Vote for (trade) protection: A way to revolt in democracies?[*]

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Abstract

"Does political power of the winners of trade can explain the recent increase in demand for trade protection?". Political power is the capacity of a group to obtain its favorite policies against the resistance of other groups. I introduce the concept of political power in a globalized democracy composed of winners (the rich) and losers (the poor) of trade. The key idea of the paper is that groups who get rich with trade can exercise their political power to change political institutions governing the future allocation of de jure political power (i.e., the political system, laws etc.). This in turn can dampen redistribution, pushing losers to demand trade protection. The main results of the model are: (1) if gains from trade are sufficiently high, losers of trade are better off in an open economy in absence of political power, (2) The effect of trade on demand for protection is conditional on the political power of the winners. I provide some preliminary empirical evidence of the results of the model.

Keywords: Demand for protection, political power, trade.
JEL Classification: D7, F13, P16

I. Introduction

Understanding and quantifying the impact of trade globalization on political preferences has been a central issue in recent research. From empirical studies it emerged that, at least in recent decades, trade globalization stands out among the determinants of protectionist populism. However, the reason why trade should lead to more demand for trade protection from some groups remains partially unclear, especially given the positive effects of trade openness on growth and welfare. Potentially, appropriate redistribution policies could compensate the groups negatively affected by trade.[1] Protection could not be the direct answer to trade. In this paper, I study if *political power* of groups who benefit from trade can explain the recent increase in demand for trade protection.

Political power is the capacity of a group to obtain its favorite policies against the resistance of other groups.[2] Acemoglu and Robinson (2006) distinguishes between two types of political power: *de facto* and *de jure*. The former depends on the brute force that certain groups can use to prevail on others (e.g., armies, revolutionary threat etc.). Groups use their political power to change institutions, and regulate the future allocation of de jure political power. Political institutions are the social and political arrangements that allocate de jure political power (i.e., the political system, laws etc.). Actual political power is a combination of the *de facto* and *de jure* power. Changes in a group's actual power comes for example from lobbying activities, political contributions, ideological positions, the use of force, corruption etc.

For the specific realm of class conflict, political power from the rich can undermine redistribution outcomes. In non-democratic politics, this might even lead to revolutions (e.g., in presence of commitment issues over promise of redistribution). In this paper, I introduce the concept of political power in a globalized democracy composed of winners (the rich) and losers (the poor) of trade. The key idea of the paper is that groups who get richer with trade can exercise their political power to change political institutions and the future allocation of de jure political power. This in turn can dampen redistribution, pushing losers to demand trade protection: groups whose preferences are not effectively represented may lose faith into the mainstream political system and its redistribution policies in a globalized world. Populist parties can then gain popularity.

Although different cause are linked to the rise of populism,[3] in this paper I focus on trade globalization, as a common feature of populist parties is trade protectionism. It is well established that trade entails winners and losers (e.g., Autor et al. (2013), Caliendo et al. (2019)), due for instance to

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[1] Rodrik (2021)'s essay discusses potential economic and political frictions that might make redistribution inefficient, and how this might result in demand for protection. It stresses that compensation is costly, and as such the deadweight loss of compensation can erode the gains from trade. Further, as discussed in the literature review, the interaction between economic and cultural factors can also be an explanation.

[2] Acemoglu and Robinson (2006), p. 21

[3] Trade, financial and cultural globalization, the automation process, the (2008) global crisis, identity and cultural mechanisms, immigration and social media and the internet etc. (Guriev and Papaioannou (2020)).

stiffer foreign competition in certain sectors. Meanwhile, trade boosts aggregate economic growth and welfare of countries. In principle, losers can seek compensation through appropriate direct redistribution policies (e.g., taxes), sharing the aggregate gains. As an alternative, losers can look for protectionist policies such as tariffs on the imported goods that mitigate competition.

Since 1945, world trade to GDP increased from 20% to 60% (World Bank data). Interestingly, beginning in the 1990s, demand for redistribution has dropped (see Gennaioli and Tabellini (2019)). At the same time, a large body of empirical works has documented an increase in demand for trade protection. In this paper, I investigate whether *political power* can explain the drop in demand for redistribution and the rise in demand for protection in globalized democracies. To answer to the research question, I analyze both theoretically and empirically the role of political power and trade in determining demand for protection. The mechanism is the following: Δ power $\leftrightarrow$ Δ institutions $\rightarrow$ Δ tax rate $\rightarrow$ Δ Demand for protection.

In the theoretical section, I model trade with the Heckscher-Ohlin (HO) framework.[4] HO predicts that in a capital-abundant country trade increases the real wage of capitalists, while decreases the one of workers, raising inequality. At the same time, it increases total income in the economy. I introduce in the country a government that taxes pre-tax income and redistribute tax revenues through a lump-sum transfer to capitalists and workers.[5] By maximizing their post-tax income, workers derive their ideal tax rate, which is increasing in inequality due to trade. Two ideological parties, the protectionist and the mainstream, propose redistribution (i.e., the tax rate) under two different regimes, respectively Autarky (i.e., no trade) and free trade. The level of redistribution proposed depends on trade openness and the level of political power from capitalists.[6]

The tax rates offered by the two parties, although subject to the same level of political power, differ because of their different ideologies: the protectionist party offer autarky, while the mainstream stands for free-trade.[7] Trade protection implies a higher pre-tax wage for workers and a lower for capitalists, reducing inequality. Thus, the protectionist party can always propose a lower tax rate compared to the mainstream.

When political power from the winners is null, then the tax rate offered by the two parties is the one preferred by the majority, by assumption the workers, under the two different regimes. The model shows that if the gains from trade are sufficiently high, the losers of trade (workers) are fully compensated in *absence* of political power from capitalists: openness implies they get a bigger share (higher tax rate) from a bigger pie. Thus, a large fraction of losers votes for the mainstream

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[4] All the model is solved in real terms.

[5] To model the political environment, I use the two-groups model of redistribution by Acemoglu and Robinson (2006).

[6] Political power is a parameter representing the weight of capitalists in the decision making process (i.e., political institutions, campaign contributions, ideology etc.).

[7] While this might seem *ad hoc*, note that in this paper I do not aim to explain why some parties become protectionist and other not. I just assume that they are.

party.

When the political power of capitalists increases, the redistributive power of the tax rate decreases. However, the post-tax income under the mainstream party falls more than the one under the protectionist. This happens for two reasons. The first is that a marginal decrease in the tax rate due to a rise in political power hurts more workers in free trade, since the pie is larger compared to autarky. The second is due to the indirect redistribution offered by the protectionist party through autarky, always implying higher pre-tax income.

The second result of the model establish the existence of a level of political power such that the redistributive power of the tax rate compensates losers less than the indirect redistribution of the protectionist party (by proposing autarky). Above this level, increases in trade openness increases the share of voters supporting the protectionist party (and here the conditional effect of trade emerges).

To sum up, the model delivers two main insights. First, if gains from trade are sufficiently high, losers of trade are better off in an open economy in absence of political power. Second, assuming the first point, the effect of trade is conditional on the level of political power. To visualize the second result, consider two countries that differ only on the level of political power of the capitalists. When invested by the same trade shock, the country with high power should become more protectionist with a lower tax rate, while the other more open with a higher tax rate.

These claims appear particularly relevant to developed countries, where in the post-1990s populist parties gained support. Over the 1970-2015 period, these countries experienced a period of globalization, culminating in what is referred to as hyper-globalization (Rodrik (2020)). Between the late 90s and early 2000s a particularly intense trade shock invested European countries and US, among others: the rise in manufacturing imports from China. To study empirically the impact of this very specific shock on political preferences under different level of political power, the paper exploits a dataset built by Colantone and Stanig (2018) to provide some preliminary empirical evidence. The data covers 76 legislative elections in fifteen European countries, between the 1988 and the 2007. The estimates of the effects of the import shock on political preferences show strong and robust evidence that the import shock has different political implications depending on the level of political power, proxied by the Bayesian Corruption index (BCI). In particular, electoral districts exposed to the import shocks experience a decrease in the share of votes won by the protectionist parties in country with low political power (i.e., low BCI index). However, electoral districts in country with high political power experience an increase in the vote share of protectionist parties. I interpret this as evidence in support of the results of the model: the effect of trade is conditional on the level of political power. I am now developing a new empirical strategy to better test the result of the model.

