ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية
2016

working paper series

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Working Paper No. 1026

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July 2016

We thank Lionel Fontagne, Matthieu Crozet, Thomas Chaney, Jeffrey Nugent, Maria Bas and participants of the GSIE seminar, ETSG 2015, ERF Forum 2016, SMYE 2016 and the Doctorissimes for their comments and suggestions.

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First published in 2016 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

The proliferation of global value chains makes the domestic production of goods increasingly dependent on inputs from foreign sources. Political tensions between countries have an impact on trade costs as they affect the international enforceability of contracts or result in impediments from authorities in the shipment or production process. By expanding their portfolio of foreign suppliers, firms and by extension entire economies are thus increasingly prone to the trade effects of adverse bilateral political shocks. In this paper, we aim to reassess the role of political relations on trade flows in light of these new developments and propose a new channel. We hypothesize that political relations matter more for imports of strategic inputs. Strategic inputs refer to inputs that a country uses intensively in its production process. We construct a simple model exhibiting input-output linkages to clarify the mechanisms at play. Using a new measure for countries' dependence on these strategic inputs, we then test the proposed mechanism empirically by interacting the measure with an indicator of political relations in a structural gravity model. To address potential endogeneity issues we then 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. Results from both analyses confirm an economically and statistically significant effect that varies conditionaly on the dependence of the country on the imported input.

JEL Classification: F13, F14, F51, F52

Keywords: Global Value Chains, political relations, dependence, input sourcing

ملخص

انتشار سلاسل القيمة العالمية يؤدى الى اعتماد الإنتاج المحلي للسلع بشكل متزايد على مدخلات من مصادر أجنبية. التوترات السياسية بين الدول لديها تأثير على تكاليف التجارة من حيث تأثيرها على إنفاذ العقود الدولية أو يؤدي إلى عوائق من السلطات في عملية الشحن أو الإنتاج. وذلك من خلال توسيع محافظهم بالموردين والشركات الأجنبية وبالتالي اقتصادات بأكملها وهي بالتالي عرضة بشكل متزايد لآثار التجارة من الصدمات السياسية الثنائية السلبية. في هذه الورقة، نهدف إلى إعادة تقييم دور العلاقات السياسية على التدفقات التجارية في ضوء هذه التطورات الجديدة واقتراح قنوات جديدة. نفترض أن العلاقات السياسية أهم أكثر بالنسبة للواردات من المدخلات الاستراتيجية. المدخلات الاستراتيجية تشير إلى المدخلات التي يستخدمها بلد بشكل مكثف في عملية الإنتاج. ونقوم ببناء نموذج بسيط واظهار الروابط بين المدخلات والمخرجات لتوضيح الآليات. باستخدام مقياس جديد لاعتماد البلدان على هذه المدخلات الاستراتيجية، فإننا نقوم باختبار الآلية المقترحة تجريبيا من خلال تفاعل القياس مع وجود مؤشر على العلاقات السياسية في نموذج الجاذبية الهيكلي. لمعالجة القضايا الباطنية المحتملة. باستخدام مجموعة بيانات جديدة عن حالة التمثيل الدبلوماسي والبيانات التجارية الشهرية، نصل الى أن إجراءات مثل استدعاء لسفير دولة هي بمثابة صدمة للعلاقات السياسية الثنائية. النتائج من كل التحليلات تؤكد تأثير اقتصادي ذات دلالة إحصائية على أن الاختلاف مشروطا باعتماد البلاد على المدخلات المستوردة.

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 global value 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 analyse the relation between political relations and trade at the industry level, allowing for a heterogeneous effect by types of products. We hypothesize that political relations matter more for *strategic* products. As strategic product 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 rationale for a greater importance of political tensions for trade of strategic products is that a shock to the price of a strategic input has a greater impact on the total production of an economy than a shock to other imported inputs. The more an economy is dependent on a specific product, the greater is the decrease in aggregate output. From the theoretical model we can directly derive a measure of *dependence* for each country-product pair.

Our empirical analysis aims at testing our theoretical prediction. We first test it in a standard structural gravity setup in which we include a measure for political relations developed by Hinz (2014). We run the estimation at the product level and interact the political relations measure with our dependence measure. As political relations and trade are possibly prone to reverse causality (i.e. political relations are likely to be affected by trade levels), we exploit an exogenous shock to political relations to further test our prediction: the summoning or recalling of foreign or own diplomats, respectively. We construct a new event database by collecting information on these diplomatic events from press releases found on the websites of the Foreign Ministry of five politically and economically important countries (France, UK, Russia, Germany, Japan). Using these events as a proxy for a negative shock to bilateral political relations, we replicate the previous gravity estimation strategy with *monthly* UN Comtrade (United Nations Statistics Division, 2015) import data of these countries vis-Ã -vis the rest of the world from January 2010 to December 2014.

Results from both empirical exercises point to the same conclusion: political relations indeed do matter in the choice of the sourcing partner for today's interdependent economies and, importantly, more so for products which the importing economy is dependent on. This provides evidence for the mechanism proposed in the theoretical model: the more an economy is dependent on a certain input, the more bilateral political relations matter for the choice in the trading partner.

The paper is related to an extensive literature on the connection between trade and political relations. 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,

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

[2] The term "strategic" is frequently used when referring to goods that touch upon political and security considerations, such as "Strategic Petroleum Reserves" of countries in case of an energy crisis (https://en.wikipedia.org/wiki/Global_strategic_petroleum_reserves).

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. However, it seems questionable to reduce the influence of political determinants of trade flows to historical episodes and those of conflict and colonial legacy. For almost half a century the Cold War never once "got hot", yet certainly constituted a major obstacle to trade and global economic integration.[3] One strand of the literature investigates the influence of bilateral political relations on aggregate trade flows. These focus by and large on security-related issues, in particular inter- and intra-state conflict (Martin et al., 2008a,b, 2012), "hijacking" of shipments (Anderson and Marcouiller, 2002; Marcouiller, 2000), terrorism (Mirza and Verdier, 2008; de Sousa et al., 2009, 2010) and international piracy (Bensassi and Mart´ınez-Zarzoso, 2012).

