Trade Policy During Crises: A Theory and Evidence from Democracies and Autocracies

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Abstract

Most research on democracy and trade policy argues that trade policies in democratic countries are more liberal than those in autocracies. In crises, both regimes shift to protectionism. We show, both theoretically and empirically, that autocracies are more likely to pursue protectionist trade policies during recessions than democracies. We add crises into the model of Grossman, Helpman (1994, 1995). Like Aghion et.al. (2009) a crisis imposes liquidity shocks on firms, and a firm survives only if its profits is sufficient to pay the shock. This setup reveals several motives for protection (to keep employment and incomes - to prevent bankruptcies of efficient firms, but to let inefficient firms die, to prorect industries that can create more jobs). The interaction between democracy and policy response to crises is determined by hazard rate: an autocratic politician provides more protection than a democratic one if an industy generates high incomes and is at high risk - so, can pay much for protection. The predictions of the model are consistent with our case studies in car-producing industry and with bilateral trade data on 75 countries over 1948-2006.

1 Introduction

During crises, both democratic and autocratic governments turn to protectionism. This pattern was visible during the Great Depression (Eichengreen, 2009) and, to the lesser extent, during the global financial crisis of 2007-2009 (Evenett, 2009). Both theoretical and empirical research on politics and trade policy argue that, in general, autocracies trade less and have more restrictive trade policies than democracies (Helpman, 1995, Kono, 2006, a,b). We show, both theoretically and empirically, that there are finer consequences of the political regime for trade policy: while in democracies protection of declining industry is relatively small, autocrats maintain high protective barriers even for the industries that experience worst decline. E.g., while the US government allowed car-industry giants *Chrysler* and *General Motors* to get into bankruptcy in the wake of the global financial crisis, and German government refused to help *Saab*, the Russian government protected *AvtoVAZ*, the behemot car producer that has been struggling for years, by sharply raising tariffs on imported cars. In a similar circumstances a decade earlier, Yugoslavian dictator Slobodan Miloshevich opted to protect the highly inefficient car-producer *Zastava*. When regime was overthrown, new democratic government cut off two thirds of workers on an automobile plant in less than a year. (See detailed case-studies in Section 3.7.)

We add crises into the model of Grossman, Helpman (1994, 1995). Like Aghion et.al. (2009) a crisis imposes liquidity shocks on firms, and a firm survives only if its profits is sufficient to pay the shock. This setup reveals several motives for protection: to keep employment, to prevent inefficient bankruptcies. The interaction between democracy and policy response to crises is determined by hazard rate: an autocratic politician provides more protection than a democratic one if an industy generates high incomes and is at high risk - so, can pay much for protection.

To test the empirical predictions of our model, we follow the recent research of political economy and trade policy by adding political variables to the gravity model of trade (see Rose 2004, Head, Mayer, and Ries 2010).[1] Specifically, we use empirical approach most similar to Aidt and Gassebner (2007), Yu (2010), and Kono (2006a). Yu (2010) takes basic gravity equation and include two additional variables: the democracy scores of the exporting and the importing countries. Using both country-level and disaggregated industry data, the paper shows that democracies trade more than autocracies. Kono (2006a) uses the dynamic specification of the gravity equation with the same democracy scores to show that while democracies have more liberal trade policies to an average trading partner, they tend to have relatively freer trade with more developed countries and relatively more restricted trade with less developed ones. Aidt and Gassebner (2007) use similar approach to argue that democracies not only trade less than autocracies, but trade less conditional on the observed trade policies. The last finding highlightes the importance of unobservable policies[2] and so makes the gravity approach more relevant than the direct estimation of the relationship between democracy and observable trade policy such as import tariffs, quotas and various characteristics of non-trade barriers. Other research based on cross-country analysis shows that democracies trade more than autocracies (Bliss

[1] Early work on the gravity model of trade includes Tinbergen (1962), Anderson (1979), and Bergstrand (1985). More recent studies use the model as a base to allow for various extensions (Eaton and Kortum 2002, Anderson and Wincoop 2003, Evans 2003, Helpman, Melitz, and Rubinstein 2007).

[2] Evenett (2009) notes that most protectionist measures imposed during the recent 2007-2009 crisis are hard to observe end even more difficult to aggregate in a single measure of protection.

and Russett 1998), have lower tariffs (Milner and Kubota, 2005), and are more likely to make liberalizing trade agreements (Mansfield, Milner, and Rosendorff 2002).

The literature that analyzes protection of declining industries starts with Gray (1973, 1975) and Corden (1974). The first paper explains the protection of declining industries by social justice, the second underlines social objective of maintaining individuals' incomes and include them into a social welfare function. Eaton and Grossman (1985) modify the standard Hecksher-Ohlin model of trade by assuming the capital to be immobile (specifically, they assume that the capital must be allocated before the uncertainity in terms of trade is resolved) and show that the protection of declining industries is optimal for a small open economy since trade policy provides insurance from shocks in world prices. Long and Vousden (1991) consider a general equilibrium model with two immobile factors and employ political support function to show that the protection is highly dependent on the risk aversion and under reasonable assumptions the declining industries receive higher protection than others. Marvel and Ray (1983) shows that US trade policy is consistent with protection of declining industries (specifically, the level of protection in the industry depends negatively on its growth rate).

The problem with first models of declining industries protection is that they are not consistent with the "step-shaped" path of protection that is observed: the data shows most protection given to "average" declining industries: when the industry just statrs to decline, the responce of trade policy is very weak; if the decline is substancial, the industry receives high protection; and if the industry is sharply falling down, the policy lets it to fall. Choi (2001) relaxes the assumption of immobile capital by introducing capital adjustment costs and get the step-shaped protection: the most declining industries are not protected. However, it does not explain the weak protection of "slightly" declining industries. A recent and highly influential paper by Freund and Ozden (2008) incorporates reference dependence (i.e. habit formation) and loss aversion into a standard Grossman-Helpman (1994) framework. The resulted pattern of protection is consistent with both features "step-shaped" protection.

Our paper is also consistent with both features. One extension of our model allows for both contributions from the industry competing with import (as in Grossman and Helpman, 1994a) and social demand for protection of the declining industry, and, under reasonable assumptions, the pattern of protection is "fully" step-shaped. First, the response of the tariff rate to a negative terms of trade shock (as long as a negative productivity shock) might be more than proportional (or there might be no responce before a certain level of decline), so a "slightly" declining industry might receive very small protection, an "average" declining industry receives high protection; and if an industry demonstrate "heavy" decline, it might lose the whole protection (if the median voter loses the job in the sector competing with import).

Our paper is related to a large literature on trade, political economy, unemployment and protection of declining industries. Baldwin (1976) introduced a majority voting by owners of productive factors to determine tariffs and argued that optimal trade policy (free trade for a small open economy) is chosen only under very restrictive assumptions. Mayer (1984) considers two-factor Hecksher-Ohlin model of trade in which majority voting results in high protection from labor-intensive import and import subsidies for capital-abundant goods, the preferred choice of relatively poor (i.e. labor-endowed) median voter. Introducing voting restrictions may reverse the pattern of tariffs if the median voter is relatively rich (i.e. capital-endowed).

However, the Hecksher-Ohlin model fails to explain the observed protection in both labor- and capital-intensive industries. The model with specific factors (based on Jones, 1975) explains the protection of both types of industries. However, introducing voting costs is needed to explain the observed protection of industries with highly concentrated ownership.

Much smaller literature is devoted to trade policy during crises. Eichengreen (2009) examines changes in trade policy of (mostly) developed countries during the Great Depression. He argues that most countries restricted their trade policy, especially the countries which maintained the gold standard or have other restrictions that prevented them from currency devaluation. Evenett (2009) considers trade policy during the recent recession of 2007-2009 and concludes that most countries have conducted more restrictive policies compared with their policies before the recession. Both democratic and autocratic countries have restricted their trade policies; still, some examples demonstrate more restrictions made by relatively less democratic countries. In particular, Russia is listed in top 5 worst offending nations in 2009 according to all four metrics of protectionism used in Evenett (2009) (and the leader by the number of product categories under discriminatory measures), China is among top 10 worst by all the metrics (and the leader by the number of traiding partners affected by discriminatory measures), and both are far from being pure democracies.

Broader literature that on political economy of trade policy is vast (Helpman, 1995). Different avenues of research include tariff formation function (Findlay and Wellisz 1982), political support function (Hillman 1982), electoral competition (Magee, Brock and Young 1989) and influence-driven contributions (Grossman, Helpman 1994). More recent research in this area uses extended versions of the model suggested in based on the assumption that trade policy is influenced by special-interest groups, which offer contributions to the politician who chooses the policy maximizing the weighted sum of the total contributions and the social welfare.

One direction of the research starts from the estimation of the tariff equation derived from the "Protection for sale" model. This literature shows that the predictions of Grossman and Helpman (1994a) are consistent with the US industry-level data for both tariff (Goldberg and Mayer, 1999) and non-tariff barriers (Gawande and Bandyopadhyay, 2000). Mitra et al. (2002) uses the Grossman-Helpman approach to directly estimate the difference in trade policy between democracy and dictatorship. Still, the logic based on the "protection for sale" model (Grossman and Helpman, 1994) makes predictions counterfactual to observed patterns of trade policy during recessions. Specifically, the model shows lower tariffs during recessions, since the special interest groups (of entrepreneurs) face lower demand, receive lower profits and are less willing to pay for protection (the return on the marginal increase of the tariff rate becomes less).

The rest of the paper is organized as follows.

2 The Model

2.1 Consumption

Our model is based on Grossman, Helpman (1994). We consider a small open economy populated by a unit continuum of individuals with identical preferences represented by a quasi-linear utility function

$$u = x_0 + \sum_{i=1}^{n} u_i(x_i)$$

where good x_0 is a numeraire good, and goods $x_i, i = 1, 2, .., n$ are sold at domestic prices p_i. All functions $u_i(\cdot)$ are increasing, differentiable, and strictly concave.

In this setup the demand for good i depends only on its price p_i and is given by the function $d_i(p_i)$, that is simply the inverse of the marginal utility $u_i'(\cdot)$. The demand for the numeraire good is $x_0 = E - \sum_{i=1}^{n} p_i d_i(p_i)$, where E is the income of the individual. The consumer's surplus is therefore

$$S(p) = \sum_{i=1}^{n} u_i(d_i(p_i)) - \sum_{i=1}^{n} p_i d_i(p_i)$$

where $p = (p_1, p_2, .., p_n)$, and the indirect utility is $V(p, E) = E + s(p)$.

2.2 Production

The economy produces n tradable goods from capital and labor with standard neoclassical production functions $F_i(K_i, L_i)$ with constant returns to scale, and a numeraire non-tradable good 0 is produced from labor only with constant returns to scale and input-output ratio equal to 1. Labor market is competitive, and we assume labor supply large enough for the numeraire good to be produced, so that the wage is equal to 1 in all industries. Capital supply is fixed and capital is specific to each industry, it may represent any specific factors needed in production. The economy is open and small, so all firms take prices as given. Denote $\pi_i(p_i)$ the aggregate reward to the specific factor in industry i, i.e. its total revenue $p_j y_j(p_j)$ minus labor costs $1 \times L_j(p_j)$ Then the supply in this industy can be written as $y_i(p_i) = \pi_i'(p_i)$.

2.3 Trade policy

Let world price of a good i equal p_i^*. Then the domestic price is the world price plus tariff

$$p_i = p_i^* + t_i$$

Domestic prices higher than world prices mean that there are import tariffs tor that goods, domestic prices below world prices correspond to export subsidies. For simplicity we normalize untits of all goods so that world price for unit of any good equals 1: $p_i^* = 1$. Then $p_i = 1 + t_i$.

The net revenue from all taxes and subsidies is redistributed uniformly among population. As population size is normalized to 1, the total and per capita transfer are equal to this net revenue

$$R(p) = \sum_{i=1}^{n} (p_i - 1)(d_i(p_i) - y_i(p_i))$$

where $(p_i - 1)$ is tariff rate and $d_i(p_i) - y_i(p_i) = m_i(p_i)$ is import of good i.

2.4 Welfare

An individual has three sources of income: wage, income from capital, and government transfers.

Capital ownership in each industry i is concentrated in hands of some share $\alpha_i \in [0,1]$ of the population (and distributed uniformly among people in this group). Then $\alpha_i = 0$ means the industry is extremely concentrated, and $\alpha_i = 1$ means ownership is spread uniformly among the whole population. We assume that each individual may own capital in not more than one industry.

Then the total welfare of capital owners in industry i is

$$W_i(p) = l_i + \pi_i(p_i) + \alpha_i(R(p) + S(p)) \tag{2.1}$$

The socal welfare is[3]

$$W(p) = 1 + \sum_{i=1}^{n} \pi_i(p_i) + R(p) + S(p) \tag{2.2}$$

2.5 Economic crises

Our model differs from the model of GH94 in only one way: we allow for economic crises. In modelling crises we use approach, a bit similar to Aghion, Hemous, and Kharroubi (2009).

Following AHK(2009), we assume that crisis imposes negative liquidity shocks on firms. If a firm is able to raise enough money to pay the shock, it survives the crisis. Otherwise, the firm can't continue working, liquidates, and dismisses all its employees. The nature of the shock may be problems with financing working capital, higher expenses on loan service (due to fall in value of the collateral, rise in interest rate for loans with floating rate, or for other reasons), liquidation of a supplier or default in payment from a customer. We start from assuming that liquidity constraints are so strict that the only source of financing the shock is current profits[4].

The size of the shock c may be different among firms, let it be a random variable distributed with cdf $F(c)$, pdf $f(c)$, and mean $\bar{c}$.

A firm in industry i survives the crisis if and only if its profits $\pi_i(p_i)$ is sufficient to pay the shock: $\pi_i(p_i) > c_i$. Then the ex ante survival probability is $q_i(p_i) = F(\pi_i(p_i))$. First assume that the costs of crisis are inevitable (i.e. even if the firm liquidates, it pays c) or repayable (i.e. the firm gets c back in short time after it has paid, so c is not sunk costs but liquidity requirement a firm should satisfy to survive the crisis). This assumption is discussed and relaxed in the next chapter.

