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Julian Hinz and Elsa Leromain

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ABSTRACT

CRITICALLY IMPORTANT: THE HETEROGENEOUS EFFECT OF POLITICS ON TRADE*

Julian Hinz and Elsa Leromain

The proliferation of international supply chains makes the domestic production of goods increasingly dependent on inputs from foreign sources. By expanding their sourcing portfolio to foreign suppliers, firms and by extension entire economies are more prone to the trade effects of adverse bilateral political shocks. In this paper, we analyze the relation between political relations and trade at lower levels of aggregation, allowing for a heterogeneous effect by types of inputs. We show that a negative shock to political relations has a more pronounced effect on trade of critical goods, conditional on the ease of switching suppliers. We construct a simple model exhibiting input-output linkages to clarify the mechanisms at play, from which we derive testable predictions. Using a new measure for countries' dependence on these critical inputs, we then test the proposed mechanism in a difference-in-differences framework. To address potential endogeneity issues we perform an event study, in which the treatment is an exogenous adverse political shock. Using a new dataset on the status of diplomatic representation and monthly trade data, we exploit the recalling or summoning of the ambassador of a country as a shock to bilateral political relations.

Keywords: Trade frictions, Political Relations, Dependence, Input Sourcing
JEL classification: F13, F14, F51, F52

Julian Hinz
Kiel Institute for the World Economy
Kiellinie 66, D-24105 Kiel, Germany
Email: julian.hinz@ifw-kiel.de

Elsa Leromain
London School of Economics,
Houghton Street, London WC2A 2AE,
United Kingdom, and
Paris School of Economics /
Université Paris 1 Panthéon-Sorbonne,
106-112 Boulevard de l'Hôpital,
75013 Paris, France

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1 Introduction

"Multinationals are very nervous now, and they should be. [...] In the past, only some sectors—mining, oil and gas, commodity companies—had to worry about geopolitics. Now companies that make fizzy drinks or handbags or chocolate are finding their supply chains, their markets, their operations completely blown apart by geopolitical risks and unfavorable treatment."

— Mark Leonard, co-founder of the European Council on Foreign Relations[1]

The proliferation of international supply chains makes the domestic production of goods increasingly dependent on inputs from foreign sources. By expanding their sourcing portfolio to foreign suppliers, firms and by extension entire economies are more prone to the trade effects of adverse bilateral political shocks. As trade issues have reentered the limelight of politics, understanding the effects and channels through which politics itself impacts trade is of vital importance. In this paper, we analyze the relation between political relations and trade at the sector level, allowing for a heterogeneous effect by types of inputs. We show that a negative shock to political relations has a more pronounced effect on trade of *critical* goods, conditional on the ease of switching suppliers. As critical goods we define foreign inputs used intensively directly and indirectly for the production of goods that are domestically consumed.[2]

We develop a simple theoretical model to illustrate the proposed mechanism. The model predicts a general decrease in trade following negative shocks, with two modifiers. First, products on highly competitive markets have a stronger response, as the initial supplier may no longer be the cheapest. Second, among such products, those that are critical are more responsive, as the incentive to switch is high.[3] The theoretical model yields a testable prediction and a measure of dependence that can be computed using input-output tables.

We test the proposed mechanism with monthly trade data in a difference-in-differences framework. Political relations and trade are likely prone to endogeneity, e.g. the literature has established a link between trade and the probability of conflict (Martin et al., 2008b). We therefore rely on an exogenous shock to political relations to test the prediction: The summoning, expulsion or recalling of foreign or own diplomats by five major countries. The decision to apply this diplomatic instrument is taken by the foreign office or govern-

[1] From "The great unraveling of globalization", Washington Post by Jeffrey Rothfeder on April 24, 2015.

[2] We thus follow Ossa (2015) in the wording, who states that "[...] imports in some industries are critical to the functioning of the economy, so that a complete shutdown of international trade is very costly overall" (Ossa, 2015, p. 266).

[3] Note that we use "industry", "good" and "product" interchangeably as in the model each industry produces one good and the data needed for the empirical analysis is only available at aggregated industry level. The concept holds for any level of aggregation.

ment of a country to exert diplomatic pressure on another country. It often goes along with a *note verbale* or *letter of protest*, a formal declaration of disapproval that occurs at that date and is specific to a country pair. For instance, in one recent case in June 2015, the media extensively reported on the summoning of the American ambassador in Paris by the French government over "unacceptable spying on French political leaders".[4] We construct a new event dataset by collecting information on these diplomatic events from press releases found on the websites of the foreign ministries of five politically and economically important countries (France, UK, Russia, Germany, Japan).[5] As bigger countries exercise their political power regardless of trade ties, focusing on these countries ensures the exogeneity of the events studied.

We find compelling empirical evidence for the theoretical prediction. On average imports drop by 8 % in response to an adverse political event, in line with the existing literature. A one-standard deviation increase in the (log normalized) dependence in a highly competitive market yields a net average drop by 15 %. We conduct a series of robustness test to validate the findings against a number of potential concerns, and find the results to be robust to different samples, data sources and the inclusion of potential confounding variables.

A growing body of research is looking into the nexus of political relations between countries and their bilateral trade, as non-traditional determinants of trade have been recognized as a primary source in explaining the *dark matter* of trade cost (Head and Mayer, 2014). Head and Mayer (2013) acknowledge the role of political history, as colonial legacies, through common languages, legal systems or currencies, as well as past conflicts have been shown to have a lasting impact on bilateral trade. Glick and Taylor (2010) study the impact of the two World wars on trade and economic activity in general, finding persistent large negative effects. In a series of papers Martin and coauthors focus on inter- and intra-state conflict and find evidence for a complex link with trade. Bilateral trade decreases the probability of interstate war, while multilateral trade openness increases it (Martin et al., 2008b), a feature that can be institutionalized by economic integration agreements (Martin et al., 2012). Trade openness may also deter large scale civil wars, but fuel smaller ones (Martin et al., 2008a). However, it seems questionable to reduce the influence of political determinants of trade flows to historical episodes and those of conflict and colonial legacy.

A number of works in recent years have pointed to the importance of non-security-related political and societal features of the trading countries. Yu (2010) studies the impact

[4] See *The Guardian*, 24 June 2015, `http://www.theguardian.com/world/2015/jun/24/francois-hollande-says-us-spying-on-french-officials-unacceptable-nsa`

[5] The United States does not make this information publicly available. China does make this piece of information public but it cannot be retrieved.

of political (democratic) institutions in the gravity equation and Umana Dajud (2013) finds positive coefficients for similarity in foreign policy and political ideology of trading partners. Rose (2007) shows that diplomatic representation may foster trade, estimating that each additional foreign mission increases exports by 6–10 %.

Some recent works point to the implications of changes in the political relations for trade flows: Michaels and Zhi (2010) estimate an 8 percent drop in bilateral trade in intermediate inputs between the US and France as a response to the French opposition to the Iraq war in 2003. Mityakov et al. (2012), emphasizing heterogeneity across sectors and the motivation of "energy security", show that a one standard deviation decrease in political distance, as measured through similarity of UN General Assembly voting, is associated with a 14 percent decrease in US imports.

Others find more mixed evidence: Nitsch (2007) shows that official visits of heads of states have on average a positive effect on export of an 8–10 % increase. However, these results are very sensitive to the type of visits and much less robust for imports. Fuchs and Klann (2013) estimate the effect of foreign visits of the Dalai Lama on the host countries' subsequent trade with China. They find a significant effect for meetings with the countries' top political leaders, however the effect lasts only for one year. Davis et al. (2016) demonstrate the heterogeneous effect of political relations on imports and exports by type of ownership. The intuition is that governments can directly influence state-owned firms' behavior, implying stronger effects for these firms as opposed to privately owned ones.

Our paper offers three important contributions to the literature. First, in departure from these earlier works, we look at the effect politics on trade at lower levels of aggregation. We show that responses are heterogeneous and negative political shocks have a stronger impact on *critical* imported inputs that the firms in the economy use intensively for final good production. Second, the model yields a measure of dependence on theses critical inputs that can be easily computed using only national input-output tables. Third, we introduce a new proxy for exogenous changes to political relations with a dataset on diplomatic events. This provides us with a clear identification of the mechanism at play.

The remainder of the paper is organized as follows. In section 2 we develop a simple model to illustrate the proposed mechanism. In section 3 we compute a measure of dependence directly derived from the model. In section 4 we test the proposed mechanism using this measure in an event study. Section 5 concludes.