A number of works have furthermore pointed to the importance non-security-related political and societal features of the trading countries. Yu (2010) studies the impact 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: he estimates 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. Similarly, Yazigi (2014) reports a marked drop in exports and imports from civil war-ridden Syria to European countries, yet increases with allied Russia and Iran. 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 the foreign trips of the Dalai Lama on the host countries' subsequent trade with China. They only find a significant effect for meetings with the countries' top political leaders and only for the period of 2002-2008, while the effect also only lasts one year. Davis et al. (2012) estimate the effect of political relations on imports and exports of state-owned enterprises. Here the idea is that governments directly influence the firms' behavior, implying a heterogeneity in the effect. Adverse bilateral political events are indeed found to lead to a reduction in imports and exports. As hypothesized, the relationship is stronger for imports by SOEs, but yields mixed results for exports.

The literature acknowledges that political relations have an effect on trade. Yet, little is known about the mechanisms at play as most of the analyses have focused on aggregate flows. We complement the existing literature by suggesting a channel through which political relations affect trade. We hypothesize that political relations matter more for *strategic* products. We test this prediction empirically by integrating an indicator for political relations and a new measure of economic dependence in a gravity framework at the product-level.

A common point of concern in the literature is the estimation of the effects of political relations on trade in cross-section analyses and the connected issue of endogeneity. In response to this, a variety of different strategies have been employed to circumvent the endogeneity issue of political relations with economic outcomes. Kuziemko and Werker (2006) exploit the rotation of UN security council non-permanent membership to assess the connection between foreign

[3] See also Findlay and O'Rourke (2007) for the history of the connection between the pattern and evolution of trade and long-term economic and political development.

aid and political support at international organizations. Romalis (2007), studying the effect of trade on growth, uses the trade policy of the United States as an instrument for the openness of developing countries. Fisman et al. (2014) take another approach and perform an event study, where they analyze the performance of Japanese and Chinese firms with exposure in the respective other market after nationalist episodes following the publication of a revisionist history textbook in Japan and a near-collision of a Chinese trawler with a Japanese coast guard vessel. To address the issue of endogeneity in our present case, we explore the effect on trade flows brought about by *exogenous* political shocks. We exploit the summoning or recalling of the ambassador (or other high-ranking members of the diplomatic staff) of a country as an exogenous negative shock to bilateral political relations to study how trade flows react.

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 test the proposition with in a simple structural gravity framework. In section 4 we address the issue of endogeneity with an event study. Section 5 concludes.

2. Theory

Most of the papers studying the connection between political relations and trade use aggregate trade flows.[4] We claim that it is key to look at the effect of political relations at lower levels of aggregation, namely the industry or product level, as it is likely to be heterogeneous. Political relations could have a stronger impact on trade of particularly sensitive, *strategic* inputs, i.e. inputs that the firms in the economy use intensively for final good production. The simple model presented in this section gives the intuitions as to why this maybe so. The model is related to Acemoglu et al. (2012) in its depiction of input-output linkages in the context of the propagation of shocks.

We sketch a simple model in which a two-sector economy uses labor, domestic and imported foreign inputs. Political relations are assumed to affect variable trade costs, e.g. in the form of the probability of actual arrival in the destination economy. The price of a foreign input in the domestic market equals the price of the good in the foreign market multiplied by bilateral trade costs. An increase of political tensions translates into an increase of trade costs, which in turn leads to an increase of the price of the input.

Assuming political relations to enter as a variable trade cost is not new. They are widely considered to be a component of "dark" trade costs, i.e. costs that are difficult to measure, although they are clearly observed Head and Mayer (2013). In his theoretical framework, Yu (2010) models variable trade costs to explicitly depends 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 of political proximity as a variable element of the trade cost function.

Deriving the model, we show that a shock to the price of an input on which the economy is *dependent* has a greater impact on the production of goods consumed in the economy than a shock to other imported inputs. The intuition is the following: an increase in the price of an input decreases production of sectors proportionally to their use. This leads to an increase of the price of these goods. As these goods are used as intermediate inputs by other sectors, the shock is transmitted to other sectors. The production of the other sectors declines. The greater domestic input linkages, the greater is the decline. Therefore, the stronger direct and indirect use of imported foreign inputs, the more dependent is an economy on this input, the greater is

[4] With the notable exception of Davis et al. (2012) who disaggregate by ownership structure, see above.

the effect on aggregate output. Following this logic, political relations should matter more for strategic products, i.e. those product the economy is dependent on.

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, 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:

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

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

where $\lambda_x + \beta_x + \gamma_x + \delta_x = \lambda_y + \alpha_y + \gamma_y + \delta_y = 1.$

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, 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. Labor is mobile and thus the wage w is equal in both sectors.

The representative consumer in the domestic economy has a Cobb-Douglas utility of the form: $U = x_c^{\sigma} y_c^{1-\sigma}$. The consumer disposes over 1 unit of labor such that she receives an income of w and hence 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 σ of her revenue on x and the rest on y. We thus have $x_c = \sigma \frac{w}{p_x}$ and $y_c = (1-\sigma)\frac{w}{p_y}$.

The production function being Cobb-Douglas, the model does not allow for a change in production technologies or a substitution between foreign and domestic inputs. Given that our analysis focuses on short-term effects of a shock, it is a reasonable assumption. In the short-run, production technology cannot adjust. Furthermore, it is important to stress that the framework aims at putting the emphasis on one channel and properly identifying the mechanisms at play. Other potential channels are ruled out of the analysis. Precisely, there is no such thing as a competition channel as there is no imported final goods. Hence, no increase of the competition on the final good market after a shock to political relations. There is no market access channel as there is no exports of final goods. Hence, no change in access to foreign market for domestic final goods producers.