Allowing for crisis would change our formulas for welfare in the following way (and make them different from the corresponding formulas in GH94).

Note that now $q_i(p_i)$ is simultaneously the probability of three events: a firm i employs its optimal number of workers $L_i(p_i)$, it makes production $y_i(p_i)$, and it obtains profits $\pi_i(p_i)$. Therefore, first, an average person

[3]Note that the social welfare is not necesarrily the sum of capital owners' welfare, because there might be people who own no capital, so we can't simply state that $W(p) = \sum_{i=1}^{n} W_i(p)$

[4]The other way is to allow firm to get credit. If the size of the credit is proportional to the profits, say, $\nu\pi$, then our results will be the same, and the effect of crisis will be just "divided" by $(\nu + 1)$.

in our economy is employed with probability equal to the expected employment rate [5]

$$\overline{q}(p) = \sum_{j=1}^{n} q_j(p_j)L_j(p_j) \tag{2.3}$$

Second, the expected output of industry i is

$$Ey_i(p_i) = q_i(p_i)y_i(p_i) \tag{2.4}$$

Third, the expected profits are

$$E\pi_i(p_i) = q_i(p_i)\pi_i(p_i) - \overline{c} \tag{2.5}$$

The consumption of all non-numeraire goods depends on their prices only and will change only to the extent to which prices will change. So, the expected import is

$$\widetilde{m}_i(p_i) = d_i(p_i) - q_i(p_i)y_i(p_i) \tag{2.6}$$

and the (expected) transfers are

$$\widetilde{R}(p) = \sum_{i=1}^{n} (p_i - 1)(d_i(p_i) - q_i(p_i)y_i(p_i)) \tag{2.7}$$

The (expected) welfare of capital owners in industry i is now

$$\widetilde{W}_i(p) = \overline{q}(p) + q_i(p_i)\pi_i(p_i) - \overline{c} + \alpha_i(\widetilde{R}(p) + S(p)) \tag{2.8}$$

The (expected) social welfare is

$$\widetilde{W}(p) = 1 + \sum_{i=1}^{n} q_i(p_i)\pi_i(p_i) - n\overline{c} + \widetilde{R}(p) + S(p) \tag{2.9}$$

2.6 Political choice and contributions

First consider the basic setup of GH94, in which there is no crises. Trade policy is determined by a politician. We assume that in some exogenously given set of industries capital owners are organized in lobbies, and these lobbies can offer contributions to the politician. The size of contributions depend on policy, that can be equivalently determined by tariffs or by domestic prices.

The politician maximises a weighed sum of contributions and social welfare:

$$G = \sum_{i=1}^{n} C_i(p) + aW(p) \tag{2.10}$$

where $C_i(p)$ is the contribution offered by lobby in industry i for a price vector p (if industry is not

[5] We will also consider a case in which all capital owners work in their specific industry, so that their chances of being employed are $q_i(p_i)$ rather than $\overline{q}(p)$.

organized, $C_i(p) = 0$ for all p), a is the weight on social welfare, that is a measure of accountability of the politician, or a measure of democracy. The politician values contributions because they form income of the politician, they can be used to finance an election campaign or populistic policies, or even to buy votes and finance other ways to stay in power (including military strength and repressions). The social well-being $W(p)$ is important to be popular among voters that increases the chances for the politician to be re-elected.

More formally, the timing in GH94 model is

1. Lobbies offer contributions

2. Politician chooses policy

3. Production and consumption are made, contributions, taxes and transfers are paid exactly as announced, and all the agents get their payoffs.

And we are looking for SPNE here.

As it is shown in Grossman, Helpman (1994), the equilibrium in such a game is characterized by locally truthful contribution schedules, i.e. $\bigtriangledown C_i(p^o) = \bigtriangledown W_i(p^o)$ for all organized industries (where p^o is the vector of domestic prices in the equilibrium), and the equilibrium tariff $t^o = p^o - 1$ is given by the first order condition in maximizing **??**: $\sum_{i=1}^{n} \bigtriangledown C_i(p^o) + a \bigtriangledown W(p^o) = 0$, or

$$\sum_{i=1}^{n} \bigtriangledown W_i(p^o) + a \bigtriangledown W(p^o) = 0 \tag{2.11}$$

In our model with crises the timing is different in the following way:

1. Lobbies offer contributions

2. Politician chooses policy

3. Lobbies pay contributions

4. Liquidity shocks are realized

5. Firms whos profits would be insufficient to pay the shocks, go bankrupt and liquidate dismissing all their workers.

6. Firms who survives pay shocks and make production; consumption is made, taxes and transfers are paid, and all the agents get their payoffs.

So, policy decisions are made and contributions are paid before liquidity shocks are realized, therefore, optimization is made ex ante. We use Perfect Bayesian Nash equilibrium concept here.

The first order condition for the optimal tariff is similar to 2.11:

$$\sum_{i=1}^{n} \bigtriangledown \widetilde{W}_i(p^o) + a \bigtriangledown \widetilde{W}(p^o) = 0 \tag{2.12}$$

The differences will be seen when we calculate all the gradients in 2.11 and 2.12, and get the explicit formulas for equilibrium the tariffs in next two sections.

2.7 Equilibrium trade policy: the basic model

It follows from 2.1 that

$$\frac{\partial W_i(p)}{\partial p_j} = (\delta_{ij} - \alpha_i) y_j(p_j) + \alpha_i (p_j - 1) m_j'(p_j) \tag{2.13}$$

where δ_{ij} equals 1 for $i = j$ and 0 otherwise. The sum for all organized industries is

$$\sum_{i \in Lobby} \frac{\partial W_i(p)}{\partial p_j} = (I_j - \alpha_L) y_j(p_j) + \alpha_L (p_j - 1) m_j'(p_j) \tag{2.14}$$

where $I_j = \sum_{i \in Lobby} \delta_{ij}$ equals 1 if industry j is organized and 0 otherwise, $\alpha_L = \sum_{i \in Lobby} \alpha_i$ is the share of population, organized in lobbies.

From 2.2 we get

$$\frac{\partial W(p)}{\partial p_j} = (p_j - 1) m_j'(p_j) \tag{2.15}$$

Substituting this into **??** gives the final expression for the equilibrium tariff in GH94 model.

$$t_i^o = \frac{I_i - \alpha_L}{a + \alpha_L} \left(\frac{y_i}{-m_i'} \right) \tag{2.16}$$

The intuition behind 2.16 is the following. The organized industries (i.e. industries with $I_i = 1$) pay for protection and get positive import tariffs/export subsidies. Not organized industries suffer from import subsidies/export tariffs since all the organized groups lobby for lower prices of all consumption goods that they don't produce.The higher is the accountability of the politician (a), the less is the impact of lobbying, and so the closer is the equilibrium tariff to the social optimum, which means no tariffs or subsidies for a small open economy (for our model we show that it is not true during a crisis). The more populous is the lobby (higher α_L), the more it suffers from the deadweight loss from protection and so the less willing it is to pay for protection. Conversely, the more concentrated the lobby is (lower α_L), the less it's concerned about deadweight losses, and the more it bids for protection. The higher is the size of the industry y_i, the more contributions are paid, giving more incentives for the politician to provide protection. Finally, the slope of import schedule in the denominator reminds that 2.16 is just a modified Ramsey rule: in the problem of raising money from taxation it's optimal to impose lower taxes on sectors with more elastic demand in order to minimize deadweight losses for a given total tax revenue.

One with this setup is that although not all industries are well organized in practice, we observe positive protection for nearly all industries, including clearly not organized ones. The model predicts not only absence of protection but even negative protection for these industries, but most of them are positively protected in reality (cases of import subsidies or export duties exist but are extremely rare). Other problem is, we observe positive and sizeable protection of some industries even in democratic countries where government officials are highly accountable to the public, but the model predicts low protection of all industries in very democratic states. Our extension of the model addresses these issues and demonstrates how the observed patterns of protection may exist in the equilibrium if there is even a minor risk of crisis.

2.8 Equilibrium trade policy during crises

In this subsection, we follow the same steps as in the previous one, but for our model.

First, substituting 2.3 and 2.7 in 2.8 and differentiatiog the result we obtain

$$\frac{\partial \widetilde{W}_i(p)}{\partial p_j} = (\delta_{ij}-\alpha_i)q_j(p_j)y_j(p_j)+\alpha_i(p_j-1)m_j'(p_j)+\alpha_i q_j'(p_j)L_j(p_j)+\alpha_i q_j(p_j)L_j'(p_j)+\delta_{ij}q_j'(p_j)\pi_j(p_j) \quad (2.17)$$

where $q_j(p_j) = F_c(\pi_j(p_j))$ measures the survival chances of the industry j that depend on its profits, and through it - on the price p_j that is affected by protection, $q_j'(p_j) = f_c(\pi_j(p_j))y_j(p_j)$ is the effect of a small increase in protection of industry j on its survival chances, $q_j'(p_j)L_j(p_j) = \frac{\partial \overline{q}(p)}{\partial p_j}$ is the effect of a small increase in protection of industry j on the employment rate in the whole economy due to higher survival chances of the industry.

The term $q_j(p_j)L_j'(p_j)$ measures an increase in employment in whole economy because of higher labor demand in the industry. This term is relevant because higher labor demand helps decrease unemployment, so it's relevant only if $q_i(p_i) < 1$ in any industry (not necessarily in industry j), and it would disappear in case of full employment (all $q_i(p_i) = 1$, that means no risk of crisis).

Second, summing up 2.17 for all organised industries we get.

$$\sum_{i\in Lobby} \frac{\partial \widetilde{W}_i(p)}{\partial p_j} = (I_j-\alpha_L)q_j(p_j)y_j(p_j)+\alpha_L(p_j-1)m_j'(p_j)+\alpha_L q_j'(p_j)L_j(p_j)+\alpha_L q_j(p_j)L_j'(p_j)+I_j q_j'(p_j)\pi_j(p_j) \quad (2.18)$$

Third, substitution of 2.7 into 2.9 gives

$$\frac{\partial \widetilde{W}(p)}{\partial p_j} = (p_j-1)m_j'(p_j) + q_j'(p_j)L_j(p_j) + q_j(p_j)L_j'(p_j) + q_j'(p_j)\pi_j(p_j) \quad (2.19)$$

And finally, we take 2.18 and 2.19 into the equilibrium condition 2.12 to obtain the main result:

$$\widetilde{t_j^o} = \frac{I_j-\alpha_L}{a+\alpha_L}\left(\frac{q_j y_j + q_j'\pi_j}{-m_j'}\right) + q_j'\frac{L_j+\pi_j}{-m_j'} + q_j\frac{L_j'}{-m_j'} \quad (2.20)$$

There are two main differences between 2.16 and 2.20.

First, consider the term $q_j y_j + q_j'\pi_j$. The equilibrium is characterised by locally truthful contribution schedules, i.e. the lobbies are willing to pay exactly additional income they receive, and it is additional profits. In GH94 model it's simply y_i (see 2.16), because $\pi_i'(p_i) = y_i(p_i)$. In our model, lobbies pay for an increase in *expected* profits, $q_i\pi_i$, and this increase is exactly $(q_i(p_i)\pi_i(p_i))' = q_i y_i + q_i'\pi_i$. The intuition behind this sum is that lobbies are willing to pay not only for an increase in profits π_i but also for higher chances of their industries to survive the crisis, because they get the profits only if the industry survives. The higher is the profits (higher π_j), or the more efficient is help (higher q_j'), the more they will pay for raising their chances. But the lower are their chances (lower q_j) the less they will pay for an increase in profits ($\pi_i' = y_i$).

Second, the optimal tariff in GH94 is zero. It is achieved in pure democracies ($a \to \infty$), in absence of organized lobbies ($I_i = \alpha_L = 0$) or when all capital owners are organized ($I_i = \alpha_L = 1$) so that they take all the DWL from protection that offsets all the benefits. In our model, optimal tariff is not zero but equals $q_i' \frac{L_i+\pi_i}{-m_i'} + q_i \frac{L_i'}{-m_i'} > 0$. This means, that it's *optimal* even for benevolent government to impose trade barriers if there is even a minor risk of crisis.

The sum $(L_i + \pi_i)$ is the total income generated by industry i: labor income plus profits (recall that wage equals 1). If an industry does not survive the crisis, this income is lost. If the govermnemt can help an industry to survive ($q_i' > 0$), it should provide protection. The more jobs are created in the industry (higher L_i), the more profitable/efficient it is (higher π_i), the more protection should be provided. Additionally, note that organized groups lobby only for profits, not for employment. This is the resulf of an assumption that job distribution does not depend on distribution of capital ownership, i.e. when a person choses a job he/she treats equally all industries, no mater whether he/she owns specific catital in some particular industry. If people tend to work in industries where they own capital, they would take it into account when lobbying for policy. In the extreme case when all capital owners work in their industries, the term L_j appears in the numerator of the first ratio in the formula: $q_j y_j + q_j' \pi_j + L_j$.

Now consider the *impact of crisis on protection.*

In absense of crisis $q_j(p_j)$ is close to 1 and $q_j'(p_j)$ is near 0. During crisis the risk of bankruptcy $q_j(p_j)$ increases, and help $q_j'(p_j)$ matters more. So, first, during crisis lobbies pay less for an increase in profits ($q_j y_j$ falls with q_j) but they are ready to pay for their resque from the crisis ($q_j' \pi_j$ becomes higher with q_j'). Second, the whole society demands protection from unemployment and income losses (q_j' $(L_j + \pi_j)$ goes up with q_j'). In general, the impact of crisis on trade barriers is uncertain, because there are forces that increase and decrease it. But it seems that motives to save business ($q_j' \pi_j$), incomes and jobs (q_j' $(L_j + \pi_j)$) are very likely to overweigh the fall in willingness to pay for higher profits ($q_j y_j$).

The last term in 2.20, $q_j \frac{L_j'}{-m_j'}$, is relevant only if unemployment is positive, i.e. $q_i(p_i) < 1$ for some industry i. Interestingly, there is a discontinuity here: even a minor risk of crisis in the economy shifts trade barriers up by some positive number, and for a particular industry j this shift depends on its ability to create jobs. Suprrisingly, it depends negatively on the extent of crisis in this particular industry. The reason is, this additional protection is provided not to help a particular industry survive, but to maintain employment in whole economy, to help dismissed people find new jobs. So the strongest industries are choosen for this purpose.