To deal with endogeneity issues, I follow Colantone and Stanig (2018) and instrument the import

shock from China to European countries with import shock to US. I run all the robustness checks of Colantone and Stanig (2018). The results are robust to the use of different measures of trade openness and to controlling for region-specific trends based on different historical characteristics and for country-level variables. I also test for the validity of the exclusion restriction applying restrictions to the instrumental variable and using a completely different instrument (similarly to Colantone and Stanig (2018)). I additionally control for immigration and population growth.[8]

The rest of the paper is organized as follows. Section II discusses the literature. Section III presents the theoretical framework. Section IV introduces the data used in the analysis and section V discusses the descriptive statistics. Section VI explains the empirical strategy. Section VII reports the empirical results and Section VIII concludes.

II. Related literature

This paper contributes to the literature that studies the impact of trade on political preferences. It shows that trade may result in higher demand for redistribution (taxes) or in demand for trade protection conditionally on the quality of institutions. Colantone and Stanig (2018) show how European electoral constituencies more exposed to the Chinese import shocks tend to vote for extreme right parties between 1988 and 2007. They also link trade exposure to less support for globalization, perception of ineffective redistribution policies and higher demand for protection.[9] For U.S., Autor et al. (2013) and Caliendo et al. (2019) show that the China shock resulted in winners and losers (i.e., drop in nominal wages, welfare and sectorial employment in exposed regions). Autor et al. (2020) provides evidence that the displacement caused by the China shock resulted in political polarization in exposed electoral districts, while Feigenbaum and Hall (2015) show that legislators from districts experiencing larger increases in Chinese import competition become more protectionist in their voting on trade-related bills (i.e., evidence of more demand for protection).[10] On the contrary, a relative older literature in economics and political science claims that trade liberalization generates more demand for redistribution. The literature identifies two channels: the insecurity due to the exposure to the international business cycle (e.g., Rodrik (1998)) and the inequality resulting from trade as predicted by the Heckscher-Ohlin or Ricardo-Viner models (e.g., Cameron (1978) proposing the "compensation hypothesis"). Other papers find that trade openness increases government size and the demand for economic assistance (e.g., Swank and Betz (2003), Ventura (2006)).

The paper contributes also to the theoretical literature explaining the rise of populism and, in

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[8]All these tests are available under request. Due to time constraints, I could not include them in this version.

[9]Other papers provide country-level evidence that the China shock resulted in more support for far-right parties, (Malgouyres (2017), Dippel et al. (2020) and Dippel et al. (2017)).

[10]see also Che et al. (2016).

particular, the increase in demand for protection. While this literature shows that a key determinant is social-identity, this paper proposes a complete resource-based approach (i.e., material interests) in which political frictions are key. Gennaioli and Tabellini (2019) stresses that low- and high-income voters care about either a cultural-based identity (i.e., nationalist vs tribal sentiments) or a conflict-based identity (redistribution conflicts) in the choice of their social and economic policies. In one of their extensions, they show that globalization can shift group identity from class to nationalist versus cultural conflict, making losers of globalization more protectionist and reducing their demand for redistribution. Grossman and Helpman (2018) argue that trade shocks may increase salience over one's identification with a particular social group (e.g., White working class) or the material interest in trade protection. Differently, in this paper, demand for protection does not arise from identity effects. Rather, demand for protection stems from structural issues in political institutions.

Finally, the paper contributes to the literature explaining the rise in support of populist parties (see Guriev and Papaioannou (2020) for a review) by proposing a new channel, i.e., political frictions. Norris and Inglehart (2019) puts forward the cultural backlash hypothesis. Others stressed how immigration sparks support for far-right movements in Europe due mainly to cultural mechanisms (e.g., Lucassen and Lubbers (2012), Rydgren (2008) and Halla et al. (2012). Yet, Gelman et al. (2008) find no effect of immigration on partisanship). Studies on the impact of the the 2008 crisis and of the European austerity policies not only explain how voters punish incumbents when the economy is in recession (e.g., Lewis-Beck and Stegmaier (2000), Lewis-Beck et al. (2008)), but also that recessions drive political turnover (Frieden et al. (2017)), pushing voters toward the far-right (Jackman and Volpert (1996)), and firing up anti-Europe sentiment (Algan et al. (2017)).

III. Theoretical framework

In this section, I formally explain how trade and political power affect losers' political preferences. The theory provides two main insights: (1)if gains from trade are sufficiently high, losers of trade are better off in an open economy in absence of political power, (2) The effect of trade on demand for protection is conditional on the political power of the winners.

I first briefly present the HO neoclassical trade framework to model trade. I second introduce the political environment: the two groups model of redistribution by Acemoglu and Robinson (2006). I derive the workers' optimal tax rate and discuss how trade affects it. I then introduce two ideological political parties, both offering redistribution. However, the protectionist party offers indirect redistribution through the autarky regime, while the mainstream party proposes free-trade. Finally, I discuss how trade and political power affect the voting decision.

A. Trade

In this section, I model trade using a HO trade framework with Constant Return to Scale, two goods $g = \{x, y\}$, two countries $c = \{1, 2\}$ and two factors of production $f = \{l, k\}$. In each country, capitalists and workers are remunerated by the inputs prices r and w. I further assume that country 1 is k-abundant relative to 2 $\left(\frac{K_1}{L_1} > \frac{K_2}{L_2} \right)$, that the good x is k-intensive relative to y. I focus on country 1, since the empirical analysis focus on the trade shock from China, a l-abundant country in the manufacturing industry, toward relative k-abundant European countries. Further, I normalize population to 1, such that $L_1 = 1 - K_1$.

Assumption 1: Workers are the majority, i.e., $L_1 > \frac{1}{2}$.

Assumption 1 guarantees that under majority voting, the median voter is a worker. Assuming a Cobb-Douglas production function, I obtain the equilibrium real wages and rents under regime $r = A, FT$, respectively, Autarky and Free Trade:

$$\frac{w^r}{P^r} = \frac{\alpha^\alpha (1-\alpha)^{1-\alpha}}{(\theta^r)^\gamma} \quad and \quad \frac{r^r}{P^r} = \alpha^\alpha (1-\alpha)^{1-\alpha} (\theta^r)^{1-\gamma} \tag{III.1}$$

where $P = \frac{\theta^{\alpha(\beta_x - \beta_y)}}{\alpha^\alpha (1-\alpha)^{1-\alpha}}$ is the price index, with β_x being the value-added of K_1 in sector X_1 and β_y of sector Y_1 and α comes from assuming Cobb-Douglas preferences. Then, θ is the remuneration of K relative to L (r/w). It measures inequality from trade ($\theta^A < \theta^{FT}$). Finally, $\gamma = \beta_x^r \alpha + (1-\alpha)\beta_y^r$ is the total value added of K_1 in the economy.[11] As in all developed economies, capitalists are richer: $w^A < r^A$, i.e., $\theta^A > 1$.

Average real income (the pie) is defined as: $\frac{I^r}{P^r} = \frac{wL_1 + rK_1}{P^r}$. Real income increases in θ (trade) when:

$$\beta_y < \beta_x \tag{III.2}$$

Proof. see appendix A. □

For an equilibrium to exists, condition III.2 needs to hold. It means that country 1 must employ relatively more capital in sector X_1, in which it has a comparative advantage, than in sector Y_1. In H-O, trade always increase real total income.

B. Redistribution and trade

I now present the political environment. In country 1, the government taxes pre-tax income III.1 and redistributes the revenues from taxation as a lump-sum transfer. Taxation generates a "Laffer

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[11]Note that $\theta^r \equiv \frac{L_1}{K_1} \phi^r$. With $\phi^r \equiv \frac{\gamma^r}{1-\gamma^r}$, and γ is the total value added of K_1 in country 1, such that with $\gamma^r = \frac{r^r K_1}{w^r L_1 + r^r K_1}$ and $\beta_y^r = \frac{r^r K_{1y}}{w^r L_{1y} + r^r K_{1y}}$.

curve" distortion $C(\tau) = \frac{(\tau)^2}{2}$.[12] I need to assume quadratic costs to have insightful results, such that $C(t) = \frac{\tau^2}{2}$. The government budget constraint is:

$$T^r = \left(\tau - \frac{(\tau)^2}{2}\right) I^r.$$

Define real post-income $\tilde{w} \equiv \frac{\hat{w}^r}{P^r}$, i.e., the nominal post-tax income of a worker $\hat{w}^r = (1-\tau)w^r + T^r$ divided by the Price index P^r:

$$\tilde{w} = \frac{(1-\tau)w^r + T^r}{P^r}.$$

First Order conditions lead to the workers' optimal tax rate:

$$\bar{\tau}(\theta^r) = 1 - \frac{w^r}{I^r}$$

which is a function of θ, i.e., trade, under regime $r = A, FT$.