In each sector the representative firm maximizes profits. In sector x:

$$\pi_x = p_x x - w l_x - p_y y_x - p_m m_x - p_n n_x.$$

which yields

$$w l_x = p_x x \lambda_x$$

$$p_y y_x = p_x x \beta_x$$

$$p_m m_x = p_x x \gamma_x$$

$$p_n n_x = p_x x \delta_x \text{ while the analogous optimization for the firm in sector } y \text{ yields } w l_y = p_y y \lambda_y$$

$$p_x x_y = p_y y \alpha_y$$

$$p_m m_y = p_y y \gamma_y$$

$$p_n n_y = p_y y \delta_y$$

Rearranging, the total amounts of the goods in the economy are therefore governed by

$$x = \frac{p_y}{p_x}\alpha_y y + x_c$$

$$y = \frac{p_x}{p_y}\beta_x x + y_c$$

$$m = \frac{p_x}{p_m}\gamma_x x + \frac{p_y}{p_m}\gamma_y y$$

$$n = \frac{p_x}{p_n}\delta_x x + \frac{p_y}{p_n}\delta_y y \quad \text{which, expressed in matrix form is} \quad \begin{pmatrix} x \\ y \\ m \\ n \end{pmatrix} = \begin{pmatrix} 0 & \frac{p_y}{p_x}\alpha_y & 0 & 0 \\ \frac{p_x}{p_y}\beta_x & 0 & 0 & 0 \\ \frac{p_x}{p_m}\gamma_x & \frac{p_y}{p_m}\gamma_y & 0 & 0 \\ \frac{p_x}{p_n}\delta_x & \frac{p_y}{p_n}\delta_y & 0 & 0 \end{pmatrix} \begin{pmatrix} x \\ y \\ m \\ n \end{pmatrix} + \begin{pmatrix} x_c \\ y_c \\ 0 \\ 0 \end{pmatrix}$$

At this point the resemblance to the Leontief matrix becomes 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:

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

The domestic economy is considered as being more dependent on input m than on input n, i.e. needs it more for final consumption, if and only if

$$x_c \frac{p_x}{p_m}(\gamma_x + \beta_x\gamma_y) + y_c \frac{p_y}{p_m}(\gamma_y + \alpha_y\gamma_x) > x_c \frac{p_x}{p_n}(\delta_x + \beta_x\delta_y) + y_c \frac{p_y}{p_n}(\delta_y + \alpha_y\delta_x)$$

Hence, the 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.

Using the fact that $\beta_x + \gamma_x + \delta_x = 1$ and $\alpha_y + \gamma_y + \delta_y = 1$, the condition is equivalent to

$$x_c p_x(\gamma_x + \beta_x\gamma_y) + y_c p_y(\gamma_y + \alpha_y\gamma_x) > \frac{p_m(1-\beta_x\alpha_y)}{p_n + p_m}$$

From the consumer maximization problem we have: $x_c = \sigma \frac{w}{p_x}$ and $y_c = (1-\sigma)\frac{w}{p_y}$. The condition can then be rewritten as

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

2.2 Impact of a change in political relation

In this setting, we analyze the effect of a change in political relations to aggregate output. We compare the effect of a shock to political relations between the domestic economy and the country that provides m with the same shock between the domestic economy and the country that provides n.

Following the existing literature, we hypothesize political relations to affect variable trade costs. The simplest way to model trade cost is assuming so-called iceberg trade costs. The price of a foreign input m sourced from i in the domestic market can then be described by $p_m = \tau^i \cdot p_m^i$ where p_m denotes the price of m in the domestic market, p_m^i the price of m in i and τ^i trade cost between the domestic economy and i. Similarly, the price of a foreign input n sourced from j in the domestic market is $p_n = \tau^j \cdot p_n^j$. A shock to political relation is modeled as a shock to τ, which leads to a shock to the price of the input.

Let us now study the effect of an increase in p_m due to a shock on τ. Focusing on sector x: From the firm profit maximisation problem in sector x we know that the demand for input m in x is:

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

Taking the derivative with respect to p_m, we have:

$$\frac{\partial m_x}{\partial p_m} = -\frac{m_x}{p_m}$$

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:

$$\frac{\partial x}{\partial p_m} = \gamma_x l_x^{\lambda_x} y_x^{\beta_x} m_x^{\gamma_x - 1} n_x^{\delta_x} \frac{\partial m_x}{\partial p_m}$$

$$= -\frac{\gamma_x}{p_m} x$$

This is the direct effect of an increase in the price of m on x. As x decreases, the price of x increases. From the firm profit maximization in x we have:

$$p_x = \frac{wl_x}{x\lambda_x}$$

Taking the derivative with respect to x:

$$\frac{\partial p_x}{\partial x} = -\frac{p_x}{x}$$

As x is used as an input by y, the change in the price of x has an effect on production of y. From the firm profit maximization in y we have that:

$$x_y = \frac{p_y y \alpha_y}{p_x}$$

Taking the derivative with respect to p_x we have:

$$\frac{\partial x_y}{\partial p_x} = -\frac{x_y}{p_x}$$

When p_x increases, x_y decreases. This leads to a decrease in y indirectly:

$$\frac{\partial y}{\partial p_x} = \alpha_y l_y^{\lambda_y} x_y^{\alpha_y - 1} m_y^{\gamma_y} n_y^{\delta_y} \frac{\partial x_y}{\partial p_x}$$

$$= -\frac{\alpha_y}{p_x} y$$

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:

$$TE_x^m = -\frac{1}{p_m}\gamma_x x + \frac{\partial x}{\partial p_y}\frac{\partial p_y}{\partial y}\frac{\partial y}{\partial p_m}$$

$$= -\frac{1}{p_m}(\gamma_x + \beta_x \gamma_y) x$$

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

$$TE_y^m = -\frac{1}{p_m}\gamma_y y + \frac{\partial y}{\partial p_x}\frac{\partial p_x}{\partial x}\frac{\partial x}{\partial p_m}$$