2 Theory

In the following, we sketch a simple model in which a two-sector economy produces intermediate and final goods using labor, domestic and imported inputs. The setup is related to Acemoglu et al. (2012) in its depiction of input-output linkages in the context of the propagation of shocks. Political relations are assumed to enter variable trade costs, which is commonplace in the literature.[6] Political tensions translate into an increase of trade costs, which in turn leads to an increase of the price of the input, which itself leads to an increase of the price final good.

2.1 Basic Setting

Assume a setting in which the domestic economy produces two goods, x and y. The production of good x requires labor l_x, a domestic input y_x, and foreign inputs m_x and n_x. The production of good y analogously requires labor l_y, x_y, m_y and n_y. The production functions are of Cobb-Douglas type such that

$$x = l_x^{\lambda_x} y_x^{\beta_x} m_x^{\gamma_x} n_x^{\delta_x} \tag{1}$$

$$y = l_y^{\lambda_y} x_y^{\alpha_y} m_y^{\gamma_y} n_y^{\delta_y} \tag{2}$$

$$\text{where} \quad \lambda_x + \beta_x + \gamma_x + \delta_x = \lambda_y + \alpha_y + \gamma_y + \delta_y = 1$$

The exponents in equations (1) and (2) denote the respective technical coefficients. The total production of a good produced domestically can be either used as input in the other sector or consumed as final good, such that $x = x_y + x_c$ and $y = y_x + y_c$. Foreign goods are only used as inputs in the domestic economy, such that $m = m_x + m_y$ and $n = n_x + n_y$. Let p_x, p_y, p_m, and p_n denote the price of the respective good in the domestic economy. Labor is mobile and thus the wage w is equal in both sectors. Foreign inputs are imported from the cheapest available source.

The representative consumer in the domestic economy has a Cobb-Douglas utility of the form $U = x_c^{\eta} y_c^{1-\eta}$. The consumer disposes over 1 unit of labor such that she receives an income of w and maximizes her utility under the budget constraint $p_x x_c + p_y y_c = w$. As a result, the representative consumer spends a share η of her income on x and the rest on y. We thus have $x_c = \eta \frac{w}{p_x}$ and $y_c = (1-\eta)\frac{w}{p_y}$.

The production function being of Cobb-Douglas type, the model does not allow for a

[6] In his theoretical framework, Yu (2010) models variable trade costs to explicitly depend on the level of democratization of the importing country. Mirza and Verdier (2008) include costs due to the threat of terrorism in a generic measure of transaction costs, arguing that terrorism threats create uncertainty and anxiety, which induce economic agents to become more aware about potential harm when conducting any transaction in the respective country. Umana Dajud (2013) measures political proximity as a variable element of the trade cost function.

change in production technologies or a substitution between foreign and domestic inputs as a response to a shock. Since our analysis focuses on short-term effects of a shock, the assumption is sensible. In the short-run, production technology is unlikely to adjust. Crucially, however, trade patterns may change after the shock. The domestic economy might substitute between inputs from different foreign sources.

The first step in developing the model is to choose the supplier for each imported input, m and n. To ship the goods from a foreign source i, the domestic economy incurs an iceberg trade costs τ_i. The price of a foreign input k sourced from i in the domestic market is then $p(d)_{k,i} = \tau_i p_{k,i}$, with $p_{k,i}$ the price of the input k in origin i. The domestic economy sources m and n from the cheapest available sources. A shock to trade costs with one partner might affect trade patterns, and hence the price of the inputs in the domestic economy.

Once the choice of the foreign input supplier is determined, in each sector the representative firm maximizes profits. The firm optimization problem yields the total amounts of the goods in the economy:

$$\begin{pmatrix} x \\ y \\ m \\ n \end{pmatrix} = \begin{pmatrix} 0 & \frac{p_y}{p_x}\alpha_y & 0 & 0 \\ \frac{p_x}{p_y}\beta_x & 0 & 0 & 0 \\ \frac{p_x}{p_m}\gamma_x & \frac{p_y}{p_m}\gamma_y & 0 & 0 \\ \frac{p_x}{p_n}\delta_x & \frac{p_y}{p_n}\delta_y & 0 & 0 \end{pmatrix} \begin{pmatrix} x \\ y \\ m \\ n \end{pmatrix} + \begin{pmatrix} x_c \\ y_c \\ 0 \\ 0 \end{pmatrix}$$

The resemblance to the Leontief matrix is clear, so that the unit output for the goods in the economy can simply be retrieved by inverting, so that

$$\begin{pmatrix} x \\ y \\ m \\ n \end{pmatrix} = \frac{1}{1-\alpha_y\beta_x} \begin{pmatrix} 1 & \frac{p_y}{p_x}\alpha_y & 0 & 0 \\ \frac{p_x}{p_y}\beta_x & 1 & 0 & 0 \\ \frac{p_x}{p_m}\gamma_x + \frac{p_x}{p_y}\beta_x\frac{p_y}{p_m}\gamma_y & \frac{p_y}{p_m}\gamma_y + \frac{p_y}{p_x}\alpha_y\frac{p_x}{p_m}\gamma_x & 1 & 0 \\ \frac{p_x}{p_n}\delta_x + \frac{p_x}{p_y}\beta_x\frac{p_y}{p_n}\delta_y & \frac{p_y}{p_n}\delta_y + \frac{p_y}{p_x}\alpha_y\frac{p_x}{p_n}\delta_x & 0 & 1 \end{pmatrix} \begin{pmatrix} x_c \\ y_c \\ 0 \\ 0 \end{pmatrix}$$

Focusing on imported inputs m and n, we have

$$\begin{pmatrix} m \\ n \end{pmatrix} = \frac{1}{1-\alpha_y\beta_x} \begin{pmatrix} \frac{p_x}{p_m}(\gamma_x + \beta_x\gamma_y) & \frac{p_y}{p_m}(\gamma_y + \alpha_y\gamma_x) \\ \frac{p_x}{p_n}(\delta_x + \beta_x\delta_y) & \frac{p_y}{p_n}(\delta_y + \alpha_y\delta_x) \end{pmatrix} \begin{pmatrix} x_c \\ y_c \end{pmatrix} \tag{3}$$

The domestic economy is considered as being more *dependent* on input m than on input n, i.e. m is more critical than n in that the economy needs more of it for final consumption, if

and only if

$$x_c \frac{p_x}{p_m}(\gamma_x + \beta_x \gamma_y) + y_c \frac{p_y}{p_m}(\gamma_y + \alpha_y \gamma_x) > x_c \frac{p_x}{p_n}(\delta_x + \beta_x \delta_y) + y_c \frac{p_y}{p_n}(\delta_y + \alpha_y \delta_x)$$
$$\Leftrightarrow \qquad \textit{Dependence}_m > \textit{Dependence}_n$$

This measure of *Dependence* is a weighted mean of each sector's dependence to an input; each sector's dependence is a function of direct use of the input and indirect input use which depends on domestic cross-sectoral linkages.

2.2 Impact of a change in political relations

In this stylized two-sector setting with imported inputs, we now consider the effect of a change in political relations on trade patterns. We make the simplifying assumption that before the shock the domestic economy sources both inputs m and n from the same country, denoted 1 in what follows. Country 1 supplies the cheapest options available in the market for the two inputs. We further assume that ex-ante production technologies in country 1 are such that the prices of inputs m and n from country 1 in the domestic economic are: $p(d)_{m,1} = p(d)_{n,1} = \tau_1 p_1$. τ_1 is the iceberg trade cost between country 1 and the domestic economy, and p_1 the price of inputs in country 1. Let ε_k be the ex-ante price gap in the domestic economy between the cheapest source for input k, i.e. country 1, and the second best, denoted country 2. As country 1 is the first best for the two inputs we have $\varepsilon_k > 0$.

We now assume that political relations between the domestic economy and country 1 deteriorate. The negative shock is modeled as an increase from τ_1 to τ_1'. Ex-post the prices of m and n from country 1 in the domestic economy are $p(d)'_{m,1} = p(d)'_{n,1} = \tau_1' p_1$. We define ζ as the price difference due to the shock, hence $p(d)'_{k,1} = p(d)_{k,1} + \zeta$. After the shock, the domestic economy has to choose a strategy given the new set of prices. As only the prices from country 1 changed, the initial supplier is not necessarily the cheapest source for either input anymore.

