(0.185)	(0.145)	(0.188)	(0.167)	(0.179)	(0.202)	(0.168)	(0.241)	(0.098)	(0.114)	(0.261)

Panel B: Weight-to-value portfolios (using non-U.S. data)

	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
α	8.925***	8.030***	5.756***	0.124	-1.270	-10.195***	4.892***	2.301	-0.338	-2.512*	-0.352	-5.244**
	(2.138)	(2.103)	(1.785)	(1.414)	(1.382)	(2.310)	(1.702)	(1.706)	(1.654)	(1.348)	(1.179)	(2.311)
β^{MKT}	1.081***	0.953***	0.980***	1.007***	1.056***	-0.025	1.145***	0.909***	1.001***	1.091***	0.945***	-0.200***
	(0.055)	(0.027)	(0.028)	(0.029)	(0.034)	(0.061)	(0.046)	(0.040)	(0.033)	(0.025)	(0.034)	(0.068)
β^{HML}	-0.311**	-0.401***	-0.170***	0.236**	0.450***	0.760***	-0.459***	-0.581***	-0.092	0.087	0.099	0.559***
	(0.156)	(0.088)	(0.066)	(0.099)	(0.092)	(0.137)	(0.117)	(0.083)	(0.092)	(0.064)	(0.084)	(0.166)
β^{SMB}	1.151***	1.129***	1.035***	0.973***	0.723***	-0.429***	0.276***	0.187**	-0.002	0.249***	-0.145***	-0.420***
	(0.115)	(0.065)	(0.061)	(0.079)	(0.047)	(0.094)	(0.081)	(0.085)	(0.078)	(0.048)	(0.049)	(0.117)
β^{RMW}	-0.796***	-0.726***	-0.445***	-0.055	0.101	0.897***	-0.325***	-0.387***	0.322***	0.186**	0.235***	0.561***
	(0.165)	(0.099)	(0.071)	(0.102)	(0.085)	(0.137)	(0.099)	(0.099)	(0.086)	(0.076)	(0.057)	(0.131)
β^{CMA}	-0.241	0.088	0.025	-0.016	-0.046	0.195	-0.256	-0.092	0.465***	0.117	0.270**	0.526**
	(0.211)	(0.160)	(0.096)	(0.148)	(0.113)	(0.189)	(0.177)	(0.134)	(0.153)	(0.095)	(0.115)	(0.252)

Table B.4
Shipping cost portfolios - Returns and Currency Factors

This table presents abnormal equally-weighted excess returns (α) over two-factor models based on the U.S. market excess return and respectively three different currency factors. We use the dollar factor from Verdelhan (Forthcoming) in panel A, the carry factor from Verdelhan (Forthcoming) in panel B, and the excess return of high interest rates currencies minus low interest rate currencies from Lustig et al. (2011) in panel C. Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. In any given month, stocks are sorted into five portfolios based on their industry shipping costs in the previous year. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is from 1975 to 2015.

	Panel A. - Dollar Factor Model					
	Low	2	3	4	High	Hi-Lo
α	0.216	1.873	1.114	3.100	5.954	−10.133*
	(3.011)	(2.790)	(3.825)	(4.724)	(5.101)	(5.570)
β^{MKT}	1.018***	1.192***	1.230***	1.308***	1.385***	−0.367***
	(0.085)	(0.066)	(0.069)	(0.070)	(0.087)	(0.137)
$\beta^{\$}$	−0.490	−0.039	1.596	2.182	1.833	−2.400
	(1.636)	(1.386)	(1.585)	(1.950)	(1.848)	(2.003)
	Panel B. - Carry Factor Model					
	Low	2	3	4	High	Hi-Lo
α	0.935	2.651	1.627	3.609	6.209	−9.654*
	(2.972)	(2.666)	(3.760)	(4.631)	(5.184)	(5.658)
β^{MKT}	0.995***	1.165***	1.203***	1.278***	1.365***	−0.370***
	(0.092)	(0.067)	(0.064)	(0.065)	(0.081)	(0.140)
β^{carry}	−1.799*	−1.963	−1.346	−1.357	−0.704	−1.132
	(1.078)	(1.301)	(1.317)	(1.668)	(1.308)	(1.013)
	Panel C. - Currency Factor Model					
	Low	2	3	4	High	Hi-Lo
α	−0.330	0.255	0.198	1.130	5.140	−9.418*
	(2.735)	(2.681)	(3.431)	(4.355)	(4.490)	(4.927)
β^{MKT}	1.022***	1.178***	1.207***	1.276***	1.365***	−0.341**
	(0.088)	(0.061)	(0.059)	(0.058)	(0.076)	(0.133)
$\beta^{\mathrm{currency}}$	1.350	1.473	0.939	1.275	0.788	0.518
	(1.022)	(1.168)	(1.212)	(1.578)	(1.311)	(1.056)