$$= -\frac{1}{p_m}(\gamma_y + \alpha_y\gamma_x)y$$

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:

$$TE_x^n = -\frac{1}{p_n}\delta_x x + \frac{\partial x}{\partial p_y}\frac{\partial p_y}{\partial y}\frac{\partial y}{\partial p_n}$$

$$= -\frac{1}{p_n}(\delta_x + \beta_x\delta_y)x$$

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

$$TE_y^n = -\frac{1}{p_n}\delta_y y + \frac{\partial y}{\partial p_x}\frac{\partial p_x}{\partial x}\frac{\partial x}{\partial p_n}$$

$$= -\frac{1}{p_n}(\delta_y + \alpha_y\delta_x)y$$

If we define aggregate output GDP as: $GDP = x^{\sigma}y^{1-\sigma}$. The total effect of a change of the price of m on Log(GDP) is:

$$\frac{\partial ln(GDP)}{\partial p_m} = \sigma\frac{\partial ln(x)}{\partial p_m} + (1-\sigma)\frac{\partial ln(y)}{\partial p_m}$$

$$= \frac{\sigma}{x}\frac{\partial x}{\partial p_m} + \frac{1-\sigma}{y}\frac{\partial y}{\partial p_m}$$

$$= -[\sigma\frac{1}{p_m}(\gamma_x + \beta_x\gamma_y) + (1-\sigma)\frac{1}{p_m}(\gamma_y + \alpha_y\gamma_x)]$$

Similarly, the total effect of a change of the price of n on Log(GDP) is:

$$\frac{\partial ln(GDP)}{\partial p_n} = -[\sigma\frac{1}{p_n}(\delta_x + \beta_x\delta_y) + (1-\sigma)\frac{1}{p_n}(\delta_y + \alpha_y\delta_x)]$$

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:

$$|\frac{\partial ln(GDP)}{\partial p_m}| > |\frac{\partial ln(GDP)}{\partial p_n}|$$

It can be shown that this is equivalent to:

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

Previously we show that this is true if the domestic economy is more dependent on m than on n. Hence, aggregate output is significantly more affected by change in p_m than by a change in p_n.

3. Dependence and Political Relations in the Gravity Equation

To test the prediction of the model, we turn to the gravity model of international trade. In a first step we estimate a standard structural gravity equation introducing political relations and the *dependence* of a product as additional explanatory variables. As Head and Mayer (2014) state, historical legacies such as colonial linkage, social and political factors are the likely candidates to explain the *dark matter* of trade costs. Including measures of political relations into a gravity equation has of course been done before. As described above, a multitude of political variables hold remarkable explanatory power for trade flows between countries. The aim of this present endeavour is to dig deeper and try to identify a channel through which political relations influence trade patterns. The theory above suggests that that those inputs on which a country is *dependent* are more sensitive to political relations than others.

3.1 Gravity model

Assume a generic structural gravity estimation

$$X_{ijkt} = \frac{Y_{ikt}}{\Omega_{ikt}} \cdot \frac{X_{jkt}}{\Phi_{jtk}} \cdot \phi_{ijkt} \quad (4)$$

where $Y_{ikt} = \sum_j X_{ijkt}$ is the value of production of k in i at time t, $X_{jkt} = \sum_i X_{ijkt}$ is the value of all imports of k in j at time t, and

$$\Omega_{ikt} = \sum_l \frac{X_{lkt}\phi_{ilkt}}{\Phi_{lkt}} \quad \text{and} \quad \Phi_{jkt} = \sum_l \frac{Y_{ltk}\phi_{ljkt}}{\Omega_{lkt}} \quad (5)$$

are the multilateral resistance terms. Bilateral trade costs ϕ_{ijkt} are assumed to take the form of

$$\phi_{ijkt} = \exp\left(\text{Controls}_{ijk} + \delta \log(\text{PoliticalR elations}_{ijt})\right)$$

Equation (4) can easily be estimated as

$$\log(X_{ijkt}) = F_{ikt} + F_{jkt} + F_{ijk} + \delta \log(\text{PoliticalR elations}_{ijt}) + \varepsilon_{ijkt} \quad (6)$$

where F_{ikt}, F_{jkt} and F_{ijk} are fixed effects capturing all exporter × product × time, importer × product × time and exporter × importer × product characteristics.

We estimate equation (6) at the industry-level. In equation 6, bilateral trade costs enter at the country-pair level. However, following the previous section, we believe the effect of political relations on trade to be heterogeneous across products. We allow δ to differ by product-type by interacting $\log(\text{PoliticalR elations}_{ij})$ with a measure of dependence.[5] If the theoretical prediction holds, the coefficient of the interaction term should be positive. Political relations then matter more for strategic products.

3.2 Data on political relations

To measure the state of political relations between two countries, we rely on the *importance* and *mood* indicators developed by Hinz (2014). The great advantage of these indicators over other measures, such as the widely-used UN General Assembly voting similarity by Voeten and Merdzanovic (2009), is the directionality, i.e. country A's views towards country B are not assumed to be equal to country B's views on A. The indicators make use of the GDELT database (Leetaru and Schrodt, 2013), a vast dataset of more than 300 million (political) events since 1979. Every event can be attributed to actors, in this case at the country level and time,

[5] See below for a definition of the variable

and is classified into one of the four categories: “material cooperation”, “verbal cooperation”, “verbal conflict” or “material conflict”.[6]

Calling M_{ijt}^{coop} the count of events in a year t initiated in country i towards country j that fall into the category “material cooperation”, and V_{ijt}^{coop}, V_{ijt}^{conf} and M_{ijt}^{conf} analogously those counts of “verbal cooperation”, “verbal conflict” or “material conflict”, the *importance* of country j to country i is defined as:

$$\text{Importance}_{ijt} = \frac{M_{ijt}^{coop} + V_{ijt}^{coop} + V_{ijt}^{conf} + M_{ijt}^{conf}}{\sum_k M_{ikt}^{coop} + V_{ikt}^{coop} + V_{ikt}^{conf} + M_{ikt}^{conf}} \quad \in [0,1]$$