Comparison of the impact of crisis on trade barriers in democracies and autocracies is determined by the first parts of expressions 2.16 and 2.20: autocracies would raise barriers (in organized industries) more than democracies if and only if

$$q_j y_j + q_j' \pi_j > y_j \tag{2.21}$$

or, taking into account that $q_j(p_j) = F(\pi_j(p_j))$, $q_j'(p_j) = y_j(p_j) f(\pi_j)$ since $\pi_j'(p_j) = y_j(p_j)$, this condition is equivalent to

$$h(\pi_j)\pi_j > 1 \tag{2.22}$$

where $h(\pi_j) = \frac{f(\pi_j)}{1-F(\pi_j)}$ is the hazard rate of crisis failures in the industry. Hazard rate here measures the effectiveness of protection as an instrument to help firms survive[6]. Intuitively, if liquidity shock throws firms just on the edge of bankruptsy (high $h(\pi_j)$) and if stakes are sufficiently high (high π_j), then firms are willing to pay much money for a small increase in protection. The autocratic ruler is more willing to use this opportunity to raise money, than the democratic politician does.

2.9 Extension 1. Efficient bankruptcy and excess employment policies in autocracies.

In previous chapter we considered a case when total costs of crisis for the economy are exogenous and can't be reduced. In our setup it meant that costs c are either inavitable (firm pays them even if it goes bankrupt) or repayable (firm will get c back after the crisis[7]). In such setup bankruptcy of any firm is clearly undesirable for the economy, the crisis has disadvantages only, it creates only losses of employment and income, and the policy should be aimed in reducing the scope of crisis. But there is a point of view according to which a crisis may have also good consequences: it throws away inefficient firms, or makes firms to close inefficient subsidiaries or product lines, that increase average productivity of the economy. in this section, we allow for these advantages of crises.

To model this we assume that when a firm liquidates it has not to pay costs c. So, if for some firm i costs of crisis are higher than profits $c_i > \pi_i(p_i)$, then bankruptcy is efficient for that firm because it saves money for its owner. Higher protection here causes additional deadweight losses by increasing total costs of crisis.

However, efficient protection is not zero even in this setup, because not all bankruptcies are efficient. The condition $c_i > \pi_i$ is not enough to guarantee that a bankruptcy is efficient for the society, because it does not take into account losses for workers dismissed from the firm. A bankruptcy is efficient for the society if $c_i > \pi_i + L_i$. So, without protection firms with $\pi_i < c_i < \pi_i + L_i$ would be liquidated by their owners, but their bankruptcy is inefficient fot the society.

Therefore there is still space for anticrisis policy, but this space is less than in previous case, because it has additional deadweight losses. In democracies, optimal poilicy should help keep employment, but not excess employment. In autocracies, demand for protection is also lowered by the opportunity to go bankrupt and escape costs of crisis.

Formally, to allow for efficient bankruptcy we should endogenize the expected costs of crisis

The (expected) welfare of capital owners in industry i now becomes

$$\widetilde{W}_i(p) = \alpha_i \overline{q}(p) + q_i(p_i)\pi_i(p_i) - \overline{c}(\pi_i(p_i)) + \alpha_i(\widetilde{R}(p) + S(p))$$

[6] A possible analogy with medicine or labor economics may be the following. $1 - F(\pi_j)$ is the share of firms which will not survive, and $f(\pi_j)$ measures how many of them will suffer shock close to their profits ($c = \pi_j$) and so may die just on the edge or be saved at low cost. Hazard rate $h(\pi_j) = \frac{f(\pi_j)}{1-F(\pi_j)}$ tells which share of firms under risk can be resqued with a small increase in profits.

[7] i.e. c is not costs, but liquidity necessary to have to survive the crisis. For example, it is liquidity to finance working capital, which can be easily borrowed in good times, but can't during crises when loans are less available.

where $\overline{c}(\pi_i(p_i)) = 0 \times prob[c > \pi_i(p_i)] + E[c|c < \pi_i(p_i)] \times prob[c < \pi_i(p_i)] = \int\limits_0^{\pi_i(p_i)} cf(c)dc$

The (expected) social welfare is

$$\widetilde{W}(p) = \overline{q}(p) + \sum_{i=1}^{n} q_i(p_i)\pi_i(p_i) - \sum_{i=1}^{n} \overline{c}(\pi_i(p_i)) + \widetilde{R}(p) + S(p) \tag{2.23}$$

The derivatives are

$$\sum_{i \in Lobby} \frac{\partial \widetilde{W}_i(p)}{\partial p_j} = (I_j - \alpha_L)q_j(p_j)y_j(p_j) + \alpha_L(p_j - 1)m_j'(p_j) + \alpha_L q_j'(p_j)L_j(p_j) + \alpha_L q_j(p_j)L_j'(p_j) + I_j q_j'(p_j)\pi_j(p_j) \tag{2.24}$$

$$\frac{\partial \widetilde{W}(p)}{\partial p_j} = (p_j - 1)m_j'(p_j) + q_j'(p_j)L_j(p_j) + q_j(p_j)L_j'(p_j) + q_j(p_j)L_j'(p_j) + q_j'(p_j)\pi_j(p_j) - c_j'(\pi_j(p_j)) \tag{2.25}$$

$$\widetilde{t_j^o} = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'}\right) + \frac{q_j' L_j + q_j'\pi_j + q_j L_j' - c_j'}{-m_j'} \tag{2.26}$$

2.10 Extension 2. Direct democracy.

Up to this point we thought of a pure democracy as of a benevolent government, and it was obvious that more democratic regimes (with higher a) imposed better policies. This is clearly not always true. It seems to us that it's more natural to consider democracy in which policy is choosen to please the median voter. It may be the case in direct democracy or in a standard downsian game among politicians. If so, the comparison between democracy and autocracy is not trivial: democracy is not obviously better than autocracy, it might be the case when democratic policy deviates from social optimum even farther than autocratic policy does.

Formally, in this extension we assume that the policymaker maximizes a weighed sum of contributions $C_i(p)$ and the welfare of the median voter $W_M(p)$:

$$G = \sum_{i=1}^{n} C_i(p) + aW_M(p) \tag{2.27}$$

The median voter is not a capital-owner, so his/her welfare does not contain profits from any industry (compare with 2.23):

$$\widetilde{W}_M(p) = \overline{q}(p) + \widetilde{R}(p) + S(p) \tag{2.28}$$

Therefore (compare with 2.25),

$$\frac{\partial \widetilde{W}(p)}{\partial p_j} = (p_j - 1)m_j'(p_j) + q_j'(p_j)L_j(p_j) + q_j(p_j)L_j'(p_j) - q_j(p_j)y_j(p_j) \tag{2.29}$$

So, the equilibrium tariff is (compare with 2.26)

$$\widetilde{t_j^o} = \frac{I_j - \alpha_L - a}{a + \alpha_L}\left(\frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'}\right) + \frac{q_j' L_j + q_j'\pi_j + q_j L_j' - c_j'}{-m_j'} \tag{2.30}$$

The only difference between 2.30 and 2.26 is the term $-a$ in $\frac{I_j - \alpha_L - a}{a+\alpha_L}$. It appears there because the policymaker no longer consider profits[8] $E\pi_j(p_j)$ as a part of welfare that affects his/her popularity, so he is less willing to provide protection to increase profits in the industry and tooks it into account only to the extent to which lobbies pay for protection.

The expression 2.30 can also be written as

$$\widetilde{t_j^o} = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'}\right) + \frac{q_j' L_j + q_j L_j' - q_j y_j}{-m_j'} \tag{2.31}$$

Now the difference between 2.31 and 2.26 is in in the second part, which don't have $q_j'\pi_j - c_j'$ but otherwise contain $-q_j y_j$, i.e. it is exaclty $(E\pi_j(p_j))' = q_j y_j + q_j'\pi_j - c_j'$, or the tariff given by 2.31 is exactly $\frac{(E\pi_j(p_j))'}{-m_j'}$ less that the tariff given by 2.26.

Note that the difference between tariff rates between democracies and autocracies ($\frac{I_j-\alpha_L}{a+\alpha_L}\left(\frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'}\right)$) is the same in 2.31 and 2.26, so this difference does not depend on whether we think of democracy represented by a benevolent government or by the median voter.

But now pure democracies have tariffs less than optimal. The limit of 2.31 for $a \to \infty$ is $\widetilde{t_j^D} = \frac{q_j' L_j + q_j L_j' - q_j y_j}{-m_j'} = \frac{q_j' L_j + q_j'\pi_j + q_j L_j' - c_j'}{-m_j'} - \frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'} < \widetilde{t_j^B} = \frac{q_j' L_j + q_j'\pi_j + q_j L_j' - c_j'}{-m_j'}$ (we continue to assume $q_j y_j + q_j'\pi_j - c_j' > 0$). Therefore, although social optimum may be unachievable[9] for all $a \in [0, \infty)$, there exists some $a < \infty$ for that the tariff rate is closer to social optimum than it is in pure democracy. In other words, imperfect democracy may be better for the society than a perfect one.

It follows from 2.30 the optimal tariff is achieved if and only if $I_j - \alpha_L - a = 0$, or

$$I_j = \alpha_L + a \tag{2.32}$$

The cases in which the condition 2.32 is satisfied have intuitive sense. First, not organized industry has optimal protection only if nobody cares about it: $\alpha_L = a = 0$, i.e. all the lobbies have population of measure zero and the politician does not care about the median voter. Otherwise, the tariff would be less than optimal because all lobbies in other industries and the median voter want lower price as consumers, and if nobody lobbies for protection in this industry, their interests would dominate. Second, the tariff for an organised industry is optimal only if $\alpha_L + a = 1$, i.e. the pressure of its lobby is balanced by other lobbies and the concerns about the median voter. So, for an organized industry, the more populous is the lobby, the less level of democracy is needed for an industry to receive optimal (not excess) protection.

[8] $q_j y_j + q_j'\pi_j - c_j'$ is exactly the derivative of the expected profits $E\pi_j(p_j) = q_j(\pi_j(p_j))\pi_j(p_j) - c_j(p_j)$

[9] The tariff in absolute autocracy ($a = 0$) $\widetilde{t_j^A} = \frac{I_j - \alpha_L}{\alpha_L}\left(\frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'}\right) + \frac{q_j' L_j + q_j L_j' - q_j y_j}{-m_j'}$ and may be higher or less than social optimum.

The difference is $\widetilde{t_j^A} - \widetilde{t_j^B} = \frac{1}{\alpha_L}\left(q_j' I_j \pi_j - I_j c_j' + 2\alpha_L L_j' q_j - 2\alpha_L q_j y_j + I_j q_j y_j\right)$ and may have any sign.

2.11 Extension 3. Trade wars and trade talks during crises

Here we make a similar modification of a 2-country model of Grossman, Helpman (1995) and show how interaction between trade partners changes during crises. First we consider a model of *Trade Wars*, in which countries choose tariffs non-cooperatively and simultaneously, maximizing the expected value function like 2.10.

The expressions tor the equilibrium tariff rates in the basic model (GH95) are

$$\tau_j^o - 1 = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{y_j}{-m_j'\rho_j}\right) + \frac{1}{e_j^*} \tag{2.33}$$

$$\tau_j^{*o} - 1 = \frac{I_j^* - \alpha_L^*}{a^* + \alpha_L^*}\left(\frac{y_j^*}{-m_j^{*\prime}\rho_j}\right) + \frac{1}{e_j} \tag{2.34}$$

where * denotes the Foreign country in all equations, ρ_j is the equilibrium world price of good j, the equilibrium domestic price in home country is $\tau_j^o\rho_j$, i.e. the tariff rate is $\tau_j^o - 1$

The only difference between these tariffs with tariffs in small open economies is the inverse foreign export elasticities on the right. These elasticities express the result that a country with monopsonic market power should impose positive tariffs in order to balance DWL from tariff and gains from lower world price. As it is shown in ... the optimal tariff is the inverse of the foreign export supply elasticity (for a small open economy the absence of monopolistic power means zero foreign export supply elasticity and so free trade). So, here the tariff is the result of both *political support* motives and *terms-of-trade* motives.

The corresponding equations in our model, which is GH95 modified in the same way as GH94 (for simplicity we consider the first case, without efficient bankruptcy) are

$$\tau_j^o - 1 = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{q_j'\pi_j + q_j y_j}{-m_j'\rho_j}\right) + \frac{1}{e_j^*} + \frac{q_j'L_j + q_j'\pi_j + q_j L_j'}{-m_j'\rho_j} \tag{2.35}$$

$$\tau_j^{*o} - 1 = \frac{I_j^* - \alpha_L^*}{a^* + \alpha_L^*}\left(\frac{q_j^{*\prime}\pi_j^* + q_j^* y_j^*}{-m_j^{*\prime}\rho_j}\right) + \frac{1}{e_j} + \frac{q_j^{*\prime}L_j^* + q_j^{*\prime}\pi_j^* + q_j^* L_j^{*\prime}}{-m_j^{*\prime}\rho_j} \tag{2.36}$$

The difference with the basic expressions is the same as we have seen in previous chapters. Political support part is changed to allow for less motives to pay for higher profits ($q_j'\pi_j$) and additional motives to pay for resque from the bankruptcy threat ($q_j y_j$). The last term $\frac{q_j'L_j+q_j'\pi_j+q_jL_j'}{-m_j'\rho_j}$ is the same as before (taking into account new notation) and captures motives of a benevolent goverment to protect employment and incomes.

Another way to study a multi-country interactions is to consider *Trade Talks* - a cooperative game of governments.

The formula to the equilibrium difference in tariffs in the basic GH95 model is

$$\tau_j^o - \tau_j^{*o} = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{y_j}{-m_j'\rho_j}\right) - \frac{I_j^* - \alpha_L^*}{a^* + \alpha_L^*}\left(\frac{y_j^*}{-m_j^{*\prime}\rho_j}\right) \tag{2.37}$$

Export elasticities disappeared: the terms-of-trade motives changed tariffs only because players didn't take into account DWL they imposed intrade partners.