Table B.5
Returns - Fama MacBeth Regressions

This table reports the Fama MacBeth coefficients from monthly cross-sectional regressions of individual stock returns on either shipping costs (Columns 1 to 6) or the logarithm of the weight-to-value ratio (Columns 7 to 12), and control variables. Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. $\text{BETA}_{USStockMarket}$ for a stock in a given month is the beta of the stock monthly returns with the US stock market return estimated using monthly data over the past 60 months. LN(ME) is the logarithm of firm market capitalization in the previous month. BE/ME is book-to-market equity defined as book value of equity (item CEQ) divided by market value of equity (item CSHO $\times$ item PRCC_F) at the end of fiscal year t-2. Return on assets (ROA) is defined as operating income after depreciation and amortization (item OIBDP-itemDP) divided by total assets at the end of fiscal year t-2. I/K is capital expenditure (item CAPX) divided by property, plant and equity (item PPENT) at the end of fiscal year t-2. MARKET LEV is total debt (item DLC+item DLTT) divided by the sum of total debt and market value of equity at the end of fiscal year t-2. All independent variables are windsorized at the 99th percentile of their empirical distribution. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Columns 1 to 3, and 1990-2015 in Columns 4 to 6.

	RET									
	All stocks	Size(Low)	Size(High)	ROA(Low)	ROA(High)	All stocks	Size(Low)	Size(High)	ROA(Low)	ROA(High)
Shipping costs	-0.822***	-1.851***	-0.396**	-2.607***	-0.368**					
	(0.253)	(0.463)	(0.175)	(0.701)	(0.176)					
Log Weight_to_value						-0.023***	-0.041***	-0.015**	-0.047***	-0.016***
						(0.007)	(0.009)	(0.006)	(0.012)	(0.006)
$\text{BETA}_{US.Stock.Market}$	0.006	0.041*	-0.024	0.029	-0.011	0.013	0.054*	-0.015	0.043*	-0.008
	(0.016)	(0.021)	(0.019)	(0.019)	(0.018)	(0.021)	(0.029)	(0.024)	(0.026)	(0.023)
LN(ME)	-0.026***	-0.177***	-0.013**	-0.060***	-0.011*	-0.029***	-0.182***	-0.009	-0.079***	-0.007
	(0.006)	(0.022)	(0.006)	(0.012)	(0.006)	(0.008)	(0.026)	(0.008)	(0.017)	(0.007)
BEME	0.023*	0.019	0.014	0.017	0.038*	0.018	0.009	0.015	0.012	0.020
	(0.012)	(0.015)	(0.019)	(0.016)	(0.022)	(0.016)	(0.019)	(0.027)	(0.021)	(0.031)
ROA	0.064	0.053	0.113*	0.122**	-0.095	0.065	0.033	0.082	0.140***	-0.101
	(0.048)	(0.070)	(0.059)	(0.053)	(0.087)	(0.062)	(0.085)	(0.069)	(0.052)	(0.099)
I/K	-0.035	-0.002	-0.039	-0.003	-0.006	-0.041	0.005	-0.043	-0.014	-0.012
	(0.024)	(0.046)	(0.038)	(0.036)	(0.041)	(0.032)	(0.059)	(0.052)	(0.045)	(0.054)
MARKET LEV	0.022	-0.048	0.057	0.065	-0.029	0.051	-0.032	0.068	0.097	-0.003
	(0.045)	(0.053)	(0.048)	(0.049)	(0.055)	(0.064)	(0.073)	(0.065)	(0.073)	(0.076)
Observations	554512	170558	200198	199288	175415	396726	129747	134806	149528	122545
R^2	0.041	0.046	0.088	0.047	0.064	0.043	0.042	0.099	0.043	0.066