The index reflects the share of events that took place in country i in year t that involved country j. The *mood* of a country i towards country j is defined as

$$\text{Mood}_{ijt} = \frac{M_{ijt}^{coop} + \frac{1}{3} \cdot V_{ijt}^{coop} - \frac{1}{3} \cdot V_{ijt}^{conf} - M_{ijt}^{conf}}{M_{ijt}^{coop} + V_{ijt}^{coop} + V_{ijt}^{conf} + M_{ijt}^{conf}} \quad \in [-1,1]$$

and therefore is a weighted measure of positive and negative events in country i towards country j at time t, on the [–1,1] interval. Figures 1a and 1b display how the political mood of Muslim-majority countries towards Denmark took a hit in early 2006 and early 2008 compared to other countries after the initial publication and later reprints of the so-called “Muhammad cartoons” by the Danish newspaper Jyllands-Posten, while its importance temporarily soared.

For most of the analysis below, we transform the two variables in a way such that

$$\text{PoliticalRelations}_{ij} = \frac{\text{Mood}_{ij} + 1}{2} \cdot \text{Importance}_{ij} \qquad (7)$$

Multiplying both indicators therefore combines both the direction and magnitude of political relations. Effectively it displays the share of positive events in country i towards country j, discounted by negative events, out of all events in country i. Figure 2a and figure 2b show the histogram values and top/bottom 5 of countries in terms of political relations for the United States in 2000.

3.3 Measure of dependence

We now turn to the empirical implementation of the concept of *dependence* in section 2. To test our predictions, we construct a time-invariant measure for *dependence* of a country on a (group) of imported products using 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

[6] See the appendix of Hinz (2014) for a discussion of the aggregation technique and descriptive statistics.

$$\text{dependence}_j = A_m(I - A_d)^{-1}F \quad (8)$$

where A_m is the matrix of the values of *imported* inputs by sector and A_d the matrix of the values of *domestic* inputs by sector. F is the vector of final consumption shares. The interpretation of the vector is straight forward: each element denotes the required value of foreign input of the respective commodity for 1 unit value of final consumption in the economy j. The higher the necessary imported value, the more dependent the country is on the input.

Unfortunately input-output tables of high detail are a rarity. While data is available for 389 industries in the United States from the Bureau of Economic Analysis, we opt to use data from GTAP (Aguiar et al., 2012)[7], commonly used in the related literature on global value chains, most notably by Johnson and Noguera (2012) and Timmer et al. (2012). While the data only has a level of disaggregation of 47 industries, their broad country coverage make it very appealing[8]. Figure 3a shows the histogram and figure 3b display the ranking of most sensitive products for the United States.

3.4 Gravity estimation results

Armed with indicators for political relations, varying over time by country-pair, and the measure of dependence, varying by country and industry, we estimate equation (6) in multiple specifications. For trade data we turn to UN Comtrade data from 2000 to 2010 (United Nations Statistics Division, 2015). We include a number of standard gravity controls: RTAs, common currency, common language and common colonial history are sourced from CEPII (Head et al., 2010) and distances are taken from Hinz (2016).

Table 1 shows the results for estimating equation (6) with disaggregated data and interacting the political relations variable with the measure of dependence. The variable *pol_relations* is economically and statistically significant throughout—even when including high dimensional fixed effects. More interesting though now is its interaction with the *dependence* measure. In the benchmark estimation (column 1) we include importer × year, exporter × year and industry fixed effects. As noted, this result is robust to country × pair fixed effects (column 2). This suggest a heterogeneity in the effect of political relations on imports along the lines of the dependence of the country on the respective industry. The magnitude of the coefficient however drops drastically when including importer × industry × year and exporter × industry × year and exporter × importer fixed effects. This is unsurprising however, as it removes a lot of the variation in the data. The results remain highly significant throughout. All other gravity covariates yield customary coefficient point estimates.

These results are appealing. They strongly suggest that political relations play a key role in the choice of the exporter for an importing country. More importantly, the effect is heterogeneous by industry, conditional on the dependence of the importing country on the respective input. However, endogeneity of trade and political relations are an obvious identification issue. The government of any country can be reasonably assumed to be keeping its own economy afloat for the sake of popularity. It might therefore be beneficial for the democratic or autocratic leader of a country to maintain a positive level of bilateral relations with important trading partners. A prime example for this in recent years was Turkey's reaction to the remembrance of the Armenian genocide at its centennial anniversary. President Erdogan and other prominent politicians publicly lashed out at numerous foreign heads of states for recognizing the atrocities as genocide, while reactions were surprisingly muted for the exact same acts by the presidents of Germany, Russia and the United States.

[7] GTAP 8 data are for the year 2007. Our measure is representative of the period studied in the gravity section and ensures the exogeneity of the input coefficients for the event study.

[8] It covers 129 regions.

4. Event Study

In order to address this endogeneity issue, we now explore the effect on trade flows brought about by *exogenous* political shocks. We exploit the summoning and recalling of the ambassador of a country (or any other member of the diplomatic staff) as an exogenous negative shock to bilateral political relations to study how trade flows react using monthly trade data for five major importers from 2010 to 2014.

4.1 Data on diplomatic events

The summoning or recalling or high-level diplomats are used as a diplomatic instrument to put pressure on a foreign government. They are considered after mediation, negotiation and arbitration fails. We believe these events make for a reasonable proxy for an adverse shock to bilateral political relations. The summoning, recalling or expulsion of diplomats is a decision taken by the foreign office or the head of state 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. 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 (temporary) expulsion of the ambassador and the 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 toward the foreign country. In the other direction, a country can recall its own ambassador or the diplomatic staff from a foreign country. In the extreme, this action yields a temporary closure of the embassy in the foreign country.