Barrot and Sauvagnat (2016) show that switching costs between trade partners are substantial in the short-run. We therefore assume that if the domestic economy were to change supplier for a given input, it would incur switching costs, which we assume to be identical across inputs. It hence faces a trade-off for each input between the potential benefits of switching supplier versus the cost associated with switching.

One can compute the benefits from switching for each input in our simple framework.[7]

[7] For further details on computations see appendix A.

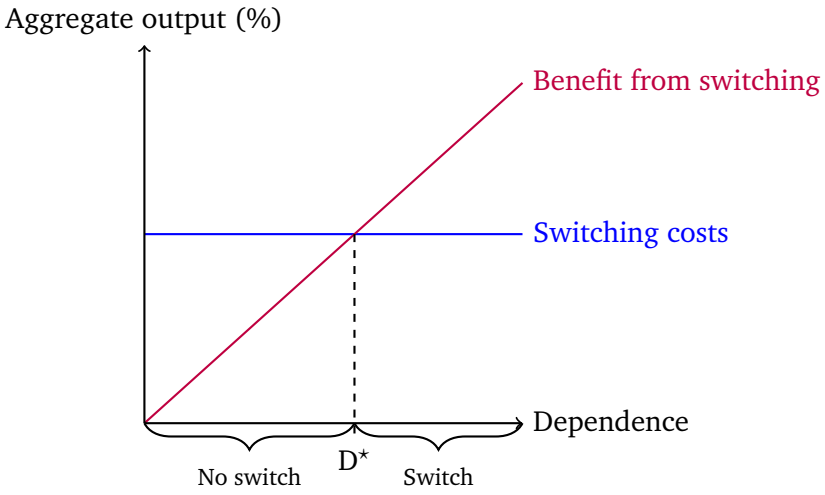


Figure 1: Trade-off for $\varepsilon_k < \zeta$

We define aggregate output as AO $= x^{\eta} y^{1-\eta}$. Then for input m the benefits from switching are:

$$\left|\frac{\partial \log(\text{AO})}{\partial p_m}\right|_{switch} - \left|\frac{\partial \log(\text{AO})}{\partial p_m}\right|_{\overline{switch}} = (\zeta - \varepsilon_m)\frac{1}{p_m}(\eta(\gamma_x + \beta_x\gamma_y) + (1-\eta)(\gamma_y + \alpha_y\gamma_x))$$

For input n the benefits from switching are:

$$\left|\frac{\partial \log(\text{AO})}{\partial p_n}\right|_{switch} - \left|\frac{\partial \log(\text{AO})}{\partial p_n}\right|_{\overline{switch}} = (\zeta - \varepsilon_n)\frac{1}{p_n}(\eta(\delta_x + \beta_x\delta_y) + (1-\eta)(\delta_y + \alpha_y\delta_x))$$

The benefits from switching for input k can hence be written as $(\zeta - \varepsilon_k)$*Dependence*$_k$. While the intensity of the shock to political relations, ζ, is identical across inputs, the value of ε_k may vary between inputs. The greater the initial price gap between the first and second best supplier, the greater ε_k is. The value of ε_k crucially depends on the type of competition on the input market. In a market where the competition is fierce, the price gap between the first and the second best is likely to be very small, while it is likely to be high in a market where each player has a strong market power. Therefore, the greater the competition, the lower ε_k is.

If $\varepsilon_k \geq \zeta$, there is no benefit from switching as country 1 is still the cheapest source for input k after the shock. Trade of input k with the initial supplier decreases as a result of the increase in price, but trade patterns do not change. If $\varepsilon_k < \zeta$, country 1 is no longer the cheapest source for inputs. The strategy is then conditional on the value of *Dependence*$_k$. There is a threshold value of dependence D^* where the benefits of switching are greater

than the switching costs. For inputs with a level of dependence above that threshold, the domestic economy switches supplier and trade patterns. Figure 1 illustrates the trade-off.

From our simple framework, we can then derive the following testable prediction:

Prediction. *A negative shock to bilateral political relations leads to a general decrease in trade flows. The response should be larger for products with highly competitive markets. Among these, the decrease should be more pronounced for critical products.*

Before testing this prediction in section 4 in a reduced-form setting, we introduce the measure of dependence, which we use to identify critical products.

3 Measure of dependence

The measure of dependence on imported inputs can be derived directly from the model in section 2 and constructed using data from input-output tables. Following equation (3), we know that

$$\begin{pmatrix} m \\ n \end{pmatrix} = \frac{1}{1-\alpha_y\beta_x} \begin{pmatrix} \frac{p_x}{p_m}(\gamma_x + \beta_x\gamma_y) & \frac{p_y}{p_m}(\gamma_y + \alpha_y\gamma_x) \\ \frac{p_x}{p_n}(\delta_x + \beta_x\delta_y) & \frac{p_y}{p_n}(\delta_y + \alpha_y\delta_x) \end{pmatrix} \begin{pmatrix} x_c \\ y_c \end{pmatrix}$$

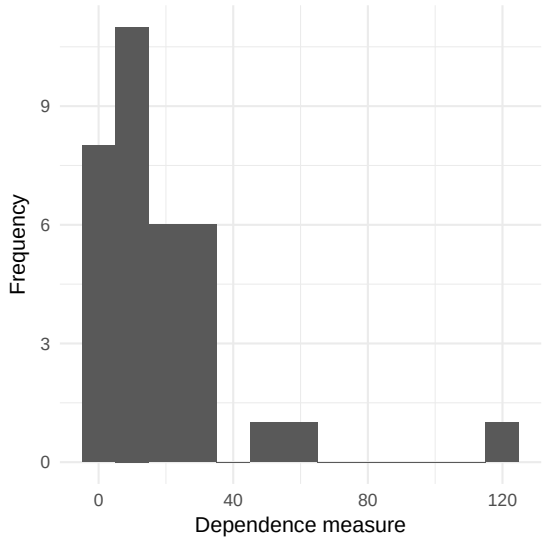
Normalizing by the total consumption of the economy and expressed in matrix form, we call the vector

$$\textit{dependence} = A_{imp}(I - A_{dom})^{-1}F \tag{4}$$

where A_{imp} is the matrix of the values of *imported* inputs by sector and A_{dom} the matrix of the values of *domestic* inputs by sector. F is the vector of final consumption shares. Each element denotes the required value of a foreign input for 1 unit value of final consumption in the domestic economy. The higher the necessary imported value, the more dependent the country is on the input. The concept is related to those developed by the flourishing literature on value-added trade.[8] One of the key concept in that literature is the "import content of exports", i.e. the share of foreign value-added in a given domestic industry. The angle of analysis of our measure is different as it focuses on the input rather than on the final product. We are interested in how much an imported input matters for final consumption, directly and indirectly.

For the empirical analysis to follow in section 4, we compute the measure using the global input-output table for the year 2008 from the World Input Output Database, commonly used in the related literature on global value chains, most notably by Timmer et al.

[8] See e.g. Johnson and Noguera (2012).



(a) Histogram of dependence for USA

	WIOD Industry	Dependence
1	Coke, Refined Petroleum and Nuclear Fuel	115.50
2	Public Admin and Defence	55.49
3	Transport Equipment	50.20
4	Renting of M&Eq and Other Business Activities	34.62
5	Financial Intermediation	34.11
6	Chemicals and Chemical Products	33.40
7	Construction	28.59
8	Basic Metals and Fabricated Metal	28.00
9	Food, Beverages and Tobacco	25.33
10	Electrical and Optical Equipment	22.66

(b) Top 10 US critical industries

Figure 2: Histogram of dependence measure and top 10 US critical industries (Imported value by industry per 1000 USD GDP)

(2014) and Koopman et al. (2014).[9] The table covers 40 countries for 35 sectors, both manufacturing and services.[10] Figure 2 shows the histogram and the ranking of the most critical products for the United States, i.e. those it is dependent on.[11] The ranking and magnitude are sensible, with petroleum, services and manufacturing inputs dominating the top ranks.