Once the countries open to trade, the H-O model predicts that country 1 exports the good that uses intensively the factor with which the country is relatively well endowed, i.e., the good X, and imports the good Y. At the FT equilibrium, factor prices and good prices equalize across countries. The rise in the relative price of X under free-trade in country 1 increases the return of K, i.e., r, while reduces the return of the other factor, w. In country 1, capitalists are the *winners* of globalization and the workers the *losers*, as $r \uparrow$ and $w \downarrow$. Although inequality increases, the pie increases as well (see III.2).

In response to the trade-induced loss, losers demand a higher tax rate as compensation, i.e., $\frac{\partial \bar{\tau}}{\partial \theta} > 0$.

C. Political parties and institutions

In this section, I introduce 2 ideological parties, the protectionist (P) and mainstream (M). The ruling party is chosen through majority voting. The P party proposes Autarky, while the M party proposes FT. The parties $j = P, M$ choose the tax rate that maximize:

$$\max_{\tau^j \in [0,1]} (1 - \chi)L_1 \tilde{w}^j + \chi K_1 \tilde{w}^j \tag{III.3}$$

Equation III.3 is a weighted sum of post-tax incomes of losers and winners. The weights are two: the number of losers and winners and the parameter χ. The $\chi \in [0, \frac{1}{2}]$ is a measure of quality of institutions. A rise in χ increases the weight of winners in the sum, and influences the tax rate delivered by the 2 parties. The parameter χ results from micro-funded models emphasizing

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[12]As in Acemoglu and Robinson (2006), the cost function has the following properties: $C' > 0$, $C'' > 0$, $C(0) = 0$, $C(1) = 1$ and $C : [0, 1] \to \mathbb{R}_+$.

different institutional details, lobbying, relatively autonomous political parties, or the presence of swing voters. I treat political institutions as exogenous, implying that in the short-run they are sticky: winners cannot immediately adjust their preferred level of χ to changes in their income due to trade.

Since the 2 parties are ideological, they do not strategically interact in response to the regime proposed by the other. The optimal tax rate delivered by party $j = P, M$ under the regime $r = A, FT$ is:

$$\tau^j(\chi, \theta^r) = 1 - \frac{w^r}{I^r} \times A(\chi, \theta^r) \tag{III.4}$$

Proof. see appendix B. $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad$ □

where $A(\chi, \theta^r) \equiv \frac{L_1(1-\chi) + \theta^r K_1 \chi}{L_1(1-\chi) + K_1 \chi}$ reflects the effect of political power on the tax rate. When $\chi = 0$, political power of winners is null. By applying the Median Voter Theorem (MVT), the outcome policy is the one preferred by workers (full democracy): $\bar{\tau}(\theta^r)$. When $\chi = \frac{1}{2}$, the winners have the power and the tax rate is the one preferred by them: $\tau^j\left(\chi = \frac{1}{2}, \theta^r\right) = 0$.

As political power χ of the winners increases, the tax rate $\tau^j(\chi, \theta^r)$ decreases. When country 1 opens to trade, the political system does not fully compensate the losers of trade for their loss.

D. Political equilibrium

Given the tax rate offered by the two parties under a specific set of institutions χ and the regime $r = A, FT$, workers weight the post-tax incomes $\hat{w}^j$ proposed. The probability that workers vote for party j is given by:

$$\tilde{w}^P\left(\chi, \theta^A\right) - \tilde{w}^M\left(\chi, \theta^{FT}\right) \gtreqless \tilde{\sigma}^i$$

with $\tilde{\sigma}^i = \sigma^i_P - \sigma^i_M$ being the difference between the two parties' ideological benefits for workers. For example, the trade off between benefiting from the indirect redistribution of protectionism and sharing racist values of the populist party. Let the distribution of this differential benefit $\tilde{\sigma}$ be given by a smooth cumulative function $F(.)$ defined over $(-\infty, +\infty)$, with associated probability density function f(.). Then, the fraction of workers that vote for party P is:

$$\pi_P \equiv Pr\left(\Delta\tilde{w} > \tilde{\sigma}^i\right) = F\left(\Delta\tilde{w}\right) \tag{III.5}$$

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where $\Delta \hat{w} = \tilde{w}^P \left(\chi, \theta^A \right) - \tilde{w}^M \left(\chi, \theta^{FT} \right)$. By decomposing the effect of trade on π_P, I get:

$$
\frac{\partial \pi_P}{\partial \theta} = -f(.) \frac{\partial \tilde{w}^M}{\partial \theta} = -\frac{f(.)}{2I^2P} \left[\underbrace{\frac{\partial w^2}{\partial \theta} I \Upsilon(\chi, \theta)}_{\substack{>0 \\ \text{Pre-tax wage} \\ \text{effect}}} + \underbrace{\frac{\partial I}{\partial \theta} (I^2 - w^2 \Upsilon(\chi, \theta))}_{\substack{<0 \\ \text{Pie effect}}} + \underbrace{\frac{\partial \Upsilon(\chi, \theta)}{\partial \theta} w^2 I}_{\substack{>0 \\ \text{Captured tax} \\ \text{effect}}} - \underbrace{\frac{\partial P}{\partial \theta} \tilde{w}}_{\substack{>0 \\ \text{Price} \\ \text{effect}}} \right]
$$

Proof. see appendix E. □

The *Pre-tax wage effect* is the direct effect of trade on pre-tax nominal wages of workers (equation III.1). The country exports the good that intensively uses the factor with which the country is relatively well-endowed, and imports the other (H-O theorem). Good prices moves toward the world price level, and, by Stoppler-Samuleson, workers' nominal wages drop, and capitalists' rents increase. The *Pie effect* increases post-tax income: trade raises the pie (equation III.2) and the tax rate, and workers receive a larger share from a larger pie. The *Captured tax effect* refers to the reduction in the tax rate caused by an increase in χ, i.e., a worsening in institutions: although trade increases the pie, losers cannot fully benefit of such increase. Finally, the *price effect*: an increase in the price index when the country opens reduces the real income of workers and increases the support for the P party. Depending on which of these effects prevail, trade has either a positive or negative effect on the fraction that workers vote for the P party.

Lemma 1. *Workers benefits from trade in absence of political power, i.e., $\tilde{w}^P \left(\chi, \theta^A \right) - \tilde{w}^M \left(\chi, \theta^{FT} \right) < 0$, if $\beta_y < \beta_x \left(\frac{\alpha I(I-P) - 2w^2 \alpha P}{\alpha I(I-P) + 2w^2(1-\alpha)P} \right)$.*

Proof. see appendix F. □

The condition $\beta_y < \beta_x \left(\frac{\alpha I(I-P) - 2w^2 \alpha P}{\alpha I(I-P) + 2w^2(1-\alpha)P} \right)$ states that, in absence of political power ($\chi = 0$), workers' real post-tax income increases with trade if the gains from trade are sufficiently high. This is equivalent to say that the "pie effect" prevails on the "nominal wage effect". Relative to condition III.2, it requires that country 1 allocates more capital in sector X_1, the one in which it has a comparative advantage, relative sector Y_1. Under this lemma, the following theorem holds (see Appendix F):

Theorem 1. *Assuming that workers benefits from trade in absence of political power, there exists a unique threshold value of political power $\bar{\chi}$ such that:*

- *If $\chi < \bar{\chi}$, then the fraction of losers voting for the P is $\pi_P < \frac{1}{2}$.*

- *If $\chi > \bar{\chi}$, then the fraction of losers voting for the P is $\pi_P > \frac{1}{2}$.*
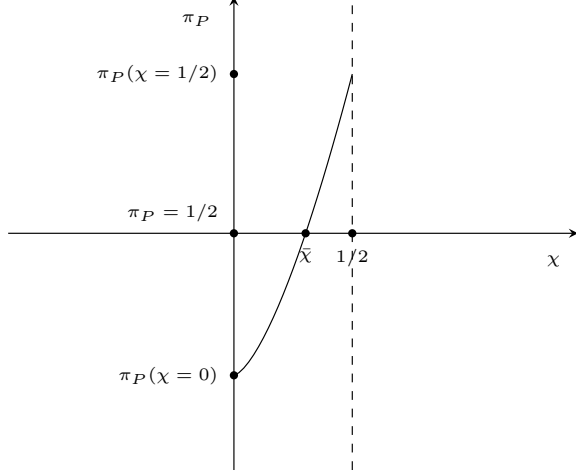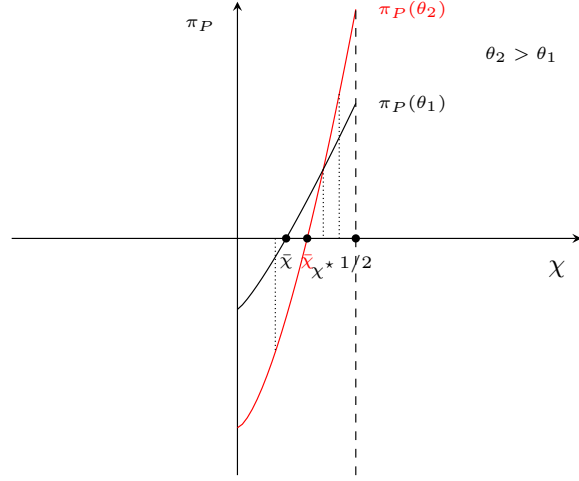
Figure III.1: The threshold value