As suggested above with Turkey's response to criticism voiced by other governments, a strong concern is that governments' actions themselves are a function of trade levels. 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 both the lead actors in trade, combining roughly 25 % of world imports between them, as well as in the political arena.[9] 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 indeed hesitate to exercise this tool of foreign policy, we do not observe such pattern in our sample. Not only are ambassadors from "small" trading partners being summoned, ambassadors from major trading partners are being summoned as well. In one recent instance in June 2015, the media extensively reported about the summoning of the American ambassador in Paris by the French government over "unacceptable spying on French political leaders".[10]

The selected five countries have repeatedly made use of summoning or recalling of an ambassador as a foreign policy tool. We have collected information on these events from official press releases available on the website of each Ministry of Foreign Affairs,[11] using keyword searches such as "ambassador summoned", "ambassador recalled", "withdraw of diplomatic staff", "embassy closure". As there is a small number of country-pairs which does not entertain bilateral diplomatic representation, e.g. North Korea and France do not have

[9] Three of the five countries—France, the United Kingdom and the Russian Federation—are permanent members of the UN Security Council.

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

[11] Appendix A.1 lists the direct weblinks to the different websites.

official diplomatic relations, in all below analysis we only consider country-pairs that have embassies in one another.[12]

To confirm the exogeneity of our events to trade levels, we analyze the link between the probability of having an event for a given country pair (i.e. summoning or recalling of an ambassador of country i by country j) and bilateral aggregate trade at the beginning of the period studied. 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 between a given country pair during the period 2010-2014. Turkey's behaviour suggests that the probability of having an event could be negatively affected by trade levels. A country could be more likely to use diplomatic pressure with countries that are not major trade partners.

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 average trade share (share of a given partner in import flows) in 2010 is significantly different for the two groups. Results presented in Table ?? show that country-pairs with an event trade significantly more than other country pairs. This rejects the hypothesis that our five importers are less likely to summon ambassadors from important trade partners. One might worry that this biases our estimates. As the effect of trade on tensions is positive, if anything, our coefficient is an underestimation of the true coefficient.

As a second test, we regress the probability of an event occurring for a given country-pair on import shares in 2010. See Table ??. The findings of the mean test are confirmed; there is a positive but not statistically significant relation between trade and the probability of an event occurring.

Given the characteristics of our events and their likely short-term impact, we opt for an analysis using monthly trade flows. It is very plausible that the hypothesized mechanism works in the short-term, similar to the observed effect of Dalai Lama visits in Fuchs and Klann (2013). 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).

Using monthly data however also poses new issues, seasonality being one. We account for this by including exporter $\times$ importer $\times$ month fixed effects in all our regressions. 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 the France, UK, Russia, Germany, Japan vis-Ã -vis the rest of the world from January 2010 to December 2014, totaling 60 months.

4.2 Estimation strategy and results

The general idea is to compare trade flows before and after the event for countries which experience a shock in political relations relative to others. We build 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. Following Fuchs and Klann (2013), we include our variable *treatment* in a gravity equation. We re-run the estimation of equation (4) at the product-level and interact the treatment variable, i.e. the shock to political relations, with our product-level measure of *dependence* as in the previous section. We therefore estimate the following equation:

$$\log(X_{ijkt}) = F_{ikt} + F_{jkt} + F_{ijkm} + \delta_0 \cdot \text{Treatment}_{ijt} + \delta_1 \cdot \text{Treatment}_{ijt} \times \log(\text{Dependence}_{jk}) + \varepsilon_{ijkt} \quad (9)$$

[12] Additionally, only events involving country pairs for which we have monthly trade data can be used in our estimation. See appendix A.2 for a complete list of events.

where as above F_{ijt} and F_{jkt} capture all exporter × industry × time and importer × industry × time characteristics. Slightly different to before, we let now vary the bilateral fixed effect F_{ijkm} also by month to account for seasonality. Standard errors are clustered at the exporter × importer × industry level. Following the same reasoning as before and keeping in mind the results from the gravity estimations in section 3, we expect the coefficient for the treatment, δ_0, and for the interaction term with $\log(\text{Dependence})$, δ_1, to be negative. Trade after the adverse political shock should decrease for the treated countries relatively to other country-pairs, and even more so for strategic products.

The results are presented in table 2. In line with the results presented in the previous section, a sudden shock to bilateral political relations negatively impacts trade between two countries. The point estimate for the treatment, i.e. the average treatment effect, on *aggregated* data however is not significant (columns 1 and 2), while pointing in the correct direction. On *disaggregated* data however (columns 3–5), as predicted by the model in section 2, the estimation yields statistically significant negative coefficients. The coefficients are stable over the different specifications and different high dimensional sets of fixed effects. In column (4) we show the results of our preferred specification, which controls for unobservables and seasonality using exporter × industry × time, importer × industry × and exporter × importer × industry × month fixed effects. A 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.[13] 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 (9) on only non-Arab league countries—yielding almost identical results (column 5). The results underline the heterogeneous response of industries to political shocks by the dependence of the country on strategic inputs and support the previous results from section 3.

5. Conclusion

In this paper we extend the literature on the link between politics and trade by suggesting a mechanism through which political relations affect the exchange of goods. Most of the previous studies look at the impact of the deterioration or improvement of bilateral political relations on aggregate flows. Our contribution is to extend the existing body of research by exposing the heterogeneity of the impact by product/industry. Estimations on aggregate trade flows are hiding important characteristics of the effect that become visible at lower levels of aggregation. Our hypothesis is that imports of *strategic* products, those on which the importing economy is very dependent on, are affected much more gravely than others. Countries are dependent on certain products that contribute directly and indirectly through input-output linkage relatively more to total output than other inputs.