4 Event Study

Having computed the measure of dependence by country and industry, we now test the prediction of the model from section 2. The theory above suggests that there are two crucial elements determining the trade response to a negative shock to political relations: The price dispersion on the market and the *dependence* of the domestic economy on critical inputs. To evade the endogeneity issue associated with political relations and bilateral trade, we follow Fuchs and Klann (2013) and Fisman et al. (2014) and perform an event study with an exogenous political shocks. We exploit the summoning and recalling of high-level diplomats by five major political and economic players, such as the ambassador or another member of the permanent diplomatic staff, as a negative shock to bilateral political relations with respect to the involved partner country and study how monthly import

[9] Relying on data from 2008 ensures the exogeneity of the input coefficients for the event study.

[10] 27 EU countries and 13 other major countries in the world including the US and China.

[11] We also compute the measure for the most detailed openly available input-output tables for the United States from the Bureau of Economic Analysis with data on 389 industries. The results are displayed in table 6. A comparison with table 2b shows consistent figures by ranking and magnitude across different levels of aggregation of the used input-output tables. Unfortunately input-output tables of this high detail are a rarity for a wider country coverage.

flows react. As will be laid out below, these major importers exercise their political power regardless of existing trade ties. The events can therefore be assumed to be exogenous.

4.1 Data on diplomatic events

Summoning or recalling high-level diplomats is used as a diplomatic instrument to put pressure on a foreign government. It often goes along with a *note verbale* or *letter of protest*, a formal declaration of disapproval that occurs at that date and is specific to a country pair. This declaration, as opposed to news reports, is an official statement by the government. We can distinguish between two directions of actions. The one direction is the summoning of a diplomat of a foreign country in the home country. In the extreme case, the protest yields the expulsion of the ambassador and diplomatic staff, or even the closure of the embassy in the home country. In this case, it is often the sign of a strong concern from the home country towards the foreign country. In the other direction, a country can recall its own ambassador and diplomatic staff from a foreign country. In the extreme, this action yields a voluntary closure of the embassy in the foreign country.

In general, the endogeneity of trade and political relations is an obvious identification issue. One might reasonably raise the concern that any government will try to keep its own economy afloat for the sake of popularity and therefore aims to maintain a positive level of bilateral political relations with important trading partners. However, we suspect this to be more important for "small" countries. "Bigger" countries may exercise their political power regardless of trade ties, whose diplomatic events would therefore be exogenous to trade ties.

As stated by Rozental and Buenrostro (2013) in their chapter in the Oxford Handbook of Modern Diplomacy, "a state aspiring to adopt a global leadership role—such as any one permanent member of the United Nations Security Council—has to maintain ties with almost all countries and regions, while middle and smaller powers must prioritize their objectives and diplomatic resource". While governments of "small" countries may thus hesitate to exercise this tool of foreign policy—it could be costly in both political and economic terms—"big" countries are much less constrained in their policy making. They summon and recall diplomats of any country—not only from "small" trading partners but from major ones as well.

We therefore focus our analysis on the actions taken by the countries of Germany, France, United Kingdom, Japan and the Russian Federation, as they are lead actors in the political arena as well as in trade, combining roughly 25 % of world imports between them.[12] The

[12]Three of the five countries—France, the United Kingdom and the Russian Federation—are permanent members of the UN Security Council. Notably absent from the list of countries are the United States and

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	461	0.66	.09	1.90	0.49	0.84
1	43	1.31	0.58	3.80	0.14	2.48
combined	504	0.72	0.10	2.14	0.53	0.90
diff		-0.65	0.33		-1.32	0.02

$diff = mean(0) - mean(1)$ $t = -1.91$
$Ho : diff = 0$ degrees of freedom $= 502$

$Ha : diff < 0$	$Ha : diff \neq 0$	$Ho : diff < 0$
$Pr(T < t) = 0.0278$	$Pr(\|T\| > \|t\|) = 0.0557$	$Pr(T > t) = 0.9722$

Table 1: Mean test on trade share for two groups (treated/non-treated)

selected five countries have repeatedly made use of summoning or recalling of diplomats as an instrument of foreign policy. We have collected information on these events over the time period from 2010 until 2014 from official press releases available on the website of each Ministry of Foreign Affairs,[13] using keyword searches such as "ambassador summoned", "ambassador recalled", "withdraw of diplomatic staff", "embassy closure".[14]

To give empirical backing to the proposition that the five countries in our sample exercise their political power regardless of trade ties, we analyze the link between the probability of having an event for a given country pair and bilateral aggregate trade at the beginning of the period we study. To identify a country pair for which an event occurred over the studied period, we construct a dummy variable that equals 1 if an event occurred at least once during the period 2010–2014.

We first perform a simple mean test by splitting the sample of country pairs between two groups: The first one being country pairs with a dummy variable equal to one; the second one being the rest. We test if the share of a given partner in import flows in 2010 is significantly different for the two groups. Results presented in Table 1 show that country pairs with an event trade significantly more than other country pairs. This rejects the

China, whose foreign policy clearly shapes global events and likely influences trade flows. Unfortunately, however, the US State Department does not make public instances in which these instrument of diplomacy are used. The Chinese Ministry of Foreign Affairs does publish press releases but it is technically difficult to retrieve them *en masse*.

[13] Appendix D.1 lists the direct weblinks to the different websites.

[14] A diplomat may be summoned or recalled for different reasons, as some examples of events show: In November 2010, Russia summoned the Canadian ambassador over new visa requirements for Russian nationals; In February 2011, France summoned the Mexican ambassador regarding the situation of the French-national Florence Cassez; In July 2012, Japan summoned the Chinese ambassador to protest against the entry of patrol ships into disputed territorial waters; In March 2013, Germany summoned the Chinese ambassador to condemn an attack on a German journalist; In June 2014, the British Foreign Office summoned the Egyptian ambassador following an Egyptian court guilty verdicts against Egyptian and international journalists. More details on these cases and a complete list of events can be found in appendix D.2.

VARIABLES	Dummy= 1 if event
share of imports	0.05
	(0.03)
Constant	-1.41***
	(0.085)
Observations	504

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Probit Test for exogeneity

hypothesis that our five importers are *less* likely to summon ambassadors from important trade partners. One might worry that this may bias estimates later on. However, as the effect of trade on the incidence of an event is positive, if anything, our coefficient is an underestimation of the true coefficient.

We then regress the probability of an event occurring for a given country pair on import shares in 2010. Table 2 shows the coefficients for this probit test. The findings of the mean test are confirmed, there appears to be, at most, a positive, but not statistically significant relation between trade and the probability of an event occurring.

4.2 Data on monthly trade flows

Given the characteristics of our events we expect a short-term impact on trade flows, similar to the observed effect of Dalai Lama visits in Fuchs and Klann (2013). [15] In consequence, we opt for an analysis using data on monthly trade flows. Unfortunately monthly trade data has only in recent years seen more widespread availability. The most prominent and free to access is UN Monthly Comtrade (United Nations Statistics Division, 2015). For the purpose of this study, we extract data on the imports of France, UK, Russia, Germany, Japan vis-à-vis the rest of the world—241 countries and territories—from January 2010 to December 2014, totaling 60 months. To match the aggregation level of the dependence measures, we aggregate the data on trade flows to the 16 manufacturing sectors in WIOD.

4.3 Estimation strategy

The key idea of the event study is to compare trade flows before and after the event for countries which experience a shock in political relations relative to other country pairs.[16] We take the logarithm of the left-hand-side variable, monthly trade flows from source to

[15] It is also likely to have a much less severe impact than military conflicts or more structural security issues like domestic political instability (Martin et al., 2008a,b, 2012).

[16] As there is a small number of country pairs that do not entertain bilateral diplomatic representations, e.g. North Korea and France do not have official diplomatic relations, we only consider country pairs that do have embassies or consulates in one another in the analysis.

destination country by industry, in order to be able to interpret the estimated coefficient on the treatment variable in terms of a percentage change in imports. To meet the requirements of a difference-in-differences approach, we employ a large set of fixed effects to control for unobservable characteristics of the involved countries and country-pairs. The approach thus is, in effect, akin to the estimation of a gravity equation of international trade.[17] We control for all exporter- and importer-industry specific characteristics with respective fixed effects. We furthermore control for everything country-pair specific, such as the two countries' bilateral political history, with country-pair fixed effects.