Table B.6
Returns - Fama Mac-Beth Regressions - Controlling for Gomes et al. (2009) sectors classification

This table reports variants of the Fama Mac-Beth regressions in Table B.5 in which we include as control variables dummies for each industry in Gomes et al. (2009) classification based on their primary contribution to final demand according to the benchmark input-output accounts, namely nondurable sectors, durable sectors, investment sectors and other. Services are absent in our regressions given that our sample is restricted to manufacturing. Monthly returns are multiplied by 12 so as to make the magnitude comparable to annualized returns. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. $BETA_{USStockMarket}$ for a stock in a given month is the beta of the stock monthly returns with the US stock market return estimated using monthly data over the past 60 months. LN(ME) is the logarithm of firm market capitalization in the previous month. BE/ME is book-to-market equity defined as book value of equity (item CEQ) divided by market value of equity (item CSHO× item PRCC_F) at the end of fiscal year t-2. Return on assets (ROA) is defined as operating income after depreciation and amortization (item OIBDP-itemDP) divided by total assets at the end of fiscal year t-2. I/K is capital expenditure (item CAPX) divided by property, plant and equity (item PPENT) at the end of fiscal year t-2. MARKET LEV is total debt (item DLC+item DLTT) divided by the sum of total debt and market value of equity at the end of fiscal year t-2. All independent variables are windsorized at the 99th percentile of their empirical distribution. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Columns 1 to 3, and 1990-2015 in Columns 4 to 6.

	RET									
	All stocks	Size(Low)	Size(High)	ROA(Low)	ROA(High)	All stocks	Size(Low)	Size(High)	ROA(Low)	ROA(High)
SC	-0.767***	-1.547***	-0.435**	-2.144***	-0.382**					
	(0.248)	(0.465)	(0.181)	(0.656)	(0.172)					
Log Weight_to_value						-0.021***	-0.034***	-0.014**	-0.043***	-0.015***
						(0.007)	(0.009)	(0.006)	(0.011)	(0.006)
$BETA_{US.Stock.Market}$	0.007	0.040*	-0.022	0.031	-0.010	0.014	0.054*	-0.016	0.043*	-0.007
	(0.016)	(0.021)	(0.018)	(0.019)	(0.017)	(0.021)	(0.028)	(0.023)	(0.026)	(0.023)
LN(ME)	-0.028***	-0.178***	-0.015**	-0.064***	-0.012**	-0.031***	-0.185***	-0.011	-0.082***	-0.008
	(0.007)	(0.022)	(0.006)	(0.012)	(0.006)	(0.008)	(0.026)	(0.008)	(0.017)	(0.007)
BEME	0.023*	0.019	0.016	0.017	0.038*	0.018	0.009	0.016	0.010	0.021
	(0.012)	(0.015)	(0.018)	(0.016)	(0.022)	(0.016)	(0.020)	(0.026)	(0.021)	(0.031)
ROA	0.077*	0.069	0.117**	0.142***	-0.095	0.074	0.040	0.096	0.149***	-0.093
	(0.046)	(0.069)	(0.055)	(0.053)	(0.086)	(0.061)	(0.084)	(0.068)	(0.052)	(0.099)
I/K	-0.029	0.012	-0.034	0.005	-0.001	-0.033	0.019	-0.029	-0.012	-0.004
	(0.024)	(0.046)	(0.040)	(0.036)	(0.041)	(0.031)	(0.061)	(0.054)	(0.045)	(0.052)
MARKET LEV	0.023	-0.053	0.068	0.063	-0.029	0.049	-0.045	0.080	0.093	-0.000
	(0.044)	(0.051)	(0.045)	(0.048)	(0.053)	(0.062)	(0.071)	(0.060)	(0.073)	(0.073)
Gomes et al. (2009) industry dummies (Durable, non-durable, investment, other)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	554512	170558	200198	199288	175415	396726	129747	134806	149528	122545
R^2	0.046	0.056	0.102	0.056	0.076	0.047	0.050	0.112	0.051	0.077