Figure III.2: The effect of trade

Figure III.1 offers a graphical representation of Theorem 1. The x-axis represents the political power level, or the quality of political institution. When $\chi = 0$, the political system is not captured, and the situation described in the previous lemma applies ("pie effect" > "nominal wage effect": the redistributive power of the tax rate fully compensate the losers of trade. The post-tax income under the M party is larger and the fraction of losers voting the P party is lower than a half. As χ increases, the redistributive power of the tax rate decreases. However, an increase in political power diminishes more post-tax income under the M party than the P party, as the latter offers a higher pre-tax wage under Autarky (protectionism). When $\chi = \bar{\chi}$, the fraction of losers voting the P party is a half: voters are indifferent between the redistribution of taxes and the one of trade protectionism. Finally, if $\chi > \bar{\chi}$, the indirect redistribution offered by protectionism overcome the one of taxes, and the fraction is larger than a half.

Proposition 1. *The threshold value of political power $\bar{\chi}$ increases with trade: $\frac{d\bar{\chi}}{d\theta} > 0$.*

Proposition 1 states that at $\bar{\chi}$, the redistributive power of the tax rate is still overcoming the one of trade protectionism. Figure III.2 graphically represents the following theorem:

Theorem 2. *There is a threshold level of political power $\chi^\star$ such that:*

- *If $\bar{\chi} < \chi < \chi^\star$, then the fraction of losers voting P decreases with trade: $\frac{\partial \pi_P}{\partial \theta} < 0$.*

- *If $\chi > \chi^\star$, then the fraction of losers voting P increases with trade: $\frac{\partial \pi_P}{\partial \theta} > 0$.*

Theorem 2 is the main contribution of the theoretical model. It states that the effect of trade on demand for protection is conditional on the quality of institutions of a country. If $\bar{\chi} < \chi < \chi^\star$, then the redistributive power of the tax rate compensate workers and demand for redistribution

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increases (for $\chi < \chi^\star$ in figure III.2). However, if the system is too captured, the redistributive power of the tax rate does not offset the drop in pre-tax income due to trade: losers of trade demand more protection (for $\chi > \chi^\star$ in figure III.2).

E. Implications

The theoretical model first shows how trade liberalization with redistribution in a full democracy (absence of political power) is beneficial for everyone in society. Second, it tells that when the winners of trade have more power (increase in political power), the effect of trade is conditional on political power. If political power is higher than a threshold, the tax rate does not compensate the losers and a protectionist party may win proposing indirect redistribution with trade protectionism (autarky). However, protectionism has cost: it raises losers' pre-tax income, but reduces average income in society. The fraction of losers revolting against the M party increases as institutions worsen (i.e., the redistributive power of the tax rate decreases).

In the next section, I provide some empirical evidence of the conditional effect of trade on political power.

IV. Data

In this section, I introduce the main sources of data used in the analysis. The dataset is borrowed from Colantone and Stanig (2018). The data cover 15 European countries for a period of twenty years, from 1988 to 2007.[13] 13 countries belongs to the EU and 2 do not (Switzerland and Norway). UK is not any more an EU country, but it was so at the time.

The primary geographical units of observation in the analysis are the *NUTS-2* administrative regions. In total, there are 196 regions with a population between 800,000 and 3 million. The import shocks data are at the *NUTS-2* region level, but electoral outcomes are at the district level. Thus, districts belonging to the same region have the same exposure to trade shocks. Sometimes, *NUTS-2* regions correspond to districts, while other times a *NUTS-2* regions contain two or three districts. Overlapping never happens since districts are always fully contained into regions.[14] The dataset has a panel structure whose observational unit is the district observed over time (elections). The observational unit districts in the dataset was previously concatenated with the year (election), so that the dataset's identifier is a district observed in each election happening in the country over the period 1988-2007, for a total of 9190 unique district-year observations across countries. Each district-year belongs to a *NUTS-2* region, which belongs to a country. Moreover, the dataset is

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[13]The sample consists of Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

[14]The matching between districts and regions was implemented manually by Colantone and Stanig (2018) and their research assistants.

weakly unbalanced, as each panel contains the same number of observations (same districts in each election), but not the same years. This is due to the fact that elections happen in different years with a different frequency in each country.

Also, all import and export data are deflated using country-specific Consumer Price Indexes from the OECD Stats at the basis year 2006.

I start by presenting the data on elections, then those on trade shock at the EU level and the ones used for the instrument. I subsequently present the data used to capture economic conditions.

A. Political preferences data

Data on political preferences constitute the dependent variables. There are three main categories, defined in this section: data on direct share each party gains at the district level, the median of the ideological positions of parties and the Centre Of Gravity (COG) of a district. The data are sourced by Colantone and Stanig (2018) from two datasets, the Global Election Database by Brancati (2016) and the Constituency-level election archive (CLEA, Kollman et al. (2016)). The data covers 76 lower-house elections over the period 1988-2007 in each district of the fifteen European countries. Thus, the dependent variables are always at the district-level.

The COG is the average of the policy positions of the competing parties weighted by their vote shares in the regions and measured as:

$$COG_{dt} = \frac{\sum_{l=1}^{n} p_{ldt} Score_{lt}}{\sum_{l=1}^{n} p_{ldt}} \qquad \text{(IV.1)}$$

where d indexes districts, l parties, and t years (elections). p_{ldt} is the vote share for party l in district d at time (election) t. Following the methodology proposed by Lowe et al. (2011), Colantone and Stanig (2018) measure political position of parties based on announcements in their Manifestos (data source is Volkens et al. (2020), Comparative Manifesto Project Database). The score of each party in each district is computed as follow:

$$Score_{lct} = log(0.5 + z_{lct}^{+}) - log(0.5 + z_{lct}^{-}) \qquad \text{(IV.2)}$$

where z_{lct}^{+} is the number of claims in a positive direction (e.g., nationalism), and z_{lct}^{-} in a negative direction. Colantone and Stanig (2018) provide three main scores. First, *Nationalism* is based on claims about the national way of life, traditional morality, law and order and multiculturalism. Second, *Net Autarky* includes claims about protectionism, internationalism and the EU. Third, *Nationalist Autarky* is a mix of the previous two, and it comprehends also human rights, democracy and constitutionalism. Furthermore, they compute scores on *Economic Nationalism*, i.e., economic left-right positioning based on claims about free market economy, welfare state, regulation, demand

management and planning.

As discussed by the authors, the median voter score is the ideological position of the (weighted) median party in the district. Parties are sorted from least- to most-nationalist (or from economic left to right). Then, Colantone and Stanig (2018) calculate the cumulative vote share of each party. The median voter score is the ideology of the party at which cumulative vote share reaches 50%, and corresponds to the party chosen by a (sincere, proximity-driven) median voter respectively on the nationalism or the left-right dimension. Thus, the centre of gravity (COG) is sensitive to the whole distribution of policy positions and vote shares. Citing the authors of the database, the COG "might increase, for instance, if an extreme party radicalizes further its position, even when the positions of all the other parties, and the vote shares of all parties, remain constant". On the other hand, they explain that the median voter score captures ideological shifts at the centre of the electorate: "it is unaffected by ideology changes at the extremes of the ideological distribution, and is less sensitive to small changes in the vote shares".

Finally, Colantone and Stanig (2018) compute the vote share for *radical right* parties, for *protectionist left* and *protectionist right*, which I use in the analysis. The authors explain that to compute them they classify parties according to the *Net Autarky* (inward vs outward orientation of a party) and the *economic conservativism* (i.e., right to left) positioning and then they calculate the cumulative vote share of each party by district.

B. Import shock

The empirical strategy exploits the rise in import competition in the manufacturing sector sparked by Chinese imports in European countries. It resort to this specific import shock for two main reasons. First, because it is a quantitatively large change. Second, it fits the theoretical model discussed above. In fact, country A (the relative *k-abundant* one) represents the European manufacturing sectors, while the country B (the relative *l-abundant* one) represents China and its imports (good y). The theoretical model suggests that in country A import competition reduces the losers' income in absence of proper redistribution. Further, its intensity induced significant adjustment costs in terms of job displacement and reduced earnings (e.g., Acemoglu et al. (2016) and Autor et al. (2013)).