The corresponding expression in our model with crises is

$$\tau_j^{*o} - \tau_j^{*o} = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{q_j'\pi_j + q_j y_j}{-m_j'\rho_j}\right) + \frac{q_j' L_j + q_j'\pi_j + q_j L_j'}{-m_j'\rho_j} - \tag{2.38}$$

$$-\frac{I_j^* - \alpha_L^*}{a^* + \alpha_L^*}\left(\frac{q_j^{*\prime}\pi_j^* + q_j^* y_j^*}{-m_j^{*\prime}\rho_j}\right) - \frac{q_j^{*\prime} L_j^* + q_j^{*\prime}\pi_j^* + q_j^* L_j^{*\prime}}{-m_j^{*\prime}\rho_j} \tag{2.39}$$

2.12 Extension 4. Inverted-U-shape pattern of protection

Real pattern of protection differs a bit from pattern predicted by basic model of GH94. The recent literature on declining industries addresses this issue. Choi (2001) suggests a model with capital adjustment costs that demonstrates low protection of slightly affected industries, but no fall in protection for dying industries.Ozden (2008) suggest a model that demonstrates the full observed pattern of protection. However, it requires restrictive or not common assumptions like habit formation, irrationality or loss-aversion. Therefore, it's worthy to get such pattern in our framework. The advantage of our model is that it is consistent with such a pattern for many reasonable distributions of crisis costs c without any additional assumptions.

Consider 2.26

$$\widetilde{t_j^o} = \frac{I_j - \alpha_L}{a + \alpha_L}\left(\frac{q_j y_j + q_j'\pi_j - c_j'}{-m_j'}\right) + \frac{q_j' L_j + q_j'\pi_j + q_j L_j' - c_j'}{-m_j'} \tag{2.40}$$

to be continued...

2.13 Extension 5. Providing liquidity as an alternative to protection: are bailouts better than tariffs?

In this extension we consider policy that allows firms to get loans backed by their profits up to a given leverage ν, i.e. a firm i can raise $\nu\pi_i$ additional finance and so have total $(\nu+1)\pi_i$ to pay the costs of crisis. The government expect to get back a share b of loans it provided

to be continued...

3 Empirical Evidence

In this section, we test the predictions of the model, estimate the effect of economic crises on trade in democracies and autocracies using bilateral trade data on 75 countries over 1948-2006.

We provide also preliminary results of similar empirical exercises using 10-industry disagggregated data on 145 countries over the recent crisis of 2007-2009.

3.1 Empirical Hypotheses

We test the following predictions of the model developed above.

Proposition 1 *In the model developed above*

1. *The autocracies compared with democracies are characterized by the higher level of trade barriers*
2. *Both regimes shift to protectionism during recessions*
3. *The autocracies shift even more*

The predictions imply additional concerns about the trade flows. We test directly the hypotheses given by the following proposition

Proposition 2 *Holding other things constant,*

1. *the import is higher and the export is lower in autocracies compared with democracies*
2. *the recessions are characterized by lower import and higher export*
3. *the previous effect is magnified in autocracies.*

This proposition follows from the previous one and the fact that the import increases and the export decreases with the tariff (the part of the proposition concerning export requires the autocrat to receive some share of the tariff revenue, otherwise the export is constant and doesn't change during crises).

3.2 Data

We use the CEPII Gravity dataset for all variables from 3.1 and Polity IV dataset for democracy scores (we use the variable Polity2). The description of the data of the CEPII Gravity dataset can be found in the Appendix to Head, Mayer, Ries (2010). The data is available for 75 countries over 59 years from 1948 to 2006. The tables with summary statistics are in the Appendix (Table 5).

3.3 Econometric Specifications

The idea is to consider a basic Gravity model of trade with additional variables that describe politics, crises and their interaction. Gravity model of trade with additional variables is used widely for the purposes of very different research, including political economy (see Frankel, Romer 1999, Rose 2004, Head, Mayer, Ries 2010, Yu 2010).

The basic specification is

$$log(Im_{odt}) = \beta_0 + \beta_1 \log(GDP_{ot}) + \beta_2 log(GDP_{dt}) - \beta_3 log(dist_{od}) + X'_{odt}\gamma + \varepsilon_{odt}, \tag{3.1}$$

where

Im_{odt} is the value of import from country o (Origin) to country d (Destination) in the year t

GDP_{ot} and GDP_{dt} are respectively, nominal gross domestic product of Origin and Destination in the year t

$dist_{od}$ is the distance between countries

X'_{odt} is the set of controls including dummies on the common border, the common language, regional trade agreements and colonial history. We also control on logged gdp per capita in Origin and Destination.

We include 6 new variables and estimate the following model

$$\begin{aligned} log(Im_{odt}) = \beta_1 Dem_{dt} + \beta_2 Gap_{dt} + \beta_3 Dem_{dt} \times Gap_{dt} + \\ + \beta_1 Dem_{ot} + \beta_2 Gap_{ot} + \beta_3 Dem_{ot} \times Gap_{ot} + \widetilde{X}'_{odt}\gamma + \varepsilon_{odt}, \end{aligned} \tag{3.2}$$

where $\widetilde{X}'_{odt}$ is the set of variables of the model 3.1

Dem_{ot} and Dem_{dt} are respectively the Polity IV democracy score for the Origin and the Destination in the year t (the variable Polity2 in the Polity IV dataset)

Gap_{ot} and Gap_{dt} are respectively GDP growth rates in the Origin and the Destination measured as the first difference of the logarithm of the GDP[10]:

The expected signs of the coefficients of interest follow from the model[11]:

$$\begin{cases} \beta_1 > 0 & \beta_4 > 0 \\ \beta_2 > 0 & \beta_5 > 0 \\ \beta_3 < 0 & \beta_6 < 0 \end{cases} \tag{3.3}$$

3.4 Results

Table 1 in the Appendix shows the results are strongly consistent with the predictions of the model: the signs of the estimates support all six hypotheses of 3.3 and all the coefficients are significant at 1%, no matter whether we use robust standard errors or standard errors clustered by both the country of origin and the country of destination. With standard errors clustered by only one country (the origin OR the destination), the significance also remains very strong in most cases.

Now consider the estimated equation from column 1 of table 1:

$$\begin{aligned} log(Im_{odt}) = \underset{(0.0116)}{0.204}\, Dem_{dt} + \underset{(0.0587)}{0.514}\, Gap_{dt} - \underset{(0.0700)}{0.264}\, Dem_{dt} \times Gap_{dt} + \\ + \underset{(0.0137)}{0.321}\, Dem_{ot} + \underset{(0.0567)}{0.359}\, Gap_{ot} - \underset{(0.0756)}{0.240}\, Dem_{ot} \times Gap_{ot} + controls, \end{aligned} \tag{3.4}$$

The data indicates that one standard deviation decrease of the democracy score (0.76, according to summary statistics in table 5) in the country of destination is associated with a substantial 15% $(= .204 \times .76)$fall in import . The same decrease in the country of origin is associated with even more substantial 24% $(= .321 \times .76)$fall of this trade flow[12]. These results are consistent with Aidt and Gassebner (2007): they find that autocracies have between 4.3% and 23.3% less imports and between 16.1% and 19.7% less

[10] We use nominal gap in exchange of real gap to allow for price shocks.

[11] The first (second) column is related to the effects on import (export). Here the export is measured with error as we interpret the data on import from O to D as the export of the D to the O.

[12] Strictly speaking, it is not equal to export from the origin to the destination due to different data sources and measurement, but it's a good proxy.

export than democracies have. Our estimates are also consistent with Yu (2010): our coefficient of the country of destination's democracy score is 0.204 (Yu 2010 estimates in to be between 0 and 0.229), and the corresponding coefficient for the country of origin is 0.321 (Yu 2010 measures it to be between 0 and 0.388).

We also make estimates not provided in the existing literature on political economy of trade policy.

First, we estimate the effect of economic crises on trade flows in gravity framework (Evenett 2009 uses only aggragated import, not bilateral trade data). Holding other things constant, the crisis in the country of destination (1% lower gdp growth) is associated with an additional 0.5% (= .514) fall of its import. Recall that this fall should be added to the fall measured by the coefficient of logGDP (nearly 1 in most papers including this one), so during a domestic crisis the import falls 1.5 times faster than the GDP. Meanwhile 1% lower GDP growth in the country of origin is associated with additional 0.4% (= .359) and total 1.4% fall of the trade flow[13]. Therefore, a global economic crisis[14] makes trade flows to fall nearly 3 times ($= 1.5 + 1.4$) faster than GDP (i.e. 3% fall in trade flows for each 1% lower GDP growth). This result is consistent with the evidence that international trade falls during crises much more dramatically than the GDP does (this pattern is especially obvious for the Great Depression and the recent economic crisis of 2007-2009).

Second, the fall of trade flows to autocracies is even higher than to democracies. The domestic crisis in a country with 1 *s.d.* lower democracy score is associated with 20% ($.264 \times .76$) faster fall in import and 18% ($.240 \times .76$) faster fall in export. The difference is more obvious if perfect democracy ($Dem = 1$) is compared with perfect autocracy ($Dem = -1$). For autocracy additional fall in import is as much as 3 times larger than for democracy ($0.514 + 0.240 \approx .75$ Vs $0.514 - 0.240 \approx .27$).

3.5 Robustness checks

We provide robustness checks of five types.

First, different clustering of standard errors in Table 1 doesn't change significance in 22 of 24 cases.

Second, we sequentially exclude the control variables and observe almost no changes (table 2, 46 of 48 coefficients remained significant and don't change magnitude much).

Third, we sequentially drop observations over each of 6 decades (table 3). The signs of the coefficients don't change, the magnitudes change a bit, and nearly all the coefficients of interest remain significant.

Fourth, in columns 1 and 2 of table 4 we exclude three variables of interest for the country of Destination (the results don't change) and then the same variables for the country of Origin (the interaction changes sign, most likely due to omitted variable bias).

Fifth, we control for time- and country fixed effects (table 4). The results become less supportive: the coefficient of the interaction term for the Destination becomes insignificant, changes the sign and once it is even significant with the 'wrong' sign (but only on 5% level). The problem may be the result of the attenuation bias: there is no doubt that our variables of interest (GDP gap and democracy score) are both measured with substantial errors. And one of them, which is most poorly measured (democracy score) is also highly persistent and so highly correlated with fixed effects. In such a case fixed effects increase atteneution bias. We have as much as $75 \times 75 = 5625$ cross-section observations, so this increase seems to be large

[13] Because the coefficient of the exporter's log GDP is also nearly 1, as in most other studies

[14] We think of it as a fall of both GDP in the country of destination and the country of origin

and sufficient to change the sign of the coefficient. A good sign is that the interaction term for the Origin remains significant with "right" (negative) sign in all FE specifications. This may be due to less endogeniety in export than in import: the initial bias in "origin"'s estimates was sufficiently small to keep the right sign of the coef even after the bias was inflated by FE. Actually, it follows from the basic macroeconomic theory that import is driven mostly by the internal demand for the foreign goods, while export is driven more by the external demand for the domestic goods. Therefore import depends on internal economic conditions to a greater extent than export does. That is why the endogeniety problem seems to be more relevant for import rather than for export. So, first, we have more reasonts to believe the "origin"'s estimates, and second, these estimates are robust to fixed effects. Therefore, taking into account all the above, our evidence is consistent with our theory even controlling for fixed effects.

3.6 Recent 2007-2009 crisis

In this section, we provide preliminary results for the recent economic crisis. We estimate gravity equation like 3.2 using data on 145 countries over 2007-2009. The data is from Comtrade database (industry-disaggregated bilateral trade, SITC1 classification), WDI (real GDP) and CEPII (nominal GDP, GDP per capita and all the gravity controls used in the previous section).

There are some improvements in the methodology.

First, to calculate GDP gap we apply Hordrick-Prescott filter[15] to real GDP series from 1960 to 2009.

Second, we add GDP Deflator as a control variable.

Third, we reduce possible endogeniety problems by using lagged independent variables in regression. Specifically, we estimate two specifications. In the first one all the regressors (except time-invariant, of course) are lagged. This reduces endogeniety, however this model violates the assumption of gravity model that import is proportional to current, not lagged GDPs. So, we estimate the second specification in which only key 6 regressors are lagged and all gravity controls, including GDPs, are current. We believe that all other gravity controls are not too correlated with the error term. The results for these models are very similar.

The main improvement is industry-disaggregated data. We use SITC-1, 10-industry classification. The information about industries is in table 6.

The results are in tables 7 and 8.

The approach in this section differs from the approach of the previous one, so the results of the two sections are hardly comparable. However, democracy is the same and GDP gap is measured in the form closely related to the previous section[16].

First, all the estimates for the variables of interest (first 6 rows of each table) for total import (first column of both tables) are roughly 10 times larger than the corresponding estimates in the previous section. Some part of this difference is explained by lower inflation during the recent crisis. However, it seems that a

[15] The smoothing parameter is 6.25, that is recommended for annual data in HPrescott procedure in Stata

[16] The average difference between nominal GDP growth and GDP Gap is long-run growth rate of the economy plus inflation. The growth seems to be stable, the inflation not. During crises inflation is often lower than average (but not always), so the nominal GDP would fall deeper that the real gdp. Therefore, the estimates based on the real GDP seem to be higher than estimates based on nominal GDP.

sizeable part of the difference is due to better methodology and relatively stronger policy responces during the recent crisis compared with recessions of 1948-2006.

Second, we observe large inter-industry differences in the estimates. Some of them are consistent with deeper crisis in some inustries, some - with different capital/labor ratio.

The third row of both tables shows the effect of crisis in the destination country. This coefficient plus the coefficient of GDP (close to 1) gives the 5-6% fall in import for each 1% fall in GDP. The most falling import is observed in beverage&tobaco, chemicals and machinery and transport equipment. The last two industries has high K/L ratio, so they seem to be more organized to lobby for protection during crises. However, materials may fall due to fall of oil prices (but in this case fuels should show similar pattern). The lowest effect is in animal/fegetable oils and fats and in different manufactured goods, that seem to be lesst organized.