Table B.7
Exporter Status from 10Ks - Fama MacBeth Regressions

This table reports the Fama MacBeth coefficients from monthly cross-sectional regressions of exporter status on either shipping costs or the logarithm of the weight-to-value ratio, and control variables. A firm is considered as an exporter in a given year based on text-based analysis of firm 10-Ks (annual reports). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. $BETA_{USStockMarket}$ for a stock in a given month is the beta of the stock monthly returns with the US stock market return estimated using monthly data over the past 60 months. LN(ME) is the logarithm of firm market capitalization in the previous month. BE/ME is book-to-market equity defined as book value of equity (item CEQ) divided by market value of equity (item CSHO$\times$ item PRCC_F) at the end of fiscal year t-2. Return on assets (ROA) is defined as operating income after depreciation and amortization (item OIBDP-itemDP) divided by total assets at the end of fiscal year t-2. I/K is capital expenditure (item CAPX) divided by property, plant and equity (item PPENT) at the end of fiscal year t-2. MARKET LEV is total debt (item DLC+item DLTT) divided by the sum of total debt and market value of equity at the end of fiscal year t-2. All independent variables are windsorized at the 99th percentile of their empirical distribution. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1994-2015.

	Exporter (0,1)					
Shipping costs	-1.805***		-2.143***		-2.257***	
	(0.190)		(0.234)		(0.195)	
Log Weight_to_value		-0.004**		-0.009***		-0.011***
		(0.002)		(0.003)		(0.002)
$BETA_{US.Stock.Market}$	0.023***	0.028***	0.063***	0.066***	0.027***	0.032***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
LN(ME)	0.043***	0.042***			0.034***	0.033***
	(0.004)	(0.003)			(0.004)	(0.004)
ROA			0.264***	0.252***	0.182***	0.172***
			(0.016)	(0.015)	(0.019)	(0.019)
MARKET LEV	0.139***	0.096***	0.096***	0.065***	0.121***	0.090***
	(0.023)	(0.023)	(0.021)	(0.020)	(0.023)	(0.023)
I/K	-0.052**	-0.038	-0.055*	-0.046	-0.033	-0.025
	(0.024)	(0.024)	(0.028)	(0.027)	(0.025)	(0.025)
Observations	26980	26965	26980	26965	26980	26965
R^2	0.064	0.057	0.051	0.043	0.076	0.067

Table B.8
Shipping costs and weight-to-value portfolios - Returns, conditional on exporter status

This table presents equally-weighted (Columns 1 to 6) or value-weighted (Columns 7 to 12) monthly excess returns (α) over a five-factor Fama-French model of either shipping costs portfolios (Panel A) or weight-to-value portfolios (Panel B). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. In any given month, stocks are independently sorted into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into two portfolios based on their status as an exporter in the previous year. A firm is considered as an exporter in a given year based on text-based analysis of firm 10-Ks (annual reports). We then regress a given portfolio's value-weighted return in excess of the risk free rate on the market portfolio minus the risk-free rate, the size factor (small minus big), and the value factor (high minus low), the profitability factor (robust minus weak), and the investment factor (conservative minus aggressive) all obtained from Kenneth French's website. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1994-2015.