As usual in difference-in-differences estimations, the shock is constructed as a dummy variable, *Treatment*, that is time and country pair-specific. It is equal to 1 for a given country pair after it experienced an event detailed above. As we expect a heterogeneous effect at the industry level, we interact the treatment variable with the country's dependence on a given industry, *Dependence*, as well as the level of competition on the input market of this industry. We proxy the competitiveness with a Herfindahl concentration index, *Concentration*. The greater the Herfindahl index, the lower is the level of competition in a given industry. As dictated by the prediction of the model, we additionally interact this term with measure of dependence. We normalize the dependence measure by the respective country's average dependence and take the logarithm to make the interpretation comparable across countries. The equation we estimate is therefore

$$\begin{aligned}\log(X_{odkt}) = F_{ok} + F_{dk} + F_{odk} &+ \delta_0 \cdot \text{Treatment}_{odt} \\ &+ \delta_1 \cdot \text{Treatment}_{odt} \times \text{Concentration}_k \\ &+ \delta_2 \cdot \text{Treatment}_{odt} \times \log(\text{Dependence}_{dk}) \\ &+ \delta_3 \cdot \text{Treatment}_{odt} \times \log(\text{Dependence}_{dk}) \times \text{Concentration}_k + \epsilon_{odkt} \qquad (5)\end{aligned}$$

where F_{ok} and F_{dk} capture all exporter $\times$ industry and importer $\times$ industry characteristics and F_{odk} their bilateral relations.[18] Standard errors are clustered at the exporter $\times$ importer $\times$ industry $\times$ month level.

For the interpretation of each coefficient it is important to keep in mind that the reference is an industry with a perfectly competitive market with no concentration of suppliers, i.e. a Herfindahl index of zero, and the average level of dependence of the respective country.[19] The coefficient on the *Treatment* variable, δ_0, is the average effect for the reference. δ_0 is expected to be negative. The coefficient of the interaction between *Treatment* $\times$ *Concen-*

[17] See Head and Mayer (2014) for a review of the state-of-the-art on the gravity framework.

[18] In some specifications we additionally add a time dimension to the country-specific fixed effects and let the bilateral fixed effect F_{odkm} vary by (calendar-) month to account for potential country pair-specific seasonality.

[19] As the logarithm of a country's mean dependence is $log(1) = 0$. The normalization of the dependence measure has no effect on the results.

tration$_k$, δ_1, shows the average elasticity of the imports to the competition on the market. According to our prediction, we expect a more concentrated market to have a lower response in trade after a negative shock to political relations, thus δ_1 should be positive. The coefficient of the interaction between *Treatment* $\times$ *log(Dependence)*$_{dk}$, δ_2, is expected to be negative, as the likelihood to switch supplier increases with the level of dependence on an input for a highly competitive market. Finally, the coefficient on the interaction between *Treatment* $\times$ *log(Dependence)*$_{dk}$ $\times$ *Concentration*$_k$, δ_3, is expected to be positive as the relevance of dependence decreases with the increase in market concentration, as it is becoming more costly to switch suppliers.

Owing to the log values in equation (5), we cannot account for potential zero trade flows, i.e. the absence of any imports from the source to the destination country, while they may be particularly instructive in our case. The extreme scenario in which a country would completely stop importing goods from the partner with whom there was an event will not show up in our estimation. To address zero flows, the gravity literature has turned to the use of the PPML estimator following Santos Silva and Tenreyro (2006). In our case, however, the PPML estimator does not converge, likely to be due to the massive number of fixed effects in our estimations.[20]

4.4 Main Results

The results for our prediction are presented in table 3. Columns (1) and (2) report the coefficients for estimating equation (5) using imports from all 241 countries with two different sets of fixed effects. For this sample, we have a total of 40 events.[21] A sudden shock to bilateral political relations, on average, i.e. for an average dependence industry with no market concentration, negatively impacts trade between two countries. The average drop in imports in reaction to a shock to political relations for the reference group is estimated to be $exp(-0.083) - 1 = 8\%$.[22] This magnitude of the effects mirrors very well the results from related literature. As noted above, Michaels and Zhi (2010) find an 8 % drop in bilateral trade between France and the US in response to the Iraq war, while Nitsch (2007) reports an increase of 8–10 % in exports after the visit of a head of state.

The coefficients on the interactions of the treatment with concentration and dependence also yield the expected signs. The former yields a positive coefficient of about 0.7, albeit insignificant in a specification with a very restrictive set of fixed effects. The magnitude is plausible, given that the mean concentration value is 0.09, yielding a net decrease in

[20] Aside from addressing the zero flow issue, Santos Silva and Tenreyro (2006) highlight the potential bias arising from a heteroscedasticity of the error terms, which we cannot address here either.

[21] For the few country-pairs for which we observe several events over the period, we consider the date of the first one to construct the treatment variable.

[22] The coefficient estimated with the dependence measure computed on GTAP data and trade data accordingly aggregated to GTAP sectors is slightly lower, ranging between 3 and 6 %. See appendix C.

	Dependent variable:	
	log(imports)	
	(1)	(2)
Treatment	-0.083^{***}	-0.083^{**}
	(0.027)	(0.041)
Treatment x Concentration	0.699^{**}	0.672
	(0.300)	(0.499)
Treatment x log(Dependence)	-0.069^{***}	-0.061^{*}
	(0.022)	(0.035)
Treatment x Concentration x log(Dependence)	0.571^{***}	0.486^{*}
	(0.167)	(0.272)
Fixed effects	ctry-dt,ctry-ind, pair-ind	ctry-ind-dt, pair-ind-mo
Observations	410,303	410,303
R^2	0.913	0.964
Adjusted R^2	0.908	0.922
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 3: Event study - Political shock and heterogeneous effect by dependence

affected imports for the average concentration industry of $\exp(-0.083 + 0.09 \times 0.699) - 1 = 1.6\%$. Similarly, the interaction of the treatment variable with the dependence measure yields sensible results in direction and magnitude. A one-standard deviation increase in the (log normalized) dependence, 1.2, yields a net average drop in affected imports of 15%.

Finally, the triple interaction of *Treatment*, *Concentration* and *Dependence* yields the outcome our theory suggest. The lower the market concentration in a given indusry, i.e. the lower the price dispersion, the more the dependence on the respective input matters for a reduction of its imports.

4.5 Robustness tests

We conduct a series of robustness test to validate the findings against a number of potential concerns, related to the sample or other confounding variables.

It could be that the results are driven by the sample of countries chosen for the tests. In table 4 we re-estimate equation (5) on three other samples. One concern is that the coefficients from our benchmark estimation are driven by outliers, (very) small economies that for other reasons than bilateral political relations decrease their exports to the 5 countries of interest after being "treated" by one of the political events described above. In column (1) we report the coefficients when selecting only the top 50 largest economies out of the 241 countries present in the data as input suppliers. The coefficients on the terms

	Dependent variable:		
	log(imports)		
	(1)	(2)	(3)
Treatment	-0.082^{***}	-0.055^{*}	-0.085^{***}
	(0.028)	(0.029)	(0.030)
Treatment x Concentration	0.624^{*}	0.452	0.675^{**}
	(0.333)	(0.352)	(0.314)
Treatment x log(Dependence)	-0.079^{***}	-0.060^{***}	-0.042^{*}
	(0.022)	(0.023)	(0.024)
Treatment x Concentration x log(Dependence)	0.563^{***}	0.382^{**}	0.364^{**}
	(0.181)	(0.183)	(0.175)
Fixed effects	ctry-dt,ctry-ind, pair-ind	ctry-dt,ctry-ind, pair-ind	ctry-dt,ctry-ind, pair-ind
Sample	Top 50	w/o Arab league	w/o Russia
Observations	237,463	371,827	359,753
R^2	0.929	0.918	0.914
Adjusted R^2	0.926	0.914	0.910
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 4: Robustness test — Country samples

of interest retain the same sign and stay within a standard error of the baseline results in table 3, despite the number of observations being cut by 42 %.

A further concern could be that the results are driven by the events occurring in connection with the so-called Arab spring, which falls right into the time window of the data we use. The summoning of the respective Ambassadors was relatively common, resulting in 31 such recorded instances.[23] The events coincided with security crises in these countries that could equally cause a sharp decline in imports, driving the reported results. We therefore re-run the estimation of equation (5) on only non-Arab league countries. We find that the concern is not merited. Column 2 of table 4 reports coefficients of slightly smaller, but still very plausible, magnitudes.

Another concern could be on the side of the importing country, as we were only able to collect data on political events from 5 major geopolitical players. One of the countries, Russia, could be of particular concern, as it could be argued that the country conducts its foreign policy structurally differently from Western countries and Japan. We therefore rerun the estimation without events involving the Russian Federation. Column (3) of table 4 again shows that this concern is also not merited, with estimated coefficient again very similar to those of the benchmark regression.