The first row of both tables shows the interaction between democracy score and GDP gap. The effect of crisis is most stronger in autocracies compared with democracies in fuels, chemicals and machinery - the most organized industries with highest K/L ratio. The lowest differnece is for mentioned oils and fats. The opposite difference is observed for miscellaneous not classified goods and services - the sector that might be the least organized one. This pattern is strongly consistent with the idea that lobbying is the key driving force of policy choice during crisis. In our basic model this mechanism is not formalized directly, and this observation motivates us to incorporate it, e.g. in a way similar to "Protection for Sale" (Grossman, Helpman, 1994). However, it seems that this mechanism is not sufficient, because if contributions are the only reason for protectionism, then the protectionism would be higher not during crisis, but during booms when industries have higher profits, i.e. more money to pay contributions.

The explanations may follow several directions. First, the crisis may reduce profits of more organized industries to the lesser extent, so they become relatively richer compared with less organized industries. Second, protectionism becomes more popular policy during crisis, and social pressure against protectionism is weaker, so politicians becomes "cheaper" in policy choice related to protectionism. More general idea is that during crises the society gives policymakers more freedom of action, that makes them "cheaper". Third, possible explanation comes from the fact that policymakers are aware more about acute problems: sharp fall of some industry giants during crisis attracts attention (of public and of politicians) and makes it easier to convince voters that protection is needed.

3.7 Cases

In this chapter we provide the examples indicating how different the responses to the crisis in the autocracies and democracies are. Specifically, we consider the support of falling industries, namely, automobile companies.

General Motors and Chrysler

During the most part of the 20th century the Big Three, General Motors, Ford and Chrysler, where the leaders of the world's automobile industry. In 1970s General Motors had more than 150 plants and employed more than 395,000 people in the U.S. However, growth of Japanese companies, scanty innovation, and compliant policy towards labor shattered Big Three's viability. Domestic sales of GM and Ford declined each year since 2000, and were expansionary for Chrysler in two years only. In 2006-2008 companies cut more than 100,000 jobs and closed dozens of factories. Formerly prosperous towns became depopulated. For instance, Flint, Michigan, the birthplace of GM, had only 120,000 inhabitants in 2008, down from 200,000 in 1960s. The respective numbers for Detroit were 1.67 million and 912,000.

The fatal blows were delivered in 2008. First, gasoline price reached $4 per gallon, which ruined demand for large fuel consuming cars and trucks, the main Big Three's source of profit. Second, financial turmoil impeded access to credit for potential buyers. The sales of new cars dropped to the lowest level in 25 years. In 2008 GM's sales decreased by 22.9% and Chrysler's by 30%. To survive, the companies had to produce cheap fuel efficient cars. In September 2008 GM, Ford and Chrysler asked government to guarantee a $25 billion loan for development of more fuel efficient cars; the loan was approved in October.

In November 2008 General Motors and Chrysler announced they needed billions of dollars to survive till the end of the year. The Big Three asked for a $25 billion bailout; in return they promised extensive cost cutting. On November 19, however, the US Senate refused to provide loans to the companies. In December the Big Three came up with a new proposal and requested $34 billion. GM asked for $12 billion of a term loan and $6 billion as a credit line. The company promised to lay off 21,000-31,000 out of its 96,000 workforce in U.S and shut down 9 factories. It also planned to concentrate on four main brands (Chevrolet, Cadillac, GMC, and Buick) and get rid of Saturn, Saab, Pontiac and Hummer. Chrysler asked for $7 billion loan till the end of the year and Ford for a $9 billion loan, but only in case of further market conditions deterioration. For all that, on December 11 the Senate turned away proposed bailout. On December 19th, in order to save two most troubled of the Big Three, President George Bush agreed to provide GM with a $13.4 billion loan and Chrysler with a $4 billion. As a part of the agreement, the companies had to develop a plan of extensive cost cutting and rising profitability till February 17th.

On January 20th, 2009 President Barack Obama was inaugurated. In February he formed the Presidential Task Force on the Auto Industry to deal with the financial bailout of General Motors and Chrysler. On February 17th GM and Chrysler presented their restructuring plans. GM promised to shut down 5 additional plants (totally 14) in U.S., but asked for $12 billion in addition to already requested $4.6 billion. Chrysler agreed to cut 3,000 jobs, but asked for additional $2 billion loan beyond $3 billion it already sought.

On March 31 Presidential Task Force came up with the evaluation of the restructuring plans. It concluded, that "The plans submitted by GM and Chrysler on February 17, 2009 did not establish a credible path to viability. In their current form, they are not sufficient to justify a substantial new investment of taxpayer resources. Each will have a set period of time and an adequate amount of working capital to establish a new strategy for long-term economic viability." Chrysler was given 30 days "to conclude a definitive agreement with Fiat and secure the support of necessary stakeholders". In that case the government promised to provide it with additional $6 billion requested to assist that partnership; otherwise, "the government will not invest any additional taxpayer funds in Chrysler". GM was given a chance to survive on its own and got 60 days to present more extensive cost-cutting plan. This agreement also included resign of GM's CEO Rick Wagoner; most part of top management was expected to be replaced. In the report, quick bankruptcy was mentioned as a possible means of restructuring. Chrysler's and GM's "best chance at success may well require utilizing the bankruptcy code in a quick and surgical way."

General Motors and Chrysler had obligations before United Auto Workers to finance health care expenditures and before various debt holders. Both companies managed to reach agreement with UAW and major bondholders – obligations were to be transferred into shares. Government's stern position was instrumental to negotiations success. As the Economist wrote on June 4th, "The car-industry task-force appointed by Barack Obama to save GM and Chrysler quickly concluded that neither could be viable without the pressure of bankruptcy to force stakeholders to renounce most of their claims." Governments of Canada and Ontario conditioned further financial assistance to GM on reaching agreement between company and Canadian Auto Workers union. This allowed GM to negotiate third cost-cutting agreement in just over a year (The New York Times, May 25, 2009). However, negotiations with small bondholders failed in a few days before deadlines. Both companies were forced into bankruptcy in accordance with Chapter 11.

Chrysler filed for bankruptcy on April 30 and emerged from it on June 10. The federal government provided $6.6 billion paid to the old Chrysler (Chrysler LLC), most of whose assets were sold to new Chrysler, formally named Chrysler Group LLC. Eight manufacturing locations, many real estate objects and 789 US dealerships were not transferred. UAW owned 55% of the new company (but it had to agree to cut wages and other benefits), Fiat 20%, and U.S. and Canadian governments 8% and 2% respectively. Fiat is able to increase its share to 35% and 51% under certain conditions.

A month later, on June 1st, General Motors filed for bankruptcy. The company decided to leave only 34 plants (including 12 out of 19 in Michigan) and 64,000 employees out of 47 plants and 91,000 of employees in 2008. To support reorganization, the government needed to pay $30 billion more (in addition to already spent $20 billion). Old General Motors Corporation was renamed into Motors Liquidation Company and sold its assets to General Motors Company. New company emerged from the bankruptcy on July 10th; it owed four most precious brands and was significantly smaller. American government got 61% of the new company, while the rest went to Canadian government, bondholders and UAW.

Saab

Even though the above mentioned companies confronted with many problems during the crisis the position of Saab was even worse. General Motors acquired 50% of Saab, the Swedish second car maker, in 1990 and the rest in 2000. Saab was a "financial disaster", keeping it alive cost GM $5 billion. For the last 20 years the company showed profits only once, GM lost $5,000 on every Saab it sold in the United States. In 2008 Saab produced 93,295 vehicles, and lost $343 million. As a result of financial crises GM failed to support Saab and announced at the beginning of 2009, that it would get rid of the company till the end of the year. (The Economist, January 29, 2009). On February 20th, Saab filed for bankruptcy protection, began restructuring, and asked Swedish government for financial support to become independent car producer.

Saab employed 4,000 out of 54,000 in its hometown Trollhattan. According to its labor leaders, Saabs closure threatened tens of thousands of jobs and would have overall detrimental effect on Sweden's southwest. However, the government refused to assist the company. According to the New York Times, published on

March 22, 2009, Sweden enterprise minister, Maud Olofsson, said, “The Swedish state is not prepared to own car factories.” Commenting GM’s decision to sell Saab, she said: “We are very disappointed in G.M., but we are not prepared to risk taxpayers’ money. This is not a game of Monopoly.” In spite of Trollhattan citizens’ demonstration and protests on February 26, two weeks later the company announced that it plans to lay off 750 workers as part of restructuring process. (NYT, March 22, 2009).

On June 16, GM agreed to sell Saab to a small Swedish automaker Koenigsegg and signed a deal on August 18. A precondition for the deal was Swedish government guarantee for a $600 million loan to Saab from the European Investment Bank. A day later Saab filled papers for bankruptcy. The government still did not decide to help Saab. As the New York Times wrote on August, 20, "But the carmaker’s future is still uncertain as Stockholm has refused the idea of a government loan to help wrap up the sale of the company." Also Koenigsegg asked the government for a loan of 1 billion kronor to help to buy Saab, and received sharp answer from the Prime Minister Mr. Reinfeldt: “I am not prepared to mortgage Sweden or act as a venture capitalist for the well-to-do”. (The New York Times, August 20, 2009).

Avtovaz

Although during the crisis Avtovaz, the largest Russian car producer, encountered to a large extent the same problems as the above mentioned companies, the situation was quite different, as well as the solution.

“Avtovaz is one of the least efficient automobile factories anywhere in the world,” New York Times wrote on April 7, 2009, "each worker produces, on average, eight cars a year, compared with 36 cars a year at General Motors’ assembly line in Bowling Green, Ky., for example." Avtovaz’s Ladas are dangerous and outdated; the first car with an airbag was introduced in 2005. Economic downturn of 2008 severely hit Avtovaz. In the first six month of 2009 the company sold only 179,870 cars for 40,2 billions of rubles, 44% of cars less than in the first half of 2008. It lost 16.9 billions of rubles, its debt grew to 93.4 billion and capitalization dropped to 15.6 billion. (Vedomosti,[17] 28.08.2009).

Avtovaz is not a state owned company — 25.64% of its shares belong to investment company "Troika Dialog", 25.1% to state corporation "Rossiiskie Tehnologii" (Russian Technologies) and 25% to Renault (Vedomosti 28.08.2009). What should a rational profit-maximizing owner do in such a situation? The classical answer would be restructuring: lay-off redundant workers, closure of inefficient factories and investment in promising ones. However, that did not happen. In the middle of March Avtovaz asked for 26 billion of rubles of government help. On March 30th the government agreed to bail out Avtovaz. The company got 25 billion ruble interest-free loan (directly from the state through "Rossiiskie Tehnologii") and a commitment from the state owned banks to provide 90 billion more (totally a little less than $3.5 billion). The government did not set conditions, such as layoffs, management replacement or improving car quality. The government also introduced high tariffs on imported cars and started to subsidize loans on cheap cars. As a more doubtful measure, government planned to transport Ladas free of charge to the Russian Far East, were people mostly drives second-hand Japanese cars.

Clearly, the Kremlin chose to "*protect jobs, not efficiency*", New York Times wrote on 7 April 2009,

[17] Vedomosti is a leading Russian business daily, jointly owned by WSJ and the FT.

"*the auto bailout, Russian style, is intended more to ensure peace in the streets than restructure a business, ... the government is backing a no-layoff policy at Avtovaz, in spite of tumbling demand for its products.*" Avtovaz said, that "from the onset of the crisis Avtovaz has not laid anybody off, and does not plan to do so." However, the company decreased working weak, offered voluntary vacations to its workers at two-third pay, and kept on stopping the conveyer[18].

The Kremlin is not able to bailout every factory, but it encourages entrepreneurs to keep jobs. Russian president Medvedev appeals to oligarchs; in one of his fireside talks, he said, that they must play "a moral role". Referring to privatization, he said "It's time to repay debts, moral debts. If a person really has become a businessman, he knows how to value his employees". Medvedev supported Oleg Deripaska's Basic Element when Alfa Bank required it to repay a loan of about $650m; the loan was prolonged. (The Economist, March 19, 2009).

One possible explanation of Avtovaz bailout is lobbying by interest groups. In fact, the company is owned by "Rossiiskie Tehnologii", "a powerful state military and industrial corporation headed by Sergei Chemezov, an old friend of Mr Putin," as the Economist wrote on March 19, 2009. The corporation managed to get cheap credits from Russian state banks to support many of its unprofitable and outdated companies. Moreover, Avtovaz has to return 25 billion to the corporation, which, in its turn, does not have to return them to the state. However, this, by itself, does not explain redundant employment on Avtovaz's factories.

When closure threatens to an inefficient company, it is often argued, that the company "plays an important social role", "provides people with jobs", and "its closure would lead to social unrest". Government protection with paternalistic motive, like in the work of Kornai (1980), would easily explain such actions. However, this explanation is not complete. As The Economist noted "The Kremlin must worry for it can no longer honor Mr Putin's side of the original bargain: that, in return for a guaranteed rise in living standards, ordinary Russians would accept curbs on the media, rigged elections and a slide into autocracy." As part of this contract, *the Kremlin is to keep jobs to get reelection.* The analysis suggests, that exactly Russian political system does not allow to responding to the crises correctly. As The Economist wrote on June 4, 2009 : "The government's crisis programme is full of the right words—modernization, competition, responsible spending, the evils of populism. But to implementing even half of this programme would require dismantling Russia's political system."

Zastava

This case demonstrates how a change of the political regime to a more democratic one may make an end of a protectionist policy held during decades before the change. It is also a rare case when political change may be considered as exogenous to the industry we are interested in. Therefore, the fact that protectionism was stopped soon after the regime became democratic, supports the causal relationship assumed in our study.

Zastava group was the flagship of Yugoslavian industry. At the end of 1980s it included 47 companies, employed 56,000 workers, produced 180,000 vehicles, and exported them to 70 countries. Since 1990, the

[18] In the middle of September Avtovaz announced that it planned to layoff 36,000 workers and later decreased this number to 27,600. On September 14th the company announced lay-off of 5,000 white collars in three months and on September 24th the company announced lay-off of 22,600 more employees by the middle of 2010. Thus the total workforce is to be reduced from 102,000 to just 75,000.

breakup of Yugoslavia and the following wars wrecked its supply chains; international sanctions deprived the company of export markets. In the first six month of 1996 the company produced only 3,500 cars. In 2000, Zastava employed 31,000 workers, including 11,000 in its car production; it planned to produce less than 30,000 vehicles in 2001. At least half of the workers were on a paid leave and received just $7 a month (average salary was $40). (The New York Times, January 5, 2001 and July 9, 1996).