We sketch a simple model that illustrates the mechanism at play by building on existing models of economic shock propagation. The model predicts that price shocks on imported inputs that contribute to total production relatively more than others through direct use and indirect use through domestic linkages have a stronger adverse effect. The model allows us derive a measure of dependence of an economy on certain products/industries that can be taken directly to the data.

We compute this measure of dependence for 129 countries and 47 industries using data from GTAP 8. We then introduce the new measure into a standard structural gravity framework and interact it with an indicator of political relations. While the empirical evidence supports the hypothesis that trade in those products that are strategic is more affected than trade in other

[13] See appendix A.2 for the list of events.

products, the approach is prone to endogeneity, as trade levels are likely to impact political relations. We therefore conduct an event study that exploits abrupt and unanticipated political shocks to test the proposed mechanism: the recalling and summoning of high-level diplomats. After testing for exogeneity of the events we confirm the heterogeneous impact of political relations on imported inputs, driven by the countries dependence on them.

Our study contributes to a growing literature that aims to shed light on the "dark" trade costs, those that can be observed but are difficult to quantify. The proposed mechanism supports the hypothesis that the impact of political relations—a component of dark trade costs that has been highlighted before—is heterogeneous and conditional on a country's dependence on certain inputs. At the same time, the mechanism clearly only tells part of the story. As it well known that firms are not homogeneous either, we wonder about their role and influence in the "great game" of international relations. With growing influence of multinationals, they have grown from spectators to actors. As intriguing as these topics are, we refer them to future research.

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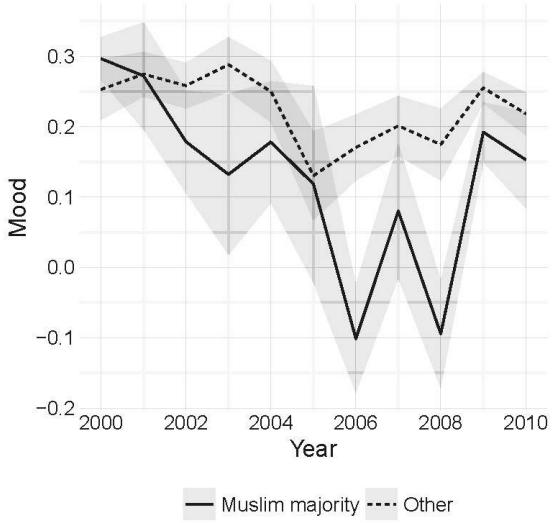
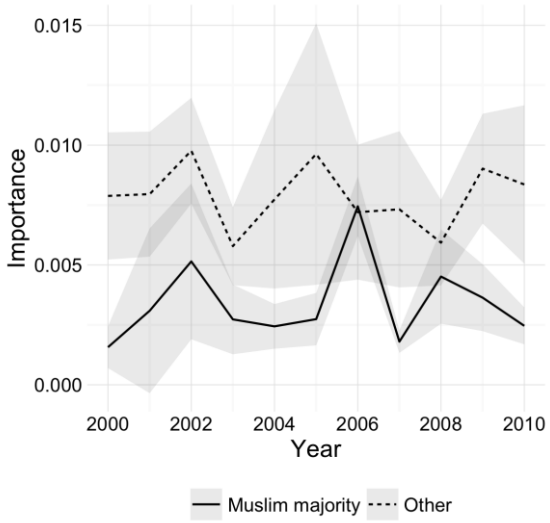
Figure 1: Mean of Political Mood and Importance of Muslim-Majority Countries and Other Countries Towards Denmark Using the Data from Hinz (2014).

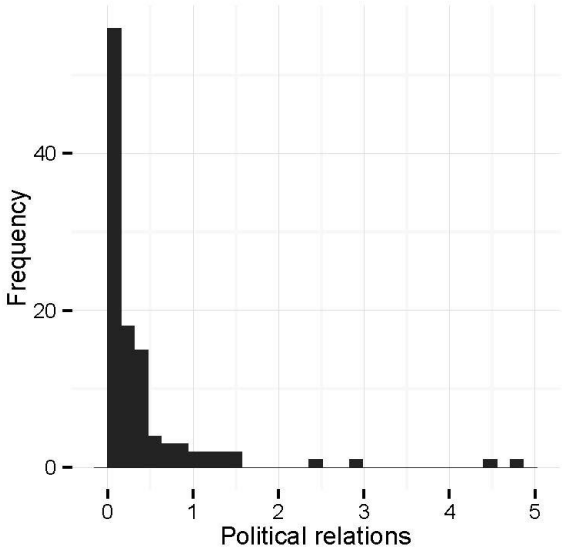


(a) Mood towards Denmark by country group



(b) Importance of Denmark by country group

Figure 2: Histogram and Top / Bottom 5 of Countries by Political Relations Measure for the USA in 2000

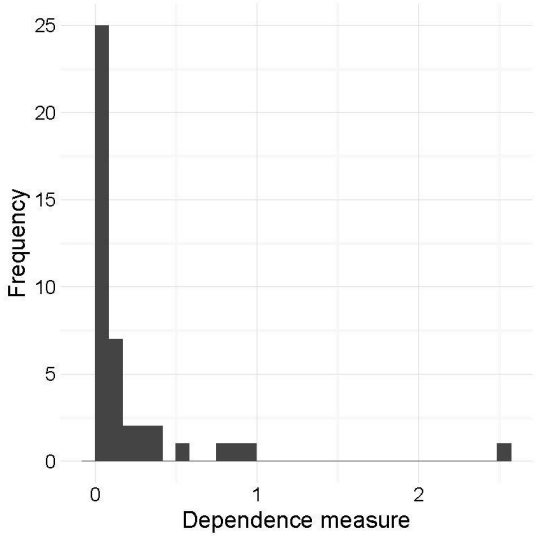


(a) Histogram of political relations

	Country	Political Relations
1	Israel	471.73
2	Russina Federation	443.30
3	China	297.52
4	Japan	250.75
5	Korea, Republic of	155.10
107	Trinidad and Tobago	1.88
108	Burkina Faso	1.52
109	Madagascar	1.76
110	Malta	1.12
111	Benin	0.59