[23] See appendix D.2 for the list of events.

	Dependent variable:	
	log(imports)	
	(1)	(2)
Treatment	-0.119^{*}	-0.098^{**}
	(0.063)	(0.041)
Treatment x Concentration	0.697^{**}	0.680^{**}
	(0.300)	(0.302)
Treatment x log(Dependence)	-0.072^{***}	-0.071^{***}
	(0.022)	(0.022)
Treatment x Concentration x log(Dependence)	0.587^{***}	0.573^{***}
	(0.168)	(0.167)
Treatment x Labor Intensity	0.061	
	(0.091)	
Treatment x Skill Intensity		0.084
		(0.161)
Fixed effects	ctry-dt,ctry-ind, pair-ind	ctry-dt,ctry-ind, pair-ind
Observations	410,303	410,303
R^2	0.913	0.913
Adjusted R^2	0.908	0.908
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 5: Event study — Robustness checks with industry specific measures

Aside from the proposed mechanism of critical inputs the economy depends on, the results could be driven by industry-specific factors that are not captured by the employed fixed effects. It could be that certain industries, labor or skill intensive ones, react differently to a sudden change in bilateral political relations than others. We test this assertion by estimating equation (5) with an additional interaction of indicators derived from the WIOD dataset on the labor and skill intensity of sectors. Table 5 shows that these concerns again are not merited. Neither the interaction with labor intensity, nor the interaction with skill intensity are significant, and the coefficients of interest retain the same sign and stay within a standard error of the results of the benchmark specification reported in table 3.

As a further robustness exercise, we use also compute the dependence measure using data from GTAP (Aguiar et al., 2012). As the primary purpose of these input-output tables is to be used in CGE quantification exercises of the impact of agricultural trade policies, the definition of the 47 sectors has a significant tendency towards agriculture. Still, the prediction of the model holds. We refer the interested reader to section C in the appendix for more details.

The econometric results give empirical support to the theoretical model sketched in

section 2. The results underline that the response of industries to political shocks is heterogeneous. The decrease in trade flow is stronger for critical inputs provided that the price dispersion on the input market is small. The results resonate with the existing literature and emphasize an explicit mechanism, the concept of critical inputs, through which political relations impact trade flows as a component of bilateral trade costs.

5 Conclusion

In this paper we extend the literature on the link between political relations and trade by modeling and testing an explicit mechanism through which political relations affect the exchange of goods. We find a sudden change in bilateral relations to have a heterogeneous impact by country and sector. Those imports that are critical to the functioning of an economy see a more pronounced effect, conditional on the competitiveness of the world market.

We set up a model that exhibits the mechanism at play by building on existing models of economic shock propagation. The model predicts that price shocks to imported inputs that—through direct and indirect use by way of domestic linkages—contribute to aggregate output relatively more than others, have a stronger adverse effect on trade. The model allows us to derive a measure of dependence of an economy on certain products that can be easily computed using widely available input-output tables.

We compute this measure of dependence using data from the WIOD dataset. We then test the prediction of the model in a difference-in-differences framework. To escape concerns about the endogeneity of bilateral trade and political relations, we exploit abrupt and unanticipated political shocks to test the proposed mechanism: the recalling and summoning of high-level diplomats by five major economic and geopolitical players. We construct a novel dataset on these diplomatic events for the time from 2010 to 2014. The econometric results provide compelling evidence for the prediction of the model. Political relations have a heterogeneous impact on imported inputs, driven by the importing country's dependence on a specific input and the competitiveness of the respective market.

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A Impact of a change in input price on aggregate output

We show here the effect of an increase in p_m on aggregate output. Focusing on sector x, from the firm profit maximization problem in that sector, we know that the demand for input m in x is

$$m_x = \frac{p_x x \gamma_x}{p_m}$$

Hence, when the price of m increases, the demand for m in x decreases. Given the Cobb-Douglas production function, this leads to a decrease in the output of x. As x is used also as an input by y, the change in the price of x has an effect on production of y. When p_x increases, x_y decreases. This leads to a decrease in y indirectly.

The increase in the price of m therefore has a *direct* effect on the production of x that is governed by its technical coefficient γ_x and an additional *indirect* effect on the production of y through domestic linkages by way of the technical coefficient α_y. Symmetrically, the increase in price of m has a direct effect on sector y and an indirect effect on sector x.

The total effect of a change in the price of m on the production of each sector is the sum of the direct and indirect effect. The effect of a change of the price of m on sector x therefore is

$$\begin{aligned} \text{TE}_x^m &= -\frac{1}{p_m}\gamma_x x + \frac{\partial x}{\partial p_y}\frac{\partial p_y}{\partial y}\frac{\partial y}{\partial p_m} \\ &= -\frac{1}{p_m}(\gamma_x + \beta_x \gamma_y)x \end{aligned}$$

The effect of a change of the price of m on sector y is

$$\begin{aligned} \text{TE}_y^m &= -\frac{1}{p_m}\gamma_y y + \frac{\partial y}{\partial p_x}\frac{\partial p_x}{\partial x}\frac{\partial x}{\partial p_m} \\ &= -\frac{1}{p_m}(\gamma_y + \alpha_y \gamma_x)y \end{aligned}$$

We can calculate the total effect of a change of the price of n on both sectors using the same reasoning. The total effect of a change of the price of n on sector x is

$$\text{TE}_x^n = -\frac{1}{p_n}(\delta_x + \beta_x \delta_y)x$$

The total effect of a change of the price of n on sector y is

$$\text{TE}_y^n = -\frac{1}{p_n}(\delta_y + \alpha_y \delta_x)y$$

The total effect of a change of the price of m on the logarithm of aggregate output is then

$$\begin{aligned}\frac{\partial \log(\text{AO})}{\partial p_m} &= \eta \frac{\partial ln(x)}{\partial p_m} + (1-\eta)\frac{\partial ln(y)}{\partial p_m} \\ &= \frac{\eta}{x}\frac{\partial x}{\partial p_m} + \frac{1-\eta}{y}\frac{\partial y}{\partial p_m} \\ &= -[\eta \frac{1}{p_m}(\gamma_x + \beta_x\gamma_y) + (1-\eta)\frac{1}{p_m}(\gamma_y + \alpha_y\gamma_x)]\end{aligned}$$

Similarly, the total effect of a change of the price of n on $\log(\text{AO})$ is

$$\frac{\partial \log(\text{AO})}{\partial p_n} = -[\eta \frac{1}{p_n}(\delta_x + \beta_x\delta_y) + (1-\eta)\frac{1}{p_n}(\delta_y + \alpha_y\delta_x)]$$

The effect on aggregate output of a change in p_m is greater than the effect of a change in p_n if and only if

$$|\frac{\partial \log(\text{AO})}{\partial p_m}| > |\frac{\partial \log(\text{AO})}{\partial p_n}|$$

which is equivalent to

$$\eta(\gamma_x + \beta_x\gamma_y) + (1-\eta)(\gamma_y + \alpha_y\gamma_x) > \frac{p_m(1-\beta_x\alpha_y)}{p_n + p_m}$$

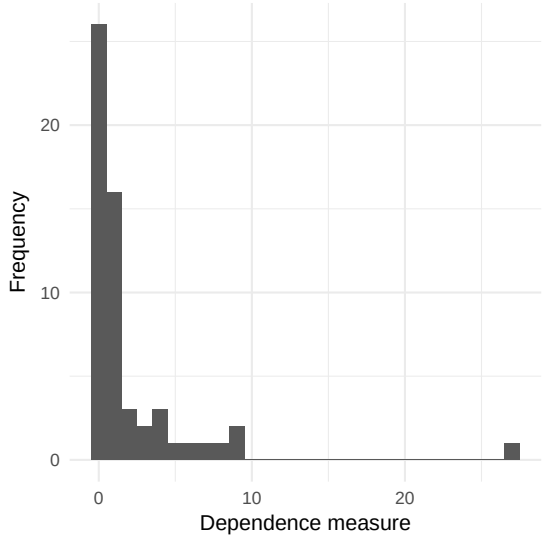
It is evident that this condition is true if and only if the domestic economy is more dependent on m than on n. Aggregate output is more affected by change in p_m than by a change in p_n if it is more dependent on m than on n. In other words, a similar shock on the price of an input will have a different effect on aggregate output, conditional on the level of dependence. An increase in the price of a critical input will lead to a stronger decrease in aggregate output than the same increase in the price of a non-critical input.