From 1989 to 2000 the country was under the rule of Slobodan Milosevic and his Socialist Party of Serbia. During that period Serbian economy stagnated. It was plagued with corruption and wage arrears, unemployment hovered near 50%. On Zastava's factories wage declined from $800 a month in 1989 to less than $100 a month in 1996. Yugoslavian politics and economy of that time were characterized by nepotism and cronyism. Most middle and large enterprises were owned by the state, major industries were controlled by government officials. Great part of the economy was black, but even it was controlled by the president. (The New York Times, July 9, 1996 and December 13, 1996).

The country definitely was not democratic, still, elections played role: in 1997 an oppositionist was elected as a major of Belgrade. Slobodan Milosevic was elected as a President of Serbia in 1989 and reelected in 1993. Because constitution prohibited being elected three times, on July 23, 1997 Milosevic was elected to be a President of the Federal Republic of Yugoslavia. As New York Times wrote on July 25, 1997, "Mr. Milosevic does not owe his success to the love of Serbia's citizenry. The economy is near collapse, with pensions and salaries paid months late or not at all. Factories have nearly shut down. His power is based on his control of the Interior Ministry and secret police, the national media and the black-market economy, which is in the hands of thugs loyal to him and his wife."

Though in the 1990s unemployment in Kragujevac, Zastava's hometown, was already more than 50%, economic and political power of Slobodan Milosevic did not allow him to restructure the company and fire redundant workers. Zastava has always been playing a great role in Serbian economy – it was tied to more than 220 firms which employed 65,000 workers. In Kragujevac formerly 40,000 out of 200,000 inhabitants worked at the company. As Aleksandar Vlahovic, Serbia's minister for economics and privatization in 2001 said about the town, "It was a social bomb. The former regime had been ready to fulfill any demand to keep the workers quiet." After Nato bombing of 1999, Slobodan Milosevic's regime gave $80 million to Zastava to restore its factories. (The Economist, September 29, 2005 and The New York, January 5, 2001).

On September 24th, 2000 Slobodan Milosevic lost elections; firstly he refused to accept the results, but finally agreed to resign. On October 7th Vojislav Kostunica became a new president of the Federal Republic of Yugoslavia. In three and a half months, on January 21, 2001 Zoran Djindjić became a Prime Minister of Serbia. The new government negotiated the plan of restructuring Zastava with workers. It included elimination of subsidies, government investment and layoff of 14,000, including 8,000 out of 12,000 on the car factory. On the following referendum 96% of workers supported the plan. The government offered to fired workers either to take a severance pay, get assistance of an unemployment agency or paid four-year skill conversion. (The New York Times, October 8, 2001). In 2001-2002 the government invested $49 million in Zastava and closed 27 of its unproductive units, reduced workforce to 8,300. (The Economist, August 15, 2002). In 2007 Fiat spent $1 billion to acquire 67% of automotive branch of Zastava. It planned to keep 2400 workers and layoff 1000, production goal for 2010 was 200,000 vehicles. (The New York Times, September

29, 2008)

4 Conclusion

We considered the impact of political system on trade policy during crises both theoretically and empirically. The model predicts autocracies to have less free trade and react on crises by more protectionist policy than democracies do. Meanwhile, both democracies and autocracies use protectionism as an instrument of anti-crisis policy. The data support the predictions of the model.

Further research will extend both the theory and the evidence. Theoretical part will model the extensions considered in this draft more formally and may develop more extensions if needed. The empirical part of the research is going to be developed in the following directions. First, we will try different approaches of calculating GDP gap (including Baxter-King band-pass filter; additionally, we will distinguish real and nominal shocks) and maybe replace it with the unemployment (however, the data on unemployment is much worse than the data on GDP). Then, we will consider different measures of democracy/autocracy scores: other dummies on polity score or absolutely different scores like Freedom House and Przeworski democracy scores. Next, since our panel is nearly as long as wide, it might be reasonable to take into account time series effects (Or simply consider shorter panel: it might be interesting to compare results for different crises / groups of crises, or, alternatively, for different groups of countries.). Finally, new data and approaches might be used: tariffs or non-tariff barriers as dependent variables.

5 Appendix

5.1 Appendix 1.

The proof that both mixed derivatives of T are negative for all $1 < \tau < 2$ and $0 < \alpha < 1$.

$T = (\tau - 1)\, p \left(\frac{\alpha}{p\tau} \left(\frac{w\bar{\theta}}{Ap\tau} + \frac{Ap}{2} \left(1 - \left(\frac{w}{Ap\tau} \right)^2 \right) \right) - \frac{A}{2} \left(1 - \left(\frac{w}{Ap\tau} \right)^2 \right) \right) / (1 - (\tau - 1)\, \alpha / \tau)$

$\frac{\partial T}{\partial \tau} = -\frac{1}{2Ap\tau^3(\alpha+\tau-\alpha\tau)^2} (-A^2p^2\alpha\tau^5 + 2A^2p^2\alpha\tau^4 - 2A^2p^2\alpha\tau^3 + A^2p^2\tau^5 + 2w^2\alpha^2\tau^2 - 4w^2\alpha^2\tau + 2w^2\alpha^2 - w^2\alpha\tau^3 + 2w^2\alpha\tau + w^2\tau^3 - 2w^2\tau^2 - 2\theta w\alpha^2\tau^3 + 4\theta w\alpha^2\tau^2 - 2\theta w\alpha^2\tau + 2\theta w\alpha\tau^3 - 4\theta w\alpha\tau^2)$

$\frac{\partial^2 T}{\partial \tau \partial A} = \frac{1}{2A^2p\tau^3(\alpha+\tau-\alpha\tau)^2} (A^2p^2\alpha\tau^5 - 2A^2p^2\alpha\tau^4 + 2A^2p^2\alpha\tau^3 - A^2p^2\tau^5 + 2w^2\alpha^2\tau^2 - 4w^2\alpha^2\tau + 2w^2\alpha^2 - w^2\alpha\tau^3 + 2w^2\alpha\tau + w^2\tau^3 - 2w^2\tau^2 - 2\theta w\alpha^2\tau^3 + 4\theta w\alpha^2\tau^2 - 2\theta w\alpha^2\tau + 2\theta w\alpha\tau^3 - 4\theta w\alpha\tau^2)$

$\frac{\partial^2 T}{\partial \tau \partial p} = \frac{1}{2Ap^2\tau^3(\alpha+\tau-\alpha\tau)^2} (A^2p^2\alpha\tau^5 - 2A^2p^2\alpha\tau^4 + 2A^2p^2\alpha\tau^3 - A^2p^2\tau^5 + 2w^2\alpha^2\tau^2 - 4w^2\alpha^2\tau + 2w^2\alpha^2 - w^2\alpha\tau^3 + 2w^2\alpha\tau + w^2\tau^3 - 2w^2\tau^2 - 2\theta w\alpha^2\tau^3 + 4\theta w\alpha^2\tau^2 - 2\theta w\alpha^2\tau + 2\theta w\alpha\tau^3 - 4\theta w\alpha\tau^2)$

So, the two mixed derivatives are equal.

$\frac{1}{2Ap^2\tau^3(\alpha+\tau-\alpha\tau)^2} = \frac{1}{2Ap^2\tau^3(\alpha+(1-\alpha)\tau)^2} > 0$ for all $0 < \alpha < 1$.

Consider the sum in parenthesis $A^2p^2\alpha\tau^5 - 2A^2p^2\alpha\tau^4 + 2A^2p^2\alpha\tau^3 - A^2p^2\tau^5 + 2w^2\alpha^2\tau^2 - 4w^2\alpha^2\tau + 2w^2\alpha^2 - w^2\alpha\tau^3 + 2w^2\alpha\tau + w^2\tau^3 - 2w^2\tau^2 - 2\theta w\alpha^2\tau^3 + 4\theta w\alpha^2\tau^2 - 2\theta w\alpha^2\tau + 2\theta w\alpha\tau^3 - 4\theta w\alpha\tau^2 =$
$A^2p^2\alpha\tau^3 \left\{ \alpha\tau^2 - 2\alpha\tau + 2\alpha - \tau^2 \right\} + w^2 \left\{ 2\alpha^2\tau^2 - 4\alpha^2\tau + 2\alpha^2 - \alpha\tau^3 + 2\alpha\tau + \tau^3 - 2\tau^2 \right\} + 2\theta w\alpha\tau \left\{ -\alpha\tau^2 + 2\alpha\tau - \alpha - 2\tau \right\} = A^2p^2\alpha\tau^3 \left\{ -(1-\alpha)\tau^2 - 2\alpha(\tau - 1) \right\} + w^2 \left\{ 2\alpha^2(\tau-1)^2 + \alpha\tau(2-\tau) - \tau^2(2-\tau) \right\} + 2\theta w\alpha\tau \left\{ -\tau(2-\tau)(1-\alpha) - \alpha \right\}$.

Under a reasonable assumption of $1 < \tau < 2$, that is the tariff rate is not negative and does not exceed 100%, all terms in the first and the third braces are negative. Consider the sum in the second (middle) braces as a fucntion $f(\alpha) = 2\alpha^2(\tau-1)^2 + \alpha\tau(2-\tau) - \tau^2(2-\tau)$ and show that it is negative on $(0;1)$ for all $1 < \tau < 2$. Note that $f'' = 4(\tau-1)^2 > 0$, so $\max_{\alpha\in[0;1]} f(\alpha)$ is either $f(0) = -\tau^2(2-\tau) < 0$ or $f(1) = -2\tau < 0$. Therefore, $f(\alpha) < 0$ on $(0;1)$.

So, for $1 < \tau < 2$ and $0 < \alpha < 1$ both mixed derivatives of T are negative.

5.2 Appendix 2.

Table 1. Main results. Dependent variable (in all tables): logarithm of the import from the country of Origin to the country of Destination. Polity score is rescaled to be between -1 and 1 in all regressions. All tables are splitted into 2 pages.

	(1)	(2)	(3)	(4)
standard errors	robust	clustered by O and D	clustered by O	clustered by D
dem_d	0.204***	0.204***	0.204***	0.204
	(0.0116)	(0.040)	(0.037)	(0.131)
gap_d	0.514***	0.514***	0.514***	0.514***
	(0.0587)	(0.061)	(0.086)	(0.185)
demxgap_d	-0.264***	-0.264***	-0.264**	-0.264**
	(0.0700)	(0.075)	(0.111)	(0.121)
dem_o	0.321***	0.321***	0.321**	0.321***
	(0.0137)	(0.043)	(0.139)	(0.054)
gap_o	0.359***	0.359***	0.359*	0.359***
	(0.0567)	(0.057)	(0.189)	(0.079)
demxgap_o	-0.240***	-0.240***	-0.240	-0.240***
	(0.0756)	(0.080)	(0.273)	(0.075)
lgdp_o	0.974***	0.974***	0.974***	0.974***
	(0.00414)	(0.017)	(0.054)	(0.020)
lgdp_d	0.801***	0.801***	0.801***	0.801***
	(0.00422)	(0.017)	(0.021)	(0.059)
ldist	-1.136***	-1.136***	-1.136***	-1.136***
	(0.00931)	(0.037)	(0.065)	(0.059)
lgdpcap_o	-0.203***	-0.203***	-0.203***	-0.203***
	(0.00625)	(0.024)	(0.067)	(0.028)
lgdpcap_d	-0.193***	-0.193***	-0.193***	-0.193***
	(0.00649)	(0.025)	(0.032)	(0.067)

gatt_o	-0.165***	-0.165**	-0.165	-0.165***
	(0.0194)	(0.068)	(0.184)	(0.061)
gatt_d	-0.242***	-0.242***	-0.242***	-0.242
	(0.0179)	(0.060)	(0.054)	(0.165)
contig	0.714***	0.714***	0.714***	0.714***
	(0.0291)	(0.127)	(0.158)	(0.145)
comlang_off	0.525***	0.525***	0.525***	0.525***
	(0.0178)	(0.077)	(0.127)	(0.120)
col_hist	0.303***	0.303	0.303	0.303
	(0.0548)	(0.279)	(0.320)	(0.406)
rta	0.586***	0.586***	0.586***	0.586***
	(0.0329)	(0.107)	(0.152)	(0.142)
Constant	-3.791***	-3.791***	-3.791***	-3.791***
	(0.0909)	(0.349)	(0.669)	(0.564)
Number of id_od			4,529	
Observations	109,343	109,343	109,343	109,343
R-squared	0.539	0.539	0.539	0.539