Import shock is defined as in Colantone and Stanig (2018), who use the methodology developed by Autor et al. (2013) and reproposed in a similar context by Autor et al. (2020). The measure is a region specific indicator for the exposure to Chinese imports defined as follow:

$$\Delta IM_{crj} = \sum_j \frac{L_{rj(pre-sample)}}{L_{r(pre-sample)}} \times \frac{\Delta IMChina_{cjt}}{L_{cj(pre-sample)}} \tag{IV.3}$$

The variable ΔIM_{crj} is a weighted sum of the changes in imports per-worker across industries. To

see why, the second term of the sum, $\frac{\Delta IMChina_{cjt}}{L_{cj(pre-sample)}}$, is the change in real imports from China in country c in industry j over the last n years normalized by the number of workers in the same country and industry. The first term of the sum is the weight and it is necessary to capture the region-specific trade shock. It equals the ratio of the number of workers, denoted by L in region r and industry j, over the total number of workers in the region at the beginning of the sample period (1988). This term measures how much the region r was specialized in the sector j. It is taken in the pre-sample period to neutralize changes in specialization due to the import shock. Thus, the different regions are more or less exposed to the growth in Chinese imports depending on their ex-ante industry specialization. Finally, the lagged pre-employment levels attenuate the simultaneity bias that import shocks exposure may induce on contemporaneous political preferences.

Employment data used in equations IV.3 are mainly sourced from national sources (see Table A2 in the online appendix of Colantone and Stanig (2018)), while import data are downloaded from the Eurostat Comext dataset with the exception of Norway and Switzerland, the two NON-EU countries in the sample. The data for these two countries are sourced from the CEPII-BACI dataset.

C. Instrument

To understand how institutions modify the effect of the import competition on political preferences, the empirical strategy consists in regressing the political outcomes on the import shock variable and its interaction with a proxy for quality of institutions. Nonetheless, the import shock exposure is unlikely to be randomly allocated across regions, which may generate a bias in the estimates of the model parameters. As explained by Colantone and Stanig (2018), reverse causality could stem from the fact that some districts are better connected to mainstream government parties in each country, resulting in more protection for them (upward bias). Thus, an instrument is necessary.

Following Colantone and Stanig (2018), who borrow from Autor et al. (2020) and Autor et al. (2013), I instrument Chinese import to European countries with Chinese import to USA:

$$\Delta IM_{crt} = \sum_j \frac{L_{rj(pre-sample)}}{L_{r(pre-sample)}} \times \frac{\Delta IMUS_{jt}}{L_{cj(pre-sample)}} \qquad \text{(IV.4)}$$

Equation IV.4 differs from IV.3 in that the sectorial variation is now given by the US imports from China. The IV strategy identifies the Chinese productivity and trade-cost components of import growth in European countries if the common rise in Chinese imports both to EU and US is driven by China's rising comparative advantage and/or decreases in trade costs. As noted by Colantone and Stanig (2018), any correlation in demand or supply shocks across high income countries that impact impact imports demand from China both in USA and EU represents a threat to this Instrumental Variable (IV) strategy, possibly contaminating both the Ordinary Least Square (OLS) and IV

estimates. Following Colantone and Stanig (2018) the results are robust to the introduction of a completely different instrument that exploits time variation in bilateral exchange rates compute by the authors at the regional level.

The data for US import are sourced from the Center for International Data of UC Davis.[15]

D. Quality of institutions

To proxy quality of institutions, I use the Bayesian Corruption Indicator (BCI, Standaert (2015)). Standaert (2015) applies a new methodology based on the Bayesian Gibbs sampling algorithm for combining indicators of corruption, allowing for a better comparisons over time (see Standaert (2015) for details). The BCI index builds upon the Wordwide Governance Indicators (WGI, Kaufmann (2007)) methodology, and improves it. The WGI index of corruption measures *"the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests"*(Kaufmann (2007), p.4). This definition is close to the one of the theoretical parameter χ. An increase in χ corresponds to a higher capture of the political system of the winners of trades (the economic elites), and a worsening in the quality of institutions.

V. Descriptive statistics

Table V.1 shows the descriptive statistics of the variable of interest of Colantone and Stanig (2018)'s database, plus the variable "BCI". The standard deviation of the import shock variable is 0.113 rather than 0.133, the latter reported by the authors in the paper. The *pure replication* is verified, which suggests that the database is correct. The maximum for *protectionist right* shares is above

Table V.1: Descriptive statistics

	obs	mean	sd	min	max
Import shock	8181	0.059	0.113	-0.177	3.297
Instrument for shock	7938	0.851	2.051	-0.492	23.234
BCI	8847	26.786	9.308	8.813	47.545
Protectionist Right	9190	0.367	0.225	0.000	1.315
Protectionist Left	9190	0.078	0.123	0.000	0.755
Radical Right (Share)	9190	0.047	0.074	0.000	0.524
Nationalist Autarchy (M)	9190	0.195	0.900	-2.979	3.051
Nationalist Autarchy (COG)	9190	0.250	0.591	-2.144	3.050
Pro-trade Left	9190	0.245	0.249	0.000	0.924
N	9190				

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[15]Import flows are available at the 5-digit level of the SITC (Rev. 3) classification, which are mapped into 2-digit NACE Rev. 1.1. codes, which are further aggregated into subsections.

one (respectively 1.371 and 1.315). Since they are cumulative vote shares, they should be smaller than or equal one. When tabulating the variable, there is are two districts for which *protectionist right* shares is greater than one and I drop the values from the dataset.

VI. Identification Strategy

Following the empirical strategy of Colantone and Stanig (2018), I model here the occurrence of the vote/ideological positions of parties in a district as a function of the import shock exposure. I however interact the import shock with institutions (BCI index). The *regression model* is:

$$PO_{cdt} = \beta_0 + \beta_1 \Delta IM_{cr(d)t} + \beta_2 \, BCI_{ct} \, \Delta IM_{cr(d)t} + f_{ct} + \epsilon_{cdt} \qquad \text{(VI.1)}$$

where c refers to country, d to district and t to time. PO_{cdt} is one of the district-level summaries defined above. The function $r()$ maps district d to its $NUTS$-2 region r. The f_{ct} are country-year fixed effects, which account for any unobservable characteristic across countries and time (election). The variable BCI_{ct} captures the change in institutions, where an increase in this index correspond to a higher capture of the political system from the elites. Without the interaction with BCI_{ct}, we have the Colantone and Stanig (2018) specification. Again, the interaction captures how variations in institutions modify the impact of import shocks on political outcome. Further, notice that the country-year fixed effect absorbs the $E(PO|\Delta IM = 0, BCI_{ct} \neq 0)$, i.e., the expected political outcome at positive growth and at *zero* changes in import.

As I condition on country-year (election) fixed effects, parameter estimates capture the average (across countries) effect of the explanatory variables on the differential change in vote across districts in the same country.[16] The coefficient β_1 captures the effects of trade shocks on vote for P party at *zero* BCI index (no political power). According to the theory, this coefficient should be negative: since trade increases the pie, in a full democracy redistribution should compensate losers, and should vote less for protectionist parties. The coefficient β_2 measures the impact of import chock at different level of political power. In other words, $\beta_2 = \frac{\partial PO}{\partial \Delta IM \, \partial BCI}$, i.e., how a 1 s.d. change in BCI index affects the impact of import shock on the share differential of PO across districts. According to the theory, electoral districts in countries with worse institutions should ask more protection compared to electoral districts in countries with better institutions, once exposed to the same import shock. Then I expect $\beta_2 > 0$. This would confirm the predictions of theorem 2: the effect of trade on demand for protection is conditional on the quality of institutions.

To account for a possible correlation across districts within the same industrial region, all specifications have standard errors clustered at the *NUTS-2* level. The clustering control for potential

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[16]More precisely, the parameter captures the average effect across countries of the average effects of the explanatory variables across districts in the same country on the differential change in vote between districts in the same country.

correlation due for example to common industrial shocks affecting all the districts in a region, thus inflating/deflating the standard errors. Further, *NUTS-2* clusters account for auto-correlation in the error term within region and over time, since imports are likely to be auto-correlated over time and not only spatially. Regressions exploit across country-year variation in country level variables, since the dependent variables are at district-level. Its mean and s.d. at $NUTS$-2 represent the average of the districts contained in the $NUTS$-2 (unless a 1:1 matching between the two).