	Panel A: Shipping cost portfolios											
	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
Non-Exporters Only	14.639***	9.907**	5.502	-0.496	-2.188	-16.827***	7.554**	5.401	-0.752	-0.601	-4.540**	-12.094**
	(5.173)	(4.831)	(4.022)	(3.487)	(3.497)	(5.754)	(3.834)	(3.676)	(4.513)	(3.015)	(1.974)	(4.948)
Exporters Only	15.940***	7.781**	8.288**	1.327	-0.761	-16.701***	5.163**	1.413	1.815	-2.212	1.179	-3.984
	(5.178)	(3.619)	(3.279)	(2.806)	(1.939)	(5.407)	(2.011)	(2.353)	(3.270)	(2.415)	(1.955)	(3.244)

	Panel A: Weight-to-value portfolios											
	Equally weighted						Value weighted					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
Non-Exporters Only	13.869***	11.461***	6.524**	0.555	-0.995	-14.863***	7.804**	6.547*	4.058	-3.867*	-1.012	-8.817**
	(3.993)	(4.136)	(3.310)	(2.861)	(2.799)	(4.403)	(3.066)	(3.718)	(3.287)	(2.032)	(2.066)	(4.182)
Exporters Only	14.559***	9.992**	7.727**	1.499	-0.796	-15.355***	2.919	8.257***	-1.658	-1.966	0.832	-2.088
	(4.895)	(3.877)	(3.432)	(2.321)	(2.247)	(5.068)	(1.848)	(2.624)	(2.845)	(1.791)	(1.956)	(3.256)

Table B.9
Tariff changes, shipping costs and trade flows

This table presents the result of panel regressions assessing the effect of tariff cuts on trade flows, conditional on the level of shipping costs (SC). SC are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. High (low) SC industries are those in the top (bottom) quintile of the distribution of SC in any given year. Tariffs are measured at the industry-year level as the ratio of customs duties to the Free-on-Board value of imports. Imports, Exports and Net Imports are measured at the industry-year level and normalized by the sum of total shipments and imports. Tariff change is the difference in tariffs with respect to the previous year. Large tariff change is a variable equal to the tariff change if it is larger than twice the median absolute tariff change in the sample, and zero otherwise. All regressions include controls for the industry level of tariffs, level of import penetration, log employment, log value added and log shipments. Standard errors are clustered at the industry level and reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance. The sample period is from 1974 to 2006.

	Delta (t+1, t+5)			
	Imports	Net imports (Imp-Exp)	Imports	Net imports (Imp-Exp)
Tariff change (t) x High SC	0.134	0.087		
	(0.145)	(0.166)		
Tariff change (t) x Low SC	-0.635***	-0.450*		
	(0.169)	(0.246)		
Large tariff change (t) x High SC			0.132	0.094
			(0.146)	(0.166)
Large tariff change (t) x Low SC			-0.639***	-0.451*
			(0.168)	(0.243)
High CIF	0.005	-0.006	0.004	-0.006
	(0.017)	(0.021)	(0.017)	(0.021)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	4206	4206	4206	4206
R^2	0.378	0.282	0.378	0.282
Difference High vs Low SC	0.769***	0.536**	0.770***	0.545**
	(0.193)	(0.253)	(0.192)	(0.250)

Table B.10
Tariff changes, shipping costs and industry cash-flows

This table presents the result of panel regressions assessing the effect of tariff cuts on various sectoral outcomes, conditional on the level of shipping costs (SC). SC are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. High (low) SC industries are those in the top (bottom) quintile of the distribution of SC in any given year. Tariffs are measured at the industry-year level as the ratio of customs duties to the Free-on-Board value of imports. Import penetration is measured at the industry-year level as the ratio of the Free-on-Board value of imports and the sum of total shipments and imports. Tariff change is the difference in tariffs with respect to the previous year. Large tariff change is a variable equal to the tariff change if it is larger than twice the median absolute tariff change in the sample, and zero otherwise. All regressions include control for the industry level of tariffs, level of import penetration, log employment, log value added and log shipments. Standard errors are clustered at the industry level and reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance. The sample period is from 1974 to 2006.