B Dependence measure with BEA Input-Output table

	BEA Industry	Dependence
1	Oil and gas extraction	13.12
2	Petroleum refineries	4.14
3	Insurance carriers	3.31
4	Iron and steel mills and ferroalloy manufacturing	1.73
5	Other motor vehicle parts manufacturing	1.62
6	Computer terminals and other computer peripheral equipment manufacturing	1.36
7	Pharmaceutical preparation manufacturing	1.26
8	Management consulting services	1.21
9	Other basic organic chemical manufacturing	1.19
10	Motor vehicle gasoline engine and engine parts manufacturing	1.17
11	Semiconductor and related device manufacturing	0.84
12	Other electronic component manufacturing	0.81
13	Motor vehicle transmission and power train parts manufacturing	0.81
14	Other plastics product manufacturing	0.72
15	Fishing, hunting and trapping	0.70
16	Telephone apparatus manufacturing	0.69
17	Plastics material and resin manufacturing	0.67
18	Primary smelting and refining of nonferrous metal (except copper and aluminum)	0.66
19	Other engine equipment manufacturing	0.64
20	Broadcast and wireless communications equipment	0.63
21	Motor vehicle electrical and electronic equipment manufacturing	0.63
22	Motor vehicle steering, suspension component (except spring), and brake systems manufacturing	0.63
23	Valve and fittings other than plumbing	0.54
24	Other fabricated metal manufacturing	0.52
25	Aircraft engine and engine parts manufacturing	0.49
26	Fertilizer manufacturing	0.49
27	Veneer, plywood, and engineered wood product manufacturing	0.47
28	Architectural, engineering, and related services	0.45
29	Alumina refining and primary aluminum production	0.44
30	Sawmills and wood preservation	0.43
31	Paper mills	0.43
32	Motor and generator manufacturing	0.42
33	Other aircraft parts and auxiliary equipment manufacturing	0.40
34	Computer storage device manufacturing	0.40
35	Air transportation	0.38
36	Lighting fixture manufacturing	0.38
37	Glass and glass product manufacturing	0.37
38	Fruit and tree nut farming	0.37
39	Communication and energy wire and cable manufacturing	0.36
40	Petrochemical manufacturing	0.36
41	Hardware manufacturing	0.36
42	Tire manufacturing	0.35
43	Aluminum product manufacturing from purchased aluminum	0.33
44	Surgical appliance and supplies manufacturing	0.32
45	Advertising, public relations, and related services	0.32
46	Other basic inorganic chemical manufacturing	0.32
47	Audio and video equipment manufacturing	0.31
48	Fabric mills	0.30
49	Flavoring syrup and concentrate manufacturing	0.30
50	Clay product and refractory manufacturing	0.30

Table 6: Top 50 US critical industries with BEA Input-Output table

C Dependence measure and estimation with GTAP data



(a) Histogram of dependence for USA

	GTAP Industry	Dependence
1	Petroleum & Coke	26.97
2	Chemical Rubber Products	8.97
3	Other Crops	8.74
4	Motor Motor vehicles and parts	7.71
5	Other Machinery & Equipment	7.34
6	Wearing Apparel	5.74
7	Water transport	4.77
8	Raw milk	4.47
9	Paddy Rice	4.12
10	Electronic Equipment	3.83

(b) Top 10 US critical industries

Figure 3: Histogram of dependence measure and top 10 US critical industries (Imported value by industry per 1000 USD GDP)

	Dependent variable:	
	log(imports)	
	(1)	(2)
Treatment	-0.051^{***}	-0.037^{*}
	(0.019)	(0.019)
Treatment x log(Dependence)	-0.035^{***}	-0.014^{*}
	(0.007)	(0.008)
Fixed effects	ctry-dt,ctry-ind, pair-ind	ctry-ind-dt, pair-ind-mo
Observations	357,190	357,190
R^2	0.906	0.962
Adjusted R^2	0.902	0.918
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 7: Robustness test — GTAP Data

D Press releases from Ministries of Foreign Affairs

D.1 Links to websites of Foreign Ministries

- France: `http://www.diplomatie.gouv.fr/en/`
- Germany: `http://www.auswaertiges-amt.de/`
- Japan: `http://www.mofa.go.jp`
- Russian Federation: `http://www.mid.ru/`
- United Kingdom: `http://www.gov.uk/government/organisations/foreign-commonwealth-office`

D.2 List of events

Table 8: List of events

Date	Origin	Destination	Event type	Comments
18/02/2010	France	Israel	summon CA	about murder of a Hamas member in Dubai
01/03/2010	Russia	Estonia	summon Ambassador	unfriendly action by authorities
14/07/2010	Russia	United States	summon Ambassador	protest apprehension of Russian citizen abroad
10/08/2010	Russia	Thailand	summon Ambassador	extradition of citizen to USA
01/09/2010	UK	Kenya	summon HC	about President Bashir of Sudan's visit to Kenya
27/09/2010	Japan	China	summon Ambassador	express concerns about detained Japanese nationals in China
14/10/2010	Russia	Canada	summon CA	confiscation and arrest of crew of cruise ship
01/11/2010	Russia	Japan	summon Ambassador	protest to protest presidents travel to disputed island
03/11/2010	Russia	Canada	summon CA	new visa requirements
19/11/2010	Russia	Canada	summon Ambassador	protest about damaged consulate
17/12/2010	Russia	United States	summon Ambassador	military exercise in South Korea
17/12/2010	Russia	South Korea	summon Ambassador	military exercise in South Korea
22/12/2010	Germany	Belarus	summon Ambassador	opposition arrests
20/01/2011	Germany	Belarus	summon Ambassador	accusations of plot
11/02/2011	France	Mexico	summon Ambassador	concerning situation of Florence Cassez
17/02/2011	France	Iran	summon Ambassador	concern about Spanish diplomate arrest

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21/02/2011	UK	Libya	summon Ambassador	concern about violence in Lybia
02/03/2011	UK	Yemen	summon CA	concern over escalating violence in Yemen
04/03/2011	Germany	Taiwan	summon Ambassador	executions
16/03/2011	UK	Libya	summon Ambassador	discuss situation in Lybia
24/03/2011	Germany	Yemen	summon Ambassador	political situation
19/04/2011	UK	Malawi	summon CA	about considering declaring the British HC persona non grata
26/04/2011	Germany	Syria	summon Ambassador	violence in Syria
27/04/2011	France	Syria	summon Ambassador	condemnation of violence in Syria
27/04/2011	UK	Syria	summon Ambassador	stop violence
28/04/2011	UK	Malawi	expulsion of HC	after expulsion of British HC
01/05/2011	UK	Libya	expulsion of Ambassador	following attack on British residence in Tripoli
13/05/2011	UK	Syria	summon Ambassador	concern about the ongoing situation in Syria
25/05/2011	Japan	South Korea	summon Ambassador	protest against members of parliament on disputed islands
31/05/2011	Germany	Syria	summon Ambassador	torture of children and teenagers
02/06/2011	Russia	Pakistan	summon Ambassador	demand investigation into deaths of four citizens
04/06/2011	Germany	Yemen	closure of German embassy	due to dangerous internal conflict
09/06/2011	Iran	UK	summon CA	UK CA was summoned by Iranian mfa
28/06/2011	UK	Syria	summon Ambassador	over allegations of Syrian Embassy intimidation
06/07/2011	Russia	Sweden	summon CA	protest court ruling
10/07/2011	France	Syria	recall its Ambassador for consultations	protest against demonstrations in front of the French embassies
12/07/2011	Germany	Syria	summon Ambassador	voilence and attacks on embassies
13/07/2011	UK	Syria	summon Ambassador	ensure Syrian Ambassador protects diplomatic mission
27/07/2011	France	Burundi	summon Ambassador	Patrice Faye sentence
27/07/2011	UK	Libya	expulsion of all diplomatic staff	condemnation of Qadhafi's regime
11/08/2011	France	Ukraine	summon Ambassador	About the Timochenko case
25/08/2011	Japan	China	summon Ambassador	protest against Chinese boat in territorial waters
29/09/2011	Germany	Iran	summon Ambassador	protest death penalty sentence against pastor