(b) Top / bottom 5 countries

Figure 3: Histogram of Dependence Measure and Top 10 US Strategic Industries (Imported Value by Industry per 100 USD GDP)



	GTAP Industry	Dependence
1	Petroleum, coal products	2.49
2	Plant-based fibers	0.93
3	Chemical, rubber, plastic products	0.89
4	Motor vehicles and parts	0.77
5	Wearing apparel	0.58
6	Paddy rice	0.41
7	Electronic equipment	0.38
8	Oil	0.32
9	Food products	0.29
10	Forestry	0.19

(a) Histogram of dependence for USA **(b) Top 10 US strategic industries**

Table 1: Gravity with GTAP Industry Level Data

	Dependent variable:			
	log(imports)			
	(1)	(2)	(3)	(4)
log(pol_relations)	0.377***	0.081***	0.392***	0.054***
	(0.013)	(0.009)	(0.008)	(0.007)
log(dependence)	0.059***	0.066***		
	(0.008)	(0.008)		
log(pol_relations):log(dependence)	0.009***	0.010***	0.005***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)
log(distance)	−1.020***		−1.196***	
	(0.021)		(0.008)	
rta	0.461***	0.069***	0.507***	0.065***
	(0.035)	(0.018)	(0.013)	(0.012)
comcur	−0.079	0.304***	0.015	0.305***
	(0.056)	(0.051)	(0.023)	(0.035)
Fixed effects	ctry-yr,ind	ctry-yr,ind,ctry-pair	ctry-yr-ind	ctry-ind-yr,ctry-pair
Observations	1,624,297	1,626,541	1,624,297	1,626,541
R^2	0.462	0.510	0.710	0.758
Adjusted R^2	0.461	0.505	0.688	0.737

Notes: Standard errors are clustered at the exporter × importer × industry level. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 2: Mean Test on Trade Share for Two Groups (Treated/ Non Treated)

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 3: Probit Test for Exogeneity

VARIABLES	Probability of an event occurring
share of imports	0.05
	(0.03)
Constant	-1.41***
	(0.085)
Observations	504

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

Table 4: Event Study With Aggregated and Disaggregated Flows

	Dependent variable:				
	log(imports)				
	(1)	(2)	(3)	(4)	(5)
Treatment	−0.069	−0.051	−0.176***	−0.143*	−0.155*
	(0.045)	(0.048)	(0.061)	(0.086)	(0.085)
Treatment x log(Dependence)			−0.024***	−0.020*	−0.022*
			(0.008)	(0.012)	(0.012)
Fixed effects	ctry-yr,ctry-mo, pair-mo	ctry-dt, pair-mo	ctry-dt,ctry-ind, pair-ind	ctry-ind-dt, pair-ind-mo	ctry-ind-dt, pair-ind-mo
Level	aggregate	aggregate	industry	industry	industry
Sample	all	all	all	all	w/o Arab league
Observations	9,671	9,671	252,321	252,321	236,672
R^2	0.952	0.969	0.904	0.967	0.967
Adjusted R^2	0.933	0.932	0.900	0.913	0.915

Notes: Standard errors are clustered at the exporter × importer × industry level. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Appendix

A. Data

A.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

A.2 Table 5: 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
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

Table 5 — *Continued on next page*

A.2 Table 5: Continued

Table 5 — *Continued from previous page*

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
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

Table 5 — *Continued on next page*

A.2 Table 5: Continued

Table 5 — *Continued from previous page*

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
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

Table 5 — *Continued on next page*

A.2 Table 5: Continued

Table 5 — *Continued from previous page*

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
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

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A.2 Table 5: Continued

Table 5 — *Continued from previous page*

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
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

A.3 Estimation: Gravity at the Aggregate Level

Table 6: Gravity with Aggregate Data

	Dependent variable:				
	log(imports)				imports
	(1)	(2)	(3)	(4)	(5)
log(distance)	−1.086***	−1.078***	−1.113***		−0.633***
	(0.011)	(0.011)	(0.011)		(0.005)
log(pol relations)	0.318***		0.233***	0.017***	0.180***
	(0.006)		(0.006)	(0.005)	(0.004)
log(mood)		0.083***			
		(0.030)			
log(importance)		0.327***			
		(0.006)			
rta	0.520***	0.519***	0.467***	0.068***	0.513***
	(0.019)	(0.019)	(0.019)	(0.026)	(0.009)
comcur	0.102**	0.104**	−0.115***	0.257***	−0.071***
	(0.041)	(0.041)	(0.041)	(0.092)	(0.012)
comlang off			0.450***		
			(0.019)		
comcol			0.806***		
			(0.025)		
colony			0.879***		
			(0.034)		
Estimator	OLS	OLS	OLS	OLS	PPML
Fixed effects	ctry-yr	ctry-yr	ctry-yr	ctry-yr, ctry-pair	ctry, yr
Observations	101,787	101,787	101,787	102,069	101,787
R^2	0.769	0.769	0.776	0.945	
Adjusted R^2	0.760	0.760	0.767	0.931	

Notes: Standard errors are clustered at the country-pair level. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 6 shows the results for aggregate country-level data and including the political relations variable. The estimated coefficients mirror those of other studies that introduce political variables into the gravity estimations. The coefficient on the variable of interest $^{\log(\text{polrelatio ns})}$ is positive and significantly so (column 1). The results are robust to including other common related variables, such as common language, as well as historical colonial ties (column 3). The estimated coefficient is lower when estimated with the PPML estimator, but remains statistically significant (column 5). Splitting up the variable pol_relations into its component by equation (7) (column 2) reveals that both the importance and mood indicator are economically and statistically significant. The coefficient drops significantly when including country-pair fixed effects (column 4). We suspect this is due to a heterogeneity in the elasticity of industries to political relations that is examined with disaggregated industry-level data in section 3.4.