A possible additional concern with the model VI.1 is that the BCI index has a direct effect which is likely to be endogenous, for instance because changes in institutions may be the outcome of policies that affect political outcomes, or because political outcomes themselves may directly affect institutions. This direct effect is handled with the country-year fixed effects, which eliminate any source of bias due to time-invariant unobserved characteristics of countries that may affect both institutions and political outcomes. Further, I introduce the BCI index at the country level, not local one, which may be less endogenous to political outcome at district/regional level. Second, I instrument the interaction. I assume that this endogeneity bias do not vary across regions with different US import shocks. The fact that I instrument the interaction term with US Import shocks ensures that the variation in BCI index is exogenous across municipalities. Assuming US import shocks are "randomly" assigned or simply exogenous to local political outcomes makes such variation in BCI index across regions not biased anymore.

To deal with these concerns, I instrument Chinese import shock to European countries with Chinese import shock to US, resulting in equation IV.4 above. The first-stage equations are:

$$\Delta IM^{eu}_{crt} = \delta_0 + \delta_1 \ \Delta IM^{us}_{crt} + \delta_2 \ BCI_{ct} \ \Delta IM^{us}_{crt} + f_{ct} + \epsilon_{cdt} \tag{VI.2}$$

$$BCI_{crt} \ \Delta IM^{eu}_{crt} = \delta_0 + \delta_1 \ \Delta IM^{us}_{crt} + \delta_2 \ BCI_{ct} \ \Delta IM^{us}_{crt} + f_{ct} + \epsilon_{cdt} \tag{VI.3}$$

Consistency of the 2SLS estimates relies on the assumption that, other than because of differences in Chinese import to European countries and its differential effect over the business cycle, the vote for P parties does not vary differentially over time across districts depending on average import to US intensity (i.e., it is uncorrelated with any other determinants of the dependent variables). As noted by Colantone and Stanig (2018), a possible concern with the identification strategy is that correlated demand and supply shocks across countries may impact Chinese imports both to US and other developed countries and at the same time affecting electoral outcome. The use of different instruments (such as restrictions on the Chinese imports to US, Chinese imports to other developed countries and a completely different one, i.e., time variation in bilateral exchange rates) reassure the validity of the results, as tested in the different robustness checks below.

VII. Empirical results

In this section, I present some *preliminary* empirical evidence of the theoretical results. I first present the baseline results of equation VI.1. Second, I report the Marginal Effects (MEs) of the import shock along the BCI index to help interpretation of results. Third, I I control for country level correlates with GDP.[17]

A. Baseline results

Table VII.1 reports the first-stage of the model VI.1. Estimates in column (1) correspond to equation VI.2 and show that US and EU import are correlated. Similarly, estimates in column (2) implies that the interaction term is significantly correlated with the endogenous interaction. In the table VII.1 , I also report the Sanderson and Windmeijer (2016) conditional first stage F-statistics for the validity of the instruments in model with multiple endogenous variables. Also, since the Stock-Yogo 10 percent critical value for a perfectly identified model with two endogenous variables is 7.03, I can reject that the instruments are weak.

Table VII.1: IV First-Stage

	(1) ΔIM_t^{EU}	(2) $BCI_t \times \Delta IM_t^{EU}$
ΔIM_t^{US}	0.0173***	0.0891
	(0.0047)	(0.1212)
$BCI_t \times \Delta IM_t^{US}$	0.0002	0.0179**
	(.0002)	(0.0065)
SW F - ΔIM_t^{US}	46.64	-
SW F - $\Delta BCI_t \, \Delta IM_t^{US}$	-	33.26
Observations	7687	7687

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table VII.2 shows the baseline results of the second stage of equation VI.1. The coefficient in column (1) shows that the import shock decreases the share won by the *protectionist right* decreases in country with good institutions, i.e., $\beta_1 < 0$. However, as institutions worsen, the share won increases , i.e., $\beta_2 > 0$: a 1 s.d. increase in Chinese import shock reduces the vote share of *protectionist right* parties by 6.9 p.p. (-0.607×0.113) across districts in the same country at *zero* level of BCI index (good institutions), while its impact reduces by 0.54 p.p. (0.0475×0.113) as BCI

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[17]Following Colantone and Stanig (2018), I also run robustness checks in which I control for different measures of trade openness and test the IV exclusion restriction. Not reported in this version, but available upon demand.

index increases by 1 s.d., i.e., 9.308. Considering that the mean share of *protectionist right* party in a district is 36.7%, with a standard deviation of 7%, a 0.54 p.p. increases in such vote share across districts when BCI increases by one standard deviation is of a quite important magnitude. Although not statistically significant, the sign for protectionist left share are in line with the theory, although of a smaller magnitude (column 2).

Similar trends are found for the share of radical right parties, with larger and significant coefficients, and for the *nationalist autarky* positioning differential across districts (median and COG). The import shock decreases the share of the radical parties, and the support for nationalism and autarky policies proposed by the median party (and COG positioning) in country were institutions are good. However, electoaral districts in country with worse BCI index experience more vote for radical parties, and the positioning of the median and COG party of those districts moves more toward nationalist and autarky ideological positioning.

Finally, I report in column (6) results for the share won by pro-trade left parties. As expected, those electoral districts exposed to trade but in country with good insituions experience more support for those parties. As BCI index decreases, electoral ditricts in such country vote more against pro-trade left parties.

Table VII.2: Baseline results

	(1) Protect. Right (S)	(2) Protect. Left (S)	(3) Radical Right (S)	(4) National. aut- arky (M)	(5) National. aut- arky (COG)	(6) Pro-trade left (S)
ΔIM_t	-0.110	-0.323	-1.128**	-6.074	0.556	0.389$^+$
	(0.449)	(0.267)	(0.437)	(4.090)	(1.411)	(0.209)
$BCI_t \times \Delta IM_t$	0.0337	0.0102	0.0674**	0.418$^+$	0.0587	-0.0327**
	(0.0211)	(0.0116)	(0.0233)	(0.223)	(0.0708)	(0.0102)
Observations	7687	7687	7687	7687	7687	7687

Standard errors in parentheses
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note that I tested a model with $NUTS$-2 fixed effects additionally to the country-year ones. When using both country-year and region fixed effects, I apply a double demeaning of all variables in the regression model. Thus, I exploit variation within country-years, and variation within districts across years (elections) in each country-year. Significance is lost throughout all the specifications, also when applying it to Colantone and Stanig (2018) specification, who do not report it in their paper.

B. Marginal effects

To help interpretation of results, table VII.3 below reports the Marginal Effects (MEs) of the import shock on the dependent variables at different BCI levels. Taking partial derivatives of equation VI.1, the MEs are:

$$\frac{\partial PO}{\partial \Delta IM} = \beta_1 + \beta_2 BCI \tag{VII.1}$$

Figure VII.1 offers a visual representation of the marginal effects for the six dependent variables. On the x-axis it reports BCI level distanced by one s.d. (9.308), while on the y-axis there are the MEs. The red horizontal line represents the null effects, while the shaded areas are 95% confidence intervals. For five of the variables in the figure, the import shock decreases support for parties with a nationalist or autarky positioning and for protectionist right parties. I also report the MEs

Figure VII.1: Marginal effects
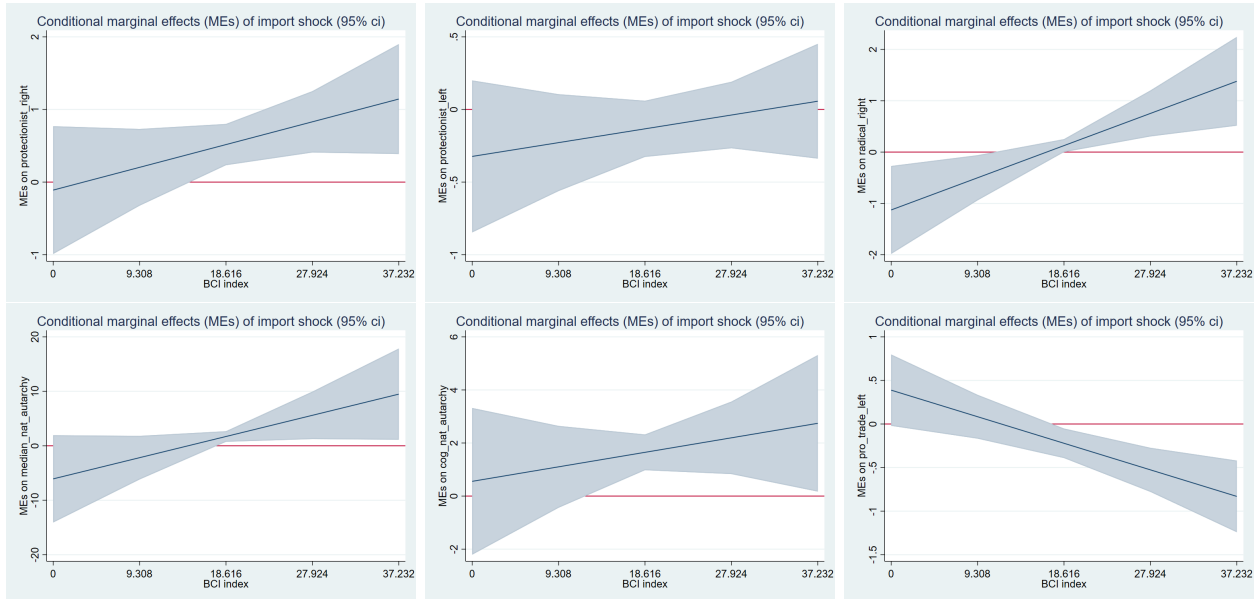
in table VII.3, where again the BCI levels are distanced by 1 s.d (9.308), thus MEs should be interpreted as the impact of a 1 s.d. increase in the Chinese import shock on the share/positioning across districts in the same country at different BCI level. Further, in row 1 of table VII.3, I report the MEs at *zero* BCI level, which correspond to the β_1 coefficient of equation VI.1, as table VII.2 shows.