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13/10/2011	UK	Syria	summon Ambassador	concern about reports suggesting harassment and intimidation of Syrian diplomats in UK
14/11/2011	France	Syria	summon Ambassador	concerning assaults in diplomatic entities in Syria
15/11/2011	France	Syria	recall its Ambassador for consultations	concerns about situation in Syria
16/11/2011	France	Israel	summon Ambassador	about the raid in Gaza
27/11/2011	Iran	UK	expulsion of British Ambassador	following a vote at the Iranian Parliament
29/11/2011	UK	Iran	summon CA	storming of British Embassy in Teheran
30/11/2011	France	Iran	recall its Ambassador for consultations	concerns about assaults in British embassy
30/11/2011	UK	Iran	expulsion of all diplomatic staff	in response to the assault on the British Embassy in Teheran ("closing of Iranian embassy in London by UK")
30/11/2011	UK	Iran	closure of British Ambassy(Teheran)	in response to the assault on the British Embassy in Teheran
16/12/2011	UK	Uruguay	summon Ambassador	response to 25th Dec Mercosur statement about Falkland Islands
23/12/2011	Turkey	France	recall its Ambassador for consultations	protest against French law proposal
02/01/2012	Congo	France	summon Ambassador	about assault of Leon Kengo Wa Dondo in Paris
06/02/2012	UK	Syria	summon Ambassador	Siege in Homs; condemnation of atrocities
07/02/2012	France	Syria	recall its Ambassador for consultations	concerns about situation in Syria
07/02/2012	Germany	Syria	summon Ambassador	spying on opposition in Germany
09/02/2012	Germany	Syria	expulsion of diplomats	four embassy staffers expelled
20/02/2012	France	Rwanda	recall its Ambassador for consultations	Kigali refuses to accept Helene Le Cal as new French Ambassador
22/02/2012	UK	Syria	summon Ambassador	stop violence in Homs
28/02/2012	France	Belarus	summon Ambassador	protest against Bielorus' decision to expel Polish and UE ambassadors
29/02/2012	UK	Belarus	recall its Ambassador for consultations	Belarus' decision to recall their Ambassadors to Poland and the EU in response to EU sanctions
29/02/2012	UK	Belarus	summon Ambassador	Belarus' decision to recall their Ambassadors to Poland and the EU in response to EU sanctions

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29/02/2012	UK	Argentina	summon CA	response to Argentina's threat to trade
01/03/2012	UK	Syria	withdrawal diplomatic staff	all diplomatic staff
03/03/2012	Germany	Iran	summon Ambassador	call for release of pastor
21/03/2012	Japan	Syria	closure of Japanese embassy	deteriorating security situation
06/04/2012	France	Hungary	summon Ambassador	concerns about situation of foreign investors in Hungary
13/04/2012	UK	North Korea	summon Ambassador	concerns about satellite launch
28/05/2012	UK	Syria	summon CA	UK's condemnation of the appalling massacre which took place in al-Houleh
29/05/2012	UK	Syria	expulsion CA and diplomates	response to killing in el-Houleh
29/05/2012	Germany	Syria	expulsion of diplomats	ambassador expelled
03/07/2012	Japan	Russia	summon Ambassador	protest against visit of Russian prime minister on disputed island
11/07/2012	Japan	China	summon Ambassador	protest against entry of patrol ships into disputed territorial waters
12/07/2012	Japan	China	summon Ambassador	protest against entry of patrol ships into disputed territorial waters (again..)
12/08/2012	Japan	Russia	summon Ambassador	express concerns about situation in Georgia
14/08/2012	Germany	Belarus	summon Ambassador	protest closing of Swedish embassy
15/08/2012	Japan	China	summon Ambassador	protest against landing of activist ships on disputed islands
20/09/2012	Germany	Belarus	summon Ambassador	protest visa rejecting of election observers
03/10/2012	Russia	Libya	summon CA	attack on embassy in Tripolis
30/10/2012	UK	Burma	summon CA	concern about the violence in Rakhine State
15/11/2012	UK	Spain	summon Ambassador	concerns regarding incursions into British Gibraltar Territorial Waters
03/12/2012	France	Israel	summon Ambassador	concerns about settlement in colonies
03/12/2012	UK	Israel	summon Ambassador	concern about settlement policy
03/12/2012	Germany	North Korea	summon Ambassador	protest missile test
12/12/2012	UK	North Korea	summon Ambassador	condemnation satellite launch
12/12/2012	Russia	Nigeria	summon Ambassador	ship crew detained
12/12/2012	Germany	North Korea	summon Ambassador	protest rocket launch
13/12/2012	Japan	China	summon Ambassador	protest against entry of aircraft and ships into disputed territory
08/02/2013	Japan	China	summon Ambassador	protest against entry of Chinese ship into territorial waters

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13/02/2013	France	Iraq	call for minister meeting	Situation of Nadir Dendoune
01/03/2013	Germany	China	summon Ambassador	protest attack on German journalist
05/04/2013	Germany	North Korea	summon Ambassador	concern about tensions on Korean peninsula
13/05/2013	Russia	United States	summon Ambassador	unclear
01/07/2013	Germany	United States	summon Ambassador	spying on Germany
11/07/2013	Russia	Montenegro	summon Ambassador	situation of citizen
02/08/2013	UK	Spain	summon Ambassador	delays at the Gibraltar border
20/08/2013	Japan	Egypt	summon Ambassador	call for peaceful solution to domestic conflict
19/09/2013	Russia	Netherlands	summon Ambassador	flying flag close to Russian shore
03/10/2013	Russia	Libya	withdrawal diplomatic staff	following attack on Russian embassy
08/10/2013	Russia	Netherlands	summon Ambassador	protest about Russian diplomat attacked
16/10/2013	Russia	Costa Rica	summon Ambassador	extradition of citizen to USA
21/10/2013	France	US	summon Ambassador	spying on France
12/11/2013	Russia	Poland	summon Ambassador	protest about violence around embassy
19/11/2013	UK	Spain	summon Ambassador	serious incursion into British Gibraltar Territorial Waters
23/11/2013	Japan	China	summon CA	protest against Chinese declaration of territorial extent
25/11/2013	Japan	China	summon Ambassador	protest against Chinese declaration of territorial extent
24/01/2014	France	Ukraine	summon Ambassador	concerns about violence in Ukraine
24/01/2014	Germany	Ukraine	summon Ambassador	concerns about violence in Ukraine
20/02/2014	UK	Ukraine	summon Ambassador	over violence in Ukraine
24/02/2014	France	Morocco	summon Ambassador	discuss situation of M.Hammouchi
25/02/2014	France	Morocco	Ministers meeting	discuss about diplomatic incident with French ambassador in DC
01/03/2014	UK	Russia	summon Ambassador	concerns about situation in Ukraine
02/04/2014	UK	Spain	summon Ambassador	concern at the incursion into British Gibraltar Territorial Waters
03/04/2014	Russia	Germany	summon Ambassador	statement of German Minister of Finance
07/04/2014	UK	Burma	summon Ambassador	call for urgent restoration of humanitarian access
07/04/2014	Germany	North Korea	summon Ambassador	concern about Nuclear test
29/04/2014	Germany	Egypt	summon Ambassador	urgent appeal against death sentences
19/05/2014	UK	Sudan	summon CA	concern at the decision to sentence MYII to death for apostasy

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26/05/2014	Japan	China	summon Ambassador	protest against entry of military aircraft into territory
11/06/2014	Japan	China	summon Ambassador	protests against two Chinese military jets which flew abnormally close to two Japan's Self Defence Force
12/06/2014	Japan	China	summon Ambassador	protest against entry of military aircraft into territory (again..)
23/06/2014	UK	Egypt	summon Ambassador	concerning verdicts against Egyptian and international journalists
13/07/2014	Russia	Ukraine	summon CA	protest killing of citizen by shelling
17/07/2014	UK	Spain	summon Ambassador	concern at the activity of a Spanish Navy vessel in Gibraltar the day before
19/07/2014	UK	Russia	summon Ambassador	urged Russian Authorities to secure access to flight MH17 crash site
04/08/2014	UK	Ethiopia	summon CA	concern about arrest of a Briton
15/08/2014	UK	Russia	summon Ambassador	account for reports overnight of Russian military vehicules crossing the border into Ukraine
18/08/2014	Turkey	Germany	summon Ambassador	activities about Federal Intelligence Agency
13/10/2014	UK	Thailand	summon CA	concern about the investigation into murders of HW and DM