	Delta (t+1, t+5)					
	Log employment	Log shipments	Log value added	Log employment	Log shipments	Log value added
Tariff change (t) x High SC	-0.435	-0.320	0.097			
	(0.641)	(0.492)	(0.795)			
Tariff change (t) x Low SC	1.165***	2.558***	3.008***			
	(0.364)	(0.724)	(0.820)			
Large tariff change (t) x High SC				-0.409	-0.303	0.132
				(0.636)	(0.492)	(0.791)
Large tariff change (t) x Low SC				1.172***	2.588***	3.024***
				(0.364)	(0.720)	(0.821)
High SC	-0.016	-0.008	-0.071	-0.016	-0.008	-0.071
	(0.033)	(0.033)	(0.055)	(0.033)	(0.033)	(0.055)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4206	4206	4206	4206	4206	4206
R^2	0.503	0.496	0.438	0.503	0.496	0.438
Difference High vs Low SC	-1.600**	-2.878***	-2.911***	-1.581**	-2.891***	-2.892***
	(0.729)	(0.718)	(0.937)	(0.725)	(0.713)	(0.936)

Table B.11
Chinese Import Growth Betas - controlling for US market returns

This table presents Chinese import growth betas of each shipping costs portfolios (Columns 1 to 6) and weight-to-value portfolios (Columns 7 to 12). Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. In any given month, stocks are independently sorted into five portfolios based on either their industry shipping costs or weight-to-value ratio in the previous year, and into three portfolios based on either their market capitalization (Size) in the previous month or based on their return on assets (ROA) in year t-2. Stocks at the intersection of the two sorts are grouped together to form portfolios based on shipping costs and either Size or ROA (Columns 1 to 6), and based on weight-to-value and either Size or ROA (Columns 7 to 12). We then compute Chinese import growth betas separately for each (double-sorted) portfolio as the coefficient β of the following OLS regression estimated at the monthly frequency over the sample period: $R_t^{EW} = \beta ChImpGr_t + \gamma MKTRF_t + \alpha + u_t$, where R_t^{EW} is the equally-weighted portfolio excess return in month t, ChImpGr_t is the growth rate of Chinese imports to the U.S. between month t and the same month in the previous year and MKTRF is the market portfolio minus the risk-free rate from Kenneth French's website. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1985-2015 in Columns 1 to 6, and 1990-2015 in Columns 7 to 12.

Chinese Import Growth Betas (controlling for US market returns)

	Shipping cost portfolios						Weight-to-value portfolios					
	Low	2	3	4	High	Hi-Lo	Low	2	3	4	High	Hi-Lo
	Size terciles						Size terciles					
T1	-0.713**	-0.613**	-0.526**	-0.263	-0.418*	0.337	-0.761*	-0.332	-0.264	-0.126	-0.347	0.489
	(0.332)	(0.301)	(0.245)	(0.236)	(0.227)	(0.253)	(0.443)	(0.404)	(0.332)	(0.289)	(0.310)	(0.337)
T2	-0.490*	-0.334	-0.225	-0.122	-0.242	0.250	-0.480	-0.082	-0.174	-0.076	-0.173	0.246
	(0.266)	(0.222)	(0.194)	(0.160)	(0.151)	(0.249)	(0.340)	(0.290)	(0.261)	(0.191)	(0.193)	(0.347)
T3	-0.339*	-0.069	-0.109	-0.106	-0.018	0.327	-0.218	-0.105	-0.069	-0.040	0.015	0.231
	(0.183)	(0.156)	(0.141)	(0.111)	(0.106)	(0.215)	(0.242)	(0.211)	(0.188)	(0.130)	(0.135)	(0.290)
	ROA terciles						ROA terciles					
T1	-0.664**	-0.508*	-0.619**	-0.210	-0.142	0.502*	-0.714*	-0.378	-0.405	-0.219	-0.003	0.627*
	(0.299)	(0.298)	(0.267)	(0.247)	(0.241)	(0.272)	(0.390)	(0.390)	(0.345)	(0.311)	(0.305)	(0.347)
T2	-0.378**	-0.189	-0.079	-0.142	-0.165	0.161	-0.276	0.103	-0.048	0.054	-0.148	0.051
	(0.187)	(0.179)	(0.152)	(0.142)	(0.134)	(0.212)	(0.251)	(0.232)	(0.211)	(0.173)	(0.176)	(0.292)
T3	-0.328**	-0.171	-0.272**	-0.111	-0.142	0.221	-0.259	-0.007	-0.202	-0.106	-0.080	0.189
	(0.144)	(0.153)	(0.134)	(0.122)	(0.103)	(0.164)	(0.195)	(0.201)	(0.187)	(0.135)	(0.128)	(0.216)