The first five columns show that for low level of the BCI index, the import shock decreases demand for protection. However, there is a leve of the BCI index such that the effect of import shock starts to increase demand for protection. I interpret this as some preliminary evidence that the effect pf trade is conditional on the type of institutions.

Table VII.3: Marginal effects

	(1) Protect. Right (S)	(2) Protect. Left (S)	(3) Radical Right (S)	(4) National. aut- arky (M)	(5) National. aut- arky (COG)	(6) Pro-trade left (S)
1. BCI = 0	-0.110	-0.323	-1.128**	-6.074	0.556	0.389[+]
	(0.449)	(0.267)	(0.437)	(4.090)	(1.411)	(0.209)
1. BCI= 9.803	0.203	-0.228	-0.501*	-2.184	1.102	0.0837
	(0.270)	(0.170)	(0.225)	(2.043)	(0.787)	(0.128)
3. BCI = 19.06	0.517***	-0.133	0.126[+]	1.706***	1.649***	-0.221*
	(0.145)	(0.0987)	(0.0645)	(0.497)	(0.344)	(0.0865)
4. BCI = 29.41	0.830***	-0.0381	0.753***	5.596*	2.196**	-0.526***
	(0.216)	(0.117)	(0.229)	(2.224)	(0.697)	(0.129)
5. BCI = 39.21	1.144**	0.0569	1.380**	9.486*	2.742*	-0.831***
	(0.386)	(0.202)	(0.441)	(4.274)	(1.313)	(0.210)
N	7687	7687	7687	7687	7687	7687

Standard errors in parentheses

[+] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

VIII. Conclusion

In this paper, I offer an explanation to why people vote for populism, and in particular for protectionism. I develop a theory that explains the effect of trade on demand for protection, and how it is conditional on political power, i.e., the quality of political institutions. When direct redistribution does not compensate losers of trade due to political power, the losers may prefer the policy of the protectionist party, that offers indirect redistribution through trade protectionism. A key contribution is to offer a theory explaining that the effect of trade is conditional on the level of political power of capitalists in a country. Using a database built by Colantone and Stanig (2018) from different sources for fifteen European countries focusing on a particular import shock, the one from China, between the 1988 and 2007. Colantone and Stanig (2018), as most of the recent empirical literature, find that such shock increased the popularity of right wing and protectionist party. Interestingly, I find that China import shocks decreases the vote share of protectionist parties in electoral districts located in country with less political power. However, electoral districts equally expose the china shock but in country with higher political power experience an increase in the vote-share won by protectionist parties. This is in line with the theoretical findings.

The paper offers a different theoretical explanation from the one advanced by identity theory (Grossman (1991) and Gennaioli and Tabellini (2019)). Here, the mechanism seems closer to the one of revolt. In dictatorship, citizens trade-off the income (and lives) destruction resulting from a revolution, with the potential gains in case of victory. If the share of average income gained by revolting, net of the fraction of resources destroyed in the conflict, is higher than income under the dedicator-ship, people revolt. Revolting is costly since it destroys resources and lives. In democracy, sustained deterioration in the functioning of political institutions deteriorates post-tax income of losers, who can potentially benefit from the gain of trade. Such deterioration decreases

the opportunity-cost of voting for populist parties. However, to vote for these parties has an aggregate cost: it decreases total income in the economy (here the shortsightedness of populists' policies).

I further aim to explore implications of growth theoretically. Using the CES production function I aim at study skilled-biased technological change, and its impact on trade, in presence of institutional frictions. This would extend the capability prediction of the model on the effect of technological shock on political preferences, also discussed by the literature (Rodrik (2020)).

A clear limitation is the proxy of institutional quality proposed, and the empirical strategy. This clearly needs to be improved.

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A. Theoretical appendix

A. Proof that trade increases total income

(Real) total income is:

$$\frac{I}{P} = \frac{wL_1 + rK_1}{\frac{\theta^{\alpha(\beta_x - \beta_y)}}{\alpha^\alpha(1-\alpha)^{1-\alpha}}}$$

$$= \frac{\frac{1}{\theta^{\beta_y}}L_1 + \theta^{\beta_y}K_1}{\frac{\theta^{\alpha(\beta_x - \beta_y)}}{\alpha^\alpha(1-\alpha)^{1-\alpha}}}$$

Taking the derivative with respect to trade, θ:

$$\begin{aligned}
\frac{\partial I}{\partial \theta} &= -\frac{\beta_y L_1}{\theta^{\beta_y + 1}} + \frac{(1-\beta_y)K_1}{\theta^{\beta_y}} \\
&= -\beta_y \left(\frac{L_1}{\theta^{\beta_y + 1}} + \frac{K_1}{\theta^{\beta_y}} \right) + \frac{K_1}{\theta^{\beta_y}} \\
&= \frac{1}{\theta}\left(-\beta_y I + rK_1 \right) \\
&= \frac{I}{\theta}\left(-\beta_y + \gamma \right)
\end{aligned} \tag{A.1}$$

which is larger than 0 if $\beta_y < \gamma$, with $\gamma = \frac{rK_1}{I} = \beta_x\alpha + (1-\alpha)\beta_y$, where β_x is the value added of capital in sector X_1. It is straightforward to prove that it always holds in a capital abundant country since $\beta_x > \beta_y$.

Then, for real income is:

$$\begin{aligned}
\frac{\partial\left(\frac{I}{P}\right)}{\partial\theta} &= \frac{\frac{\partial I}{\partial\theta}P - \frac{\partial P}{\partial\theta}I}{P^2} \\
&= \frac{1}{\theta}\frac{(-\beta_y I + rK_1) - \frac{\alpha(\beta_x - \beta_y)}{\theta}P}{P^2} \\
&= \frac{1}{\theta}\frac{(-\beta_y I + rK_1 - P\alpha\beta_x + \alpha\beta_y P)}{P^2} \\
&= \frac{1}{\theta}\frac{\beta_y(\alpha P - I) + rK_1 - P\alpha\beta_x}{P^2} \\
&= \frac{I}{\theta}\frac{\beta_y\left(\frac{\alpha P}{I} - 1\right) + \gamma - \frac{\alpha P}{I}\beta_x}{P^2} \\
&= \frac{I}{\theta}\frac{\beta_y\left(\frac{\alpha P}{I} - 1\right) + \beta_x\alpha + (1-\alpha)\beta_y - \frac{\alpha P}{I}\beta_x}{P^2} \\
&= \frac{\frac{\alpha I}{\theta}\left(1 - \frac{P}{I}\right)(\beta_x - \beta_y)}{P^2}
\end{aligned} \tag{A.2}$$

which is positive since $\beta_x > \beta_y$.

B. Tax-rates proposed by parties

Post-tax income of group $\hat{y} = \hat{w}, \hat{r}$ is:

$$\hat{y} = (1 - \tau)y + \left(\tau - \frac{\tau^2}{2}\right)I$$

Political parties maximize the following weighted sum with τ:

$$\max_{\tau^j \in [0,1]} (1 - \chi)L_1 \hat{w}^j + \chi K_1 \, \hat{r}^j \tag{B.1}$$

The F.O.C. is:

$$-(1 - \chi)L_1 w + (1 - \chi)L_1(1 - \tau)I \chi K_1 r + \chi K_1 (1 - \tau)I = 0$$

$$I(1 - \tau)[(1 - \chi)L_1 + \chi K_1] = [(1 - \chi)L_1 + \theta \chi K_1]w$$

$$\tau(\chi, \theta) = 1 - \frac{w}{I} \times A(\chi, \theta) \tag{B.2}$$

where $A(\chi, \theta) \equiv \frac{L_1(1-\chi)+\theta K_1 \chi}{L_1(1-\chi)+K_1 \chi} > 1$.