Robust (col 1) and clustered (col 2-4) standard errors in parentheses

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

Table 2. Robustness checks. Different sets of control variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dem_d	0.213***	0.215***	0.221***	0.228***	0.167***	0.170***	0.0598	0.0622*
	(0.0398)	(0.0398)	(0.0398)	(0.0399)	(0.0379)	(0.0380)	(0.0369)	(0.0368)
gap_d	0.513***	0.514***	0.476***	0.472***	0.482***	0.475***	0.362***	0.405***
	(0.0615)	(0.0615)	(0.0619)	(0.0619)	(0.0619)	(0.0619)	(0.0626)	(0.0630)
demxgap_d	-0.261***	-0.263***	-0.250***	-0.248***	-0.247***	-0.241***	-0.223***	-0.197***
	(0.0752)	(0.0752)	(0.0752)	(0.0752)	(0.0751)	(0.0751)	(0.0760)	(0.0766)
dem_o	0.329***	0.331***	0.339***	0.346***	0.349***	0.308***	0.319***	0.182***
	(0.0429)	(0.0429)	(0.0431)	(0.0431)	(0.0431)	(0.0416)	(0.0419)	(0.0392)
gap_o	0.360***	0.361***	0.328***	0.327***	0.320***	0.327***	0.369***	0.262***
	(0.0574)	(0.0574)	(0.0576)	(0.0575)	(0.0575)	(0.0576)	(0.0581)	(0.0592)
demxgap_o	-0.239***	-0.234***	-0.253***	-0.265***	-0.268***	-0.275***	-0.290***	-0.304***
	(0.0806)	(0.0807)	(0.0808)	(0.0807)	(0.0808)	(0.0810)	(0.0811)	(0.0825)
lgdp_o	0.977***	0.978***	0.968***	0.978***	0.979***	0.977***	0.970***	0.875***
	(0.0168)	(0.0167)	(0.0169)	(0.0168)	(0.0169)	(0.0169)	(0.0166)	(0.0130)
lgdp_d	0.804***	0.804***	0.795***	0.805***	0.801***	0.802***	0.719***	0.701***
	(0.0174)	(0.0174)	(0.0174)	(0.0173)	(0.0174)	(0.0174)	(0.0129)	(0.0127)
ldist	-1.169***	-1.175***	-1.207***	-1.291***	-1.296***	-1.300***	-1.281***	-1.251***
	(0.0369)	(0.0366)	(0.0368)	(0.0346)	(0.0346)	(0.0347)	(0.0345)	(0.0341)
lgdpcap_o	-0.200***	-0.201***	-0.206***	-0.217***	-0.219***	-0.224***	-0.243***	
	(0.0235)	(0.0235)	(0.0237)	(0.0236)	(0.0236)	(0.0235)	(0.0232)	
lgdpcap_d	-0.190***	-0.191***	-0.195***	-0.207***	-0.212***	-0.213***		
	(0.0250)	(0.0249)	(0.0250)	(0.0249)	(0.0248)	(0.0248)		
gatt_o	-0.162**	-0.163**	-0.149**	-0.164**	-0.164**			
	(0.0676)	(0.0676)	(0.0681)	(0.0683)	(0.0683)			
gatt_d	-0.239***	-0.239***	-0.222***	-0.238***				
	(0.0599)	(0.0599)	(0.0606)	(0.0608)				
contig	0.727***	0.744***	0.857***					
	(0.129)	(0.127)	(0.133)					
comlang_off	0.524***	0.522***						
	(0.0772)	(0.0771)						

col_hist	0.312							
	(0.283)							
Constant	-3.596***	-3.537***	-2.954***	-2.185***	-2.217***	-2.233***	-2.896***	-3.769***
	(0.349)	(0.346)	(0.351)	(0.333)	(0.335)	(0.336)	(0.333)	(0.324)
Observations	109,343	109,343	109,343	109,343	109,343	109,343	109,343	109,343
R-squared	0.538	0.538	0.535	0.532	0.532	0.531	0.527	0.520

Standard errors clustered by OxD pairs in parentheses

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

Table 3. Robustness checks. Different periods of time.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample	no 1950s	no 1960s	no 1970s	no 1980s	no 1990s	no 2000s
dem_d	0.204***	0.0738*	0.150***	0.297***	0.219***	0.259***	0.245***
	(0.0398)	(0.0388)	(0.0395)	(0.0421)	(0.0418)	(0.0411)	(0.0407)
gap_d	0.514***	0.572***	0.452***	0.110	0.604***	0.209***	0.897***
	(0.0615)	(0.0627)	(0.0616)	(0.0713)	(0.0794)	(0.0722)	(0.0650)
demxgap_d	-0.264***	-0.279***	-0.311***	-0.139	-0.260***	-0.329***	-0.102
	(0.0751)	(0.0773)	(0.0757)	(0.0880)	(0.0953)	(0.0860)	(0.0790)
dem_o	0.321***	0.201***	0.278***	0.403***	0.354***	0.352***	0.355***
	(0.0430)	(0.0425)	(0.0432)	(0.0463)	(0.0458)	(0.0430)	(0.0434)
gap_o	0.359***	0.387***	0.328***	-0.0443	0.500***	0.132*	0.709***
	(0.0574)	(0.0588)	(0.0594)	(0.0640)	(0.0707)	(0.0686)	(0.0615)
demxgap_o	-0.240***	-0.150*	-0.384***	-0.110	-0.393***	-0.222**	-0.0533
	(0.0805)	(0.0833)	(0.0812)	(0.0894)	(0.0974)	(0.0947)	(0.0868)
lgdp_o	0.974***	1.004***	1.016***	1.001***	0.980***	0.935***	0.906***
	(0.0168)	(0.0164)	(0.0163)	(0.0168)	(0.0169)	(0.0179)	(0.0178)
lgdp_d	0.801***	0.820***	0.828***	0.809***	0.789***	0.783***	0.784***
	(0.0174)	(0.0168)	(0.0169)	(0.0177)	(0.0178)	(0.0184)	(0.0182)
ldist	-1.136***	-1.165***	-1.175***	-1.164***	-1.110***	-1.099***	-1.098***
	(0.0375)	(0.0365)	(0.0372)	(0.0383)	(0.0384)	(0.0389)	(0.0381)
lgdpcap_o	-0.203***	-0.127***	-0.159***	-0.248***	-0.260***	-0.207***	-0.175***
	(0.0235)	(0.0235)	(0.0235)	(0.0237)	(0.0236)	(0.0250)	(0.0248)
lgdpcap_d	-0.193***	-0.110***	-0.143***	-0.235***	-0.244***	-0.222***	-0.165***
	(0.0250)	(0.0245)	(0.0248)	(0.0253)	(0.0256)	(0.0258)	(0.0261)

gatt_o	-0.165**	-0.134**	-0.164**	-0.282***	-0.195***	-0.155**	-0.0592
	(0.0675)	(0.0671)	(0.0675)	(0.0694)	(0.0690)	(0.0710)	(0.0694)
gatt_d	-0.242***	-0.197***	-0.274***	-0.343***	-0.214***	-0.204***	-0.207***
	(0.0598)	(0.0592)	(0.0603)	(0.0616)	(0.0616)	(0.0630)	(0.0618)
contig	0.714***	0.707***	0.789***	0.717***	0.675***	0.669***	0.701***
	(0.127)	(0.122)	(0.128)	(0.129)	(0.128)	(0.134)	(0.132)
comlang_off	0.525***	0.647***	0.623***	0.557***	0.582***	0.397***	0.355***
	(0.0770)	(0.0754)	(0.0761)	(0.0777)	(0.0784)	(0.0794)	(0.0792)
col_hist	0.303	0.446	0.410	0.359	0.284	0.104	0.136
	(0.279)	(0.288)	(0.274)	(0.263)	(0.269)	(0.298)	(0.298)
rta	0.586***	0.576***	0.577***	0.637***	0.659***	0.551***	0.577***
	(0.107)	(0.107)	(0.109)	(0.105)	(0.104)	(0.106)	(0.139)
Constant	-3.791***	-5.380***	-4.987***	-3.228***	-3.183***	-3.095***	-3.560***
	(0.349)	(0.356)	(0.359)	(0.355)	(0.350)	(0.355)	(0.354)
Observations	109,343	102,246	97,217	90,094	88,089	81,955	87,114
R-squared	0.539	0.565	0.562	0.541	0.531	0.516	0.529

Standard errors clustered by OxD pairs in parentheses

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

Table 4. Robustness checks. Excluded Origin or Destination. Fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	No O	No D	OxD FE	O FE	D FE	year FE	year FE+OxD FE
dem_d	0.223***		0.0530***	0.108***	-0.141***	0.0844***	0.0604***
	(0.0399)		(0.0124)	(0.0101)	(0.0166)	(0.0108)	(0.0130)
gap_d	0.392***		0.169***	-0.113**	0.296***	-0.163***	0.0263
	(0.0646)		(0.0344)	(0.0538)	(0.0546)	(0.0594)	(0.0369)
demxgap_d	0.268***		0.0741*	-0.00794	0.0746	-0.0196	0.0559
	(0.103)		(0.0421)	(0.0643)	(0.0650)	(0.0666)	(0.0421)
dem_o		0.320***	0.0418***	-0.0612***	0.194***	0.172***	0.0500***
		(0.0429)	(0.0127)	(0.0170)	(0.0124)	(0.0131)	(0.0134)
gap_o		0.421***	0.0865***	0.136***	-0.162***	-0.255***	-0.0613*
		(0.0568)	(0.0323)	(0.0515)	(0.0519)	(0.0567)	(0.0347)
demxgap_o		-0.285***	-0.180***	-0.120*	-0.210***	-0.163**	-0.118***
		(0.0794)	(0.0432)	(0.0693)	(0.0686)	(0.0724)	(0.0443)
lgdp_o	0.978***	0.969***	0.0893***	-1.053***	1.060***	1.057***	0.305***
	(0.0167)	(0.0169)	(0.0291)	(0.0318)	(0.00383)	(0.00392)	(0.0348)
lgdp_d	0.796***	0.805***	0.764***	0.899***	-0.546***	0.882***	0.989***
	(0.0175)	(0.0175)	(0.0283)	(0.00376)	(0.0284)	(0.00389)	(0.0338)
lgdpcap_o	-0.159***	-0.210***	0.485***	1.375***	0.0761***	0.0900***	0.388***
	(0.0223)	(0.0235)	(0.0295)	(0.0374)	(0.00602)	(0.00626)	(0.0317)
lgdpcap_d	-0.200***	-0.160***	-0.247***	0.0623***	0.539***	0.0816***	-0.353***
	(0.0249)	(0.0245)	(0.0285)	(0.00604)	(0.0341)	(0.00633)	(0.0306)

gatt_o	0.000494	-0.169**	0.214***	0.0289	-0.0636***	-0.0802***	0.193***
	(0.0648)	(0.0678)	(0.0196)	(0.0268)	(0.0173)	(0.0180)	(0.0198)
gatt_d	-0.250***	-0.123**	0.156***	-0.110***	-0.0131	-0.115***	0.127***
	(0.0605)	(0.0569)	(0.0195)	(0.0158)	(0.0254)	(0.0165)	(0.0197)
rta	0.639***	0.631***	0.469***	0.906***	0.977***	1.047***	0.427***
	(0.107)	(0.108)	(0.0327)	(0.0336)	(0.0355)	(0.0348)	(0.0332)
ldist	-1.112***	-1.116***		-1.325***	-1.142***	-1.174***	
	(0.0376)	(0.0376)		(0.00921)	(0.00932)	(0.00852)	
contig	0.727***	0.723***		0.383***	0.796***	0.595***	
	(0.126)	(0.127)		(0.0310)	(0.0310)	(0.0298)	
comlang_off	0.531***	0.524***		0.630***	0.747***	0.726***	
	(0.0776)	(0.0772)		(0.0177)	(0.0175)	(0.0165)	
col_hist	0.349	0.344		0.627***	0.405***	0.313***	
	(0.278)	(0.278)		(0.0576)	(0.0595)	(0.0597)	
Constant	-4.272***	-4.144***	-9.203***	3.802***	1.253***	-9.372***	-11.17***
	(0.344)	(0.346)	(0.0540)	(0.0974)	(0.0955)	(0.0952)	(0.190)
Observations	109,638	109,666	109,343	109,343	109,343	109,343	109,343
R-squared	0.535	0.536	0.393	0.663	0.652	0.633	0.397
Number of id_od			4,529				4,529

Robust standard errors in parentheses

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

Table 5. Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Import	111776	1.397348	3.401887	-18.4207	12.76117
polity2_d	111776	0.219842	0.759949	-1	1
gap_d	109638	0.058895	0.138223	-1.44701	1.08743
demxgap_d	109638	0.011024	0.120728	-1.44701	1.447012
polity2_o	111776	0.245054	0.75913	-1	1
gap_o	109666	0.059336	0.137935	-1.44701	1.08743
demxgap_o	109666	0.018047	0.113392	-1.08743	1.302311
lgdp_o	111776	10.14965	2.223217	4.592848	16.39586
lgdp_d	111776	9.969718	2.306333	4.590056	16.39586
ldist	111776	8.61832	0.835046	4.741773	9.871305
lgdpcap_o	111776	7.405278	1.554252	3.091771	11.11192
lgdpcap_d	111776	7.346033	1.566594	3.091771	11.11192
gatt_o	111776	0.708918	0.454263	0	1
gatt_d	111776	0.69217	0.461598	0	1
contig	111776	0.044884	0.207051	0	1
comlang_off	111776	0.173937	0.379057	0	1
col_hist	111776	0.012641	0.111721	0	1
rta	111776	0.031161	0.173752	0	1

Table 6. Industry classification.

SITC number	Definition	Notation in tables
0	Food and live animals	animals
1	Beverages and tobacco	bev & tob
2	Crude materials, inedible, except fuels	materials
3	Mineral fuels, lubricants and related materials	fuels
4	Animal and vegetable oils and fats	oils & fats
5	Chemicals	chemicals
6	Manufact goods classified chiefly by material	manuf 1
7	Machinery and transport equipment	machinery
8	Miscellaneous manufactured articles	manuf 2
9	Commod. & transacts. Not class. Accord. To kind	not class

Table 7. Estimates for the recent crisis, all independent variables lagged. Part 1.
Some controls are included in 3rd lag due to insufficient recent data on them.