Table B.12
Returns - Fama Mac-Beth Regressions - Controlling for intra-industry input linkages

This table reports variants of the Fama Mac-Beth regressions in Table B.5 for different subsamples. In Columns [1] and [2] (respectively Columns [3] and [4]), we run the regressions only in industries for which the share of inputs sourced from the same (SIC4) industry is below (respectively above) five percent. The share of inputs sourced from the same (SIC4) industry is computed from the BEA 2007 input-output matrix. Shipping costs are measured at the industry-year level as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports. Weight-to-value is measured at the industry-year level as the ratio of the weight in kilograms over the Free-On-Board value of imports. $\text{BETA}_{USStockMarket}$ for a stock in a given month is the beta of the stock monthly returns with the US stock market return estimated using monthly data over the past 60 months. LN(ME) is the logarithm of firm market capitalization in the previous month. BE/ME is book-to-market equity defined as book value of equity (item CEQ) divided by market value of equity (item CSHO× item PRCC_F) at the end of fiscal year t-2. Return on assets (ROA) is defined as operating income after depreciation and amortization (item OIBDP-itemDP) divided by total assets at the end of fiscal year t-2. I/K is capital expenditure (item CAPX) divided by property, plant and equity (item PPENT) at the end of fiscal year t-2. MARKET LEV is total debt (item DLC+item DLTT) divided by the sum of total debt and market value of equity at the end of fiscal year t-2. All independent variables are windsorized at the 99th percentile of their empirical distribution. Standard errors are estimated using Newey-West with 12 lags. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. The sample period is 1975-2015 in Columns 1 and 2, and 1990-2015 in Columns 3 and 4.

	RET Intra-industry input share			
	$\leq 5\%$	$> 5\%$	$\leq 5\%$	$> 5\%$
SC	-0.611***	-1.307***		
	(0.218)	(0.482)		
Log Weight-to-value			-0.021***	-0.027***
			(0.006)	(0.009)
$\text{BETA}_{US.Stock.Market}$	-0.001	0.015	0.002	0.021
	(0.016)	(0.016)	(0.022)	(0.020)
LN(ME)	-0.024***	-0.031***	-0.026***	-0.034***
	(0.007)	(0.007)	(0.009)	(0.009)
BEME	0.021*	0.028*	0.019	0.021
	(0.012)	(0.016)	(0.015)	(0.021)
ROA	0.058	0.074	0.059	0.081
	(0.054)	(0.049)	(0.068)	(0.060)
I/K	-0.037	-0.030	-0.029	-0.043
	(0.030)	(0.033)	(0.041)	(0.042)
MARKET LEV	0.023	0.030	0.069	0.027
	(0.051)	(0.046)	(0.072)	(0.061)
Observations	305403	245079	211778	183202
R^2	0.048	0.053	0.049	0.052