	(1)	(2)	(3)	(4)	(5)	(6)
	total	0	1	2	3	4
		animals	bev & tob	materials	fuels	oils & fats
L.demxgap6_d	-9.945***	1.099	-6.134**	-3.787*	-14.16***	-1.000
	(1.448)	(1.956)	(2.565)	(2.074)	(3.599)	(3.316)
L.demxgap6_o	-3.771**	-7.021***	-13.66***	4.675**	-0.988	-35.73***
	(1.501)	(2.023)	(3.304)	(2.111)	(3.303)	(4.414)
L.gap6_d	4.691***	-3.001*	7.636***	4.802***	3.242	-2.459
	(1.135)	(1.587)	(2.048)	(1.657)	(2.853)	(2.743)
L.gap6_o	6.720***	5.392***	9.650***	-2.622	14.16***	38.40***
	(1.218)	(1.700)	(2.708)	(1.684)	(2.782)	(3.733)
L.dem_d	-0.0562	-0.241***	0.0556	-0.281***	0.310***	-0.258***
	(0.0352)	(0.0497)	(0.0677)	(0.0489)	(0.0905)	(0.0901)
L.dem_o	0.122***	0.641***	1.088***	0.274***	-1.380***	0.617***
	(0.0377)	(0.0497)	(0.0715)	(0.0536)	(0.0924)	(0.0854)
L.lrgdp_o	1.256***	0.984***	0.778***	0.915***	0.980***	0.698***
	(0.0112)	(0.0155)	(0.0203)	(0.0153)	(0.0286)	(0.0262)
L.lrgdp_d	1.046***	0.699***	0.522***	1.178***	1.109***	0.655***
	(0.0115)	(0.0160)	(0.0207)	(0.0157)	(0.0287)	(0.0269)
L3.ldist	-1.254***	-0.964***	-0.875***	-1.131***	-1.693***	-0.824***
	(0.0280)	(0.0363)	(0.0455)	(0.0375)	(0.0679)	(0.0608)
L.lgdpcap_o	0.0448***	-0.277***	-0.180***	-0.242***	0.202***	-0.273***
	(0.0165)	(0.0230)	(0.0310)	(0.0230)	(0.0445)	(0.0377)
L.lgdpcap_d	-0.0495***	0.194***	0.127***	-0.269***	-0.427***	-0.147***
	(0.0165)	(0.0233)	(0.0306)	(0.0217)	(0.0402)	(0.0394)

L.lprice_o	-0.000926	0.00726	-0.0283	0.0479*	0.377***	-0.0590
	(0.0212)	(0.0298)	(0.0457)	(0.0247)	(0.0674)	(0.0401)
L.lprice_d	-0.0297	-0.00934	-0.117***	-0.170***	-0.216***	-0.0648
	(0.0197)	(0.0302)	(0.0389)	(0.0254)	(0.0456)	(0.0532)
L3.gatt_o	0.458***	0.799***	1.036***	0.435***	-1.386***	0.597***
	(0.0672)	(0.0899)	(0.121)	(0.0924)	(0.168)	(0.164)
L3.gatt_d	0.237***	-0.328***	-0.674***	0.558***	0.961***	0.0942
	(0.0640)	(0.0864)	(0.120)	(0.0899)	(0.146)	(0.151)
L3.contig	0.889***	1.361***	1.330***	1.273***	1.414***	1.764***
	(0.118)	(0.118)	(0.153)	(0.125)	(0.200)	(0.169)
L3.comlang_off	0.822***	0.957***	0.606***	0.388***	0.595***	0.471***
	(0.0540)	(0.0726)	(0.0995)	(0.0717)	(0.135)	(0.113)
L3.rta	0.526***	0.719***	0.956***	0.559***	0.0282	0.293**
	(0.0600)	(0.0760)	(0.0974)	(0.0795)	(0.139)	(0.119)
Constant	-30.56***	-19.75***	-13.33***	-25.29***	-23.14***	-12.18***
	(0.450)	(0.612)	(0.848)	(0.607)	(1.145)	(1.029)
Observations	39,008	29,048	18,801	26,984	16,211	13,107
R-squared	0.687	0.446	0.358	0.483	0.342	0.233

Robust standard errors in parentheses

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

Table 7. Estimates for the recent crisis, all independent variables lagged. Part 2.

	(1)	(2)	(3)	(4)	(5)
	5	6	7	8	9
	chemicals	manuf 1	machinery	manuf 2	not class
L.demxgap6_d	-10.17***	-9.119***	-13.29***	-9.135***	8.681***
	(1.758)	(1.801)	(1.789)	(1.658)	(2.778)
L.demxgap6_o	0.992	0.950	0.993	-3.468**	-2.930
	(1.944)	(1.826)	(1.726)	(1.746)	(2.805)
L.gap6_d	6.802***	0.00871	6.235***	3.256**	2.783
	(1.361)	(1.431)	(1.422)	(1.311)	(2.186)
L.gap6_o	5.211***	6.928***	4.079***	5.911***	1.749
	(1.623)	(1.480)	(1.398)	(1.434)	(2.180)
L.dem_d	0.0339	-0.122***	-0.128***	0.119***	-0.615***
	(0.0435)	(0.0431)	(0.0451)	(0.0421)	(0.0640)
L.dem_o	-0.143***	0.168***	0.506***	0.382***	0.163**
	(0.0490)	(0.0450)	(0.0473)	(0.0459)	(0.0634)
L.lrgdp_o	1.248***	1.406***	1.350***	1.279***	0.836***
	(0.0152)	(0.0139)	(0.0140)	(0.0134)	(0.0203)
L.lrgdp_d	0.919***	0.921***	0.798***	0.762***	0.844***
	(0.0146)	(0.0139)	(0.0144)	(0.0140)	(0.0222)
L3.ldist	-1.336***	-1.539***	-1.194***	-1.219***	-0.823***
	(0.0334)	(0.0342)	(0.0328)	(0.0325)	(0.0488)
L.lgdpcap_old_o	0.346***	-0.0739***	0.259***	-0.110***	0.155***
	(0.0215)	(0.0201)	(0.0197)	(0.0197)	(0.0284)
L.lgdpcap_old_d	-0.306***	-0.0702***	-0.0127	0.280***	0.160***
	(0.0207)	(0.0194)	(0.0192)	(0.0188)	(0.0307)

L.lprice_o	-0.188***	-0.110***	-0.124***	-0.243***	-0.0242
	(0.0277)	(0.0230)	(0.0222)	(0.0208)	(0.0282)
L.lprice_d	0.00571	0.0186	0.0548**	0.0394*	-0.0568**
	(0.0261)	(0.0237)	(0.0220)	(0.0207)	(0.0285)
L3.gatt_o	0.216**	0.258***	0.891***	1.197***	0.202*
	(0.0895)	(0.0839)	(0.0808)	(0.0804)	(0.113)
L3.gatt_d	0.314***	0.364***	0.153*	0.0188	-0.0145
	(0.0804)	(0.0775)	(0.0796)	(0.0727)	(0.107)
L3.contig	1.081***	1.035***	0.986***	0.941***	0.868***
	(0.118)	(0.126)	(0.125)	(0.121)	(0.185)
L3.comlang_off	0.793***	0.679***	0.679***	0.870***	0.873***
	(0.0708)	(0.0650)	(0.0586)	(0.0601)	(0.0825)
L3.rta	0.708***	0.690***	1.004***	0.866***	0.891***
	(0.0703)	(0.0727)	(0.0683)	(0.0667)	(0.104)
Constant	-28.84***	-29.74***	-32.30***	-29.02***	-26.49***
	(0.567)	(0.547)	(0.527)	(0.514)	(0.794)
Observations	27,755	32,127	32,902	33,110	18,086
R-squared	0.621	0.630	0.672	0.646	0.429

Robust standard errors in parentheses

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

Table 8. Estimates for the recent crisis, only independent variables of interest lagged. Part 1.

	(1)	(2)	(3)	(4)	(5)	(6)
	total	0	1	2	3	4
		animals	bev & tob	materials	fuels	oils & fats
L.demxgap6_d	-9.321***	1.861	-5.502*	-2.635	-11.31***	-2.060
	(1.592)	(2.226)	(2.893)	(2.320)	(3.991)	(3.788)
L.demxgap6_o	-3.786**	-6.577***	-13.26***	3.528	-3.036	-39.19***
	(1.645)	(2.209)	(3.392)	(2.262)	(3.495)	(4.617)
L.gap6_d	5.799***	-2.455	8.120***	4.475**	1.481	-1.149
	(1.234)	(1.790)	(2.296)	(1.836)	(3.147)	(3.103)
L.gap6_o	8.639***	5.607***	10.41***	-2.068	17.24***	39.55***
	(1.311)	(1.822)	(2.767)	(1.785)	(2.931)	(3.860)
L.dem_d	-0.0679*	-0.261***	0.0435	-0.302***	0.255***	-0.267***
	(0.0362)	(0.0518)	(0.0709)	(0.0505)	(0.0943)	(0.0950)
L.dem_o	0.0989**	0.542***	1.088***	0.227***	-1.357***	0.616***
	(0.0388)	(0.0500)	(0.0730)	(0.0544)	(0.0944)	(0.0870)
lrgdp_o	1.251***	0.968***	0.775***	0.901***	0.991***	0.682***
	(0.0112)	(0.0157)	(0.0207)	(0.0153)	(0.0289)	(0.0266)
lrgdp_d	1.037***	0.697***	0.520***	1.171***	1.098***	0.647***
	(0.0116)	(0.0162)	(0.0209)	(0.0159)	(0.0290)	(0.0272)
L3.ldist	-1.252***	-0.976***	-0.875***	-1.146***	-1.725***	-0.857***
	(0.0282)	(0.0368)	(0.0462)	(0.0379)	(0.0685)	(0.0614)
lgdpcap_old_o	0.0684***	-0.224***	-0.175***	-0.192***	0.226***	-0.230***
	(0.0173)	(0.0238)	(0.0321)	(0.0237)	(0.0468)	(0.0393)
lgdpcap_old_d	-0.0138	0.224***	0.148***	-0.227***	-0.376***	-0.120***
	(0.0172)	(0.0245)	(0.0323)	(0.0226)	(0.0421)	(0.0418)

lprice_o	0.00857	0.0293	-0.0217	0.0520**	0.383***	-0.0362
	(0.0215)	(0.0297)	(0.0464)	(0.0249)	(0.0674)	(0.0407)
lprice_d	-0.0218	-0.00964	-0.102***	-0.155***	-0.205***	-0.0652
	(0.0197)	(0.0306)	(0.0392)	(0.0254)	(0.0456)	(0.0535)
L3.gatt_o	0.484***	0.879***	1.042***	0.467***	-1.399***	0.648***
	(0.0687)	(0.0921)	(0.123)	(0.0936)	(0.169)	(0.167)
L3.gatt_d	0.251***	-0.313***	-0.671***	0.556***	0.964***	0.0968
	(0.0649)	(0.0884)	(0.123)	(0.0908)	(0.149)	(0.154)
L3.contig	0.912***	1.364***	1.337***	1.290***	1.417***	1.727***
	(0.119)	(0.119)	(0.154)	(0.126)	(0.201)	(0.171)
L3.comlang_off	0.852***	0.946***	0.599***	0.391***	0.668***	0.448***
	(0.0543)	(0.0736)	(0.101)	(0.0722)	(0.137)	(0.115)
L3.rta	0.525***	0.678***	0.956***	0.523***	-0.00876	0.242**
	(0.0607)	(0.0770)	(0.0984)	(0.0803)	(0.140)	(0.120)
Constant	-30.94***	-20.11***	-13.63***	-25.54***	-23.67***	-12.04***
	(0.458)	(0.628)	(0.874)	(0.618)	(1.169)	(1.054)
Observations	37,514	27,987	18,140	26,071	15,567	12,672
R-squared	0.690	0.448	0.357	0.487	0.349	0.232

Robust standard errors in parentheses

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

Table 8. Estimates for the recent crisis, only independent variables of interest lagged. Part 2.

	(1)	(2)	(3)	(4)	(5)
	5	6	7	8	9
	chemicals	manuf1	machinery	manuf 2	not class
L.demxgap6_d	-10.57***	-8.256***	-11.84***	-9.184***	10.13***
	(1.948)	(1.989)	(1.952)	(1.841)	(3.238)
L.demxgap6_o	3.462	2.517	1.410	-3.080	-2.106
	(2.167)	(1.959)	(1.866)	(1.914)	(2.989)
L.gap6_d	7.720***	0.226	6.399***	5.291***	2.157
	(1.491)	(1.570)	(1.532)	(1.446)	(2.530)
L.gap6_o	6.802***	7.292***	5.984***	7.453***	3.156
	(1.781)	(1.559)	(1.495)	(1.550)	(2.308)
L.dem_d	0.0466	-0.113**	-0.124***	0.150***	-0.656***
	(0.0454)	(0.0447)	(0.0469)	(0.0441)	(0.0653)
L.dem_o	-0.173***	0.141***	0.444***	0.330***	0.146**
	(0.0508)	(0.0455)	(0.0493)	(0.0475)	(0.0654)
lrgdp_o	1.250***	1.398***	1.339***	1.269***	0.838***
	(0.0154)	(0.0140)	(0.0141)	(0.0135)	(0.0205)
lrgdp_d	0.912***	0.919***	0.798***	0.763***	0.827***
	(0.0148)	(0.0140)	(0.0146)	(0.0142)	(0.0224)
L3.ldist	-1.335***	-1.544***	-1.195***	-1.211***	-0.842***
	(0.0339)	(0.0343)	(0.0332)	(0.0329)	(0.0495)
lgdpcap_o	0.359***	-0.0373*	0.305***	-0.0802***	0.174***
	(0.0227)	(0.0207)	(0.0205)	(0.0205)	(0.0296)
lgdpcap_d	-0.277***	-0.0404**	0.00887	0.293***	0.204***
	(0.0219)	(0.0204)	(0.0201)	(0.0198)	(0.0316)

lprice_o	-0.181***	-0.0884***	-0.117***	-0.232***	-0.0262
	(0.0281)	(0.0229)	(0.0225)	(0.0211)	(0.0282)
lprice_d	0.0143	0.0270	0.0641***	0.0438**	-0.0494*
	(0.0263)	(0.0237)	(0.0220)	(0.0207)	(0.0284)
L3.gatt_o	0.225**	0.291***	0.976***	1.269***	0.199*
	(0.0923)	(0.0857)	(0.0832)	(0.0819)	(0.115)
L3.gatt_d	0.317***	0.356***	0.148*	0.0281	0.0463
	(0.0819)	(0.0791)	(0.0811)	(0.0741)	(0.109)
L3.contig	1.111***	1.058***	1.000***	0.971***	0.821***
	(0.119)	(0.125)	(0.127)	(0.123)	(0.188)
L3.comlang_off	0.842***	0.692***	0.710***	0.889***	0.897***
	(0.0718)	(0.0653)	(0.0592)	(0.0610)	(0.0838)
L3.rta	0.696***	0.685***	0.992***	0.867***	0.877***
	(0.0709)	(0.0732)	(0.0692)	(0.0673)	(0.105)
Constant	-29.31***	-30.28***	-32.84***	-29.49***	-26.64***
	(0.581)	(0.558)	(0.538)	(0.524)	(0.807)
Observations	26,659	30,919	31,664	31,853	17,442
R-squared	0.623	0.633	0.675	0.647	0.434

Robust standard errors in parentheses

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