C. Post-tax income

I first rewrite real post-tax income of worker under any regime, and in presence of political power χ as:

$$\tilde{w}(\chi, \theta) = \frac{1}{P}(1 - \tau(\chi))w + \left(\tau(\chi) - \frac{\tau(\chi)^2}{2}\right)I$$

where $\tau(\chi) = 1 - \frac{w}{I} \times A(\chi, \theta)$ (see C). I substitute and rearrange:

$$= \frac{1}{P}\left[\frac{w}{I}A(\chi, \theta)w + \left(\frac{I - wA(\chi, \theta)}{I}\right)\left(1 - \frac{I - wA(\chi, \theta)}{2I}\right)I\right]$$

$$= \frac{1}{P}\left[\frac{w^2}{I}A(\chi, \theta) + (I - wA(\chi, \theta))\left(1 - \frac{I + wA(\chi, \theta)}{2I}\right)\right]$$

$$= \frac{1}{P}\left[\frac{w^2}{I}A(\chi, \theta) + \left(\frac{I^2 - w^2 A(\chi, \theta)^2}{2I}\right)\right]$$

$$= \frac{1}{P}\left(\frac{2w^2 A(\chi, \theta) + I^2 - w^2 A(\chi, \theta)^2}{2I}\right)$$

$$= \frac{1}{P}\left(\frac{w^2 A(\chi, \theta)(2 - A(\chi, \theta)) + I^2}{2I}\right)$$

$$= \frac{1}{2P}\left(\frac{w^2}{I}\Upsilon(\chi, \theta) + I\right) \tag{C.1}$$

where $\Upsilon(\chi,\theta) = A(\chi,\theta)(2 - A(\chi,\theta))$.

D. Properties of $\Upsilon(\chi,\theta)$

$\Upsilon(\chi,\theta)$ can be rewritten as:

$$
\begin{aligned}
\Upsilon(\chi,\theta) &= A(\chi,\theta)(2 - A(\chi,\theta)) \\
&= \frac{L_1(1-\chi) + \theta K_1\chi}{L_1(1-\chi) + K_1\chi}\left(2 - \frac{L_1(1-\chi) + \theta K_1\chi}{L_1(1-\chi) + K_1\chi}\right) \\
&= \frac{L_1(1-\chi) + \theta K_1\chi}{L_1(1-\chi) + K_1\chi}\left(\frac{2L_1(1-\chi) + 2\chi K_1 - L_1(1-\chi) - \theta K_1\chi}{L_1(1-\chi) + K_1\chi}\right) \\
&= \frac{L_1(1-\chi) + \theta K_1\chi}{L_1(1-\chi) + K_1\chi}\left(\frac{L_1(1-\chi) - K_1\chi(\theta - 2)}{L_1(1-\chi) + K_1\chi}\right) \\
&= \frac{L_1^2(1-\chi)^2 - L_1(1-\chi)K_1\chi(\theta - 2) + 2L_1(1-\chi)\chi K_1 + L_1(1-\chi)K_1\chi(\theta - 2) - \theta K_1^2\chi^2(\theta - 2)}{[L_1(1-\chi) + K_1\chi]^2} \\
&= \frac{L_1(1-\chi)\left[L_1(1-\chi) + 2\chi K_1\right] - K_1^2\chi^2\theta(\theta - 2)}{[L_1(1-\chi) + K_1\chi]^2}
\end{aligned}
$$

Then:

a. $\Upsilon(\chi = 0,\theta) = 1$

b. $\Upsilon(\chi = 1/2,\theta) = \frac{L_1(L_1 + 2K_1) - K_1^2\theta(\theta - 2)}{(L_1 + K_1)^2}$

c. The derivative with respect to political power χ is:

$$
\begin{aligned}
\frac{\partial \Upsilon(\chi,\theta)}{\partial \chi} &= \frac{\partial A(\chi,\theta)}{\partial \chi}[2 - A(\chi,\theta)] - A(\chi,\theta)\frac{\partial A(\chi,\theta)}{\partial \chi} \\
&= \frac{\partial A(\chi,\theta)}{\partial \chi}2[1 - A(\chi,\theta)] \\
&= -\frac{2K_1^2\chi(\theta - 1)^2}{L_1^2(1 - \chi + \chi K_1)^3} < 0
\end{aligned}
$$

d. The derivative with trade θ:

$$
\frac{\partial \Upsilon(\chi,\theta)}{\partial \theta} = -\frac{2\chi^2 K_1^2(\theta - 1)}{L_1^2(1 - \chi + \chi K_1)^2} < 0
$$

E. Decomposing the effect of trade

Taking the derivative of $\tilde{w}(\chi,\theta) = \frac{1}{2P}\left(\frac{w^2}{I}\Upsilon(\chi,\theta) + I\right)$ with respect to trade θ:

$$
\frac{\partial \tilde{w}(\chi,\theta)}{\partial \theta} = \frac{\frac{\partial \hat{w}}{\partial \theta}P - \frac{\partial P}{\partial \theta}\hat{w}}{P^2}
$$

$$= \frac{1}{2P^2} \left[\frac{\partial \left(\frac{w^2}{I} \right)}{\partial \theta} P\Upsilon(\chi, \theta) + \frac{\partial I}{\partial \theta} P + \frac{w^2 P}{I} \frac{\partial \Upsilon(\chi, \theta)}{\partial \theta} - \frac{\partial P}{\partial \theta} \hat{w} \right]$$

$$= \frac{1}{2P^2} \left[\frac{\frac{\partial w^2}{\partial \theta} IP\Upsilon(\chi, \theta) - \frac{\partial I}{\partial \theta} w^2 P\Upsilon(\chi, \theta)}{I^2} + \frac{\partial I}{\partial \theta} P + \frac{w^2 P}{I} \frac{\partial \Upsilon(\chi, \theta)}{\partial \theta} - \frac{\partial P}{\partial \theta} \hat{w} \right]$$

$$= \frac{1}{2P^2} \left[\frac{\partial w^2}{\partial \theta} IP\Upsilon(\chi, \theta) - \frac{\partial I}{\partial \theta} w^2 P\Upsilon(\chi, \theta) + I^2 P \frac{\partial I}{\partial \theta} + w^2 IP \frac{\partial \Upsilon(\chi, \theta)}{\partial \theta} - \frac{\partial P}{\partial \theta} \hat{w} \right]$$

$$= \frac{1}{2P} \left\{ \frac{\partial w^2}{\partial \theta} I\Upsilon(\chi, \theta) + \frac{\partial I}{\partial \theta} \left[I^2 - w^2 \Upsilon(\chi, \theta) \right] + \frac{\partial \Upsilon(\chi, \theta)}{\partial \theta} w^2 I - \frac{\partial P}{\partial \theta} \tilde{w} \right\}$$

F.1 Monotonicity

To proof that the fraction of voters π_P is monotononically increasing in χ, I exploit the normalization of the population to 1 and rewrite post-tax income as:

$$\tilde{w} = \frac{1}{P} \left[[1 - \tau(\chi)]w + \left(\tau(\chi) - \frac{\tau(\chi)^2}{2} \right) I \right]$$

$$= \frac{1}{P} \left[[1 - \tau(\chi)]w + \left(\tau(\chi) - \frac{\tau(\chi)^2}{2} \right) I \right]$$

$$= \frac{1}{P} \left[w - \tau(\chi)w + \left(\tau(\chi) - \frac{\tau(\chi)^2}{2} \right) I \right]$$

$$= \frac{1}{P} \left\{ w + w\tau(\chi) \left[-1 + \left(1 - \frac{\tau(\chi)}{2} \right) (1 + K_1(\theta - 1)) \right] \right\}$$

$$= \frac{1}{P} \left\{ w + w\tau(\chi) \left\{ -1 + \left(1 - \frac{(1 - 2\chi)K_1 L_1(\theta - 1)}{2(1 - \chi - K_1 + 2\chi K_1)[1 + K_1(\theta - 1)]} \right) [1 + K_1(\theta - 1)] \right\} \right\}$$

$$= \frac{1}{P} \left[w + w\tau(\chi) \left(\frac{-2(1 - \chi - K_1 + 2\chi K_1) + 2(1 - \chi - K_1 + 2\chi K_1)[1 + K_1(\theta - 1)] - (1 - 2\chi)K_1 L_1(\theta - 1)}{2(1 - \chi - K_1 + 2\chi K_1)} \right) \right]$$

$$= \frac{1}{P} \left[w + w\tau(\chi) \left(\frac{2(1 - \chi - K_1 + 2\chi K_1)K_1(\theta - 1) - (1 - 2\chi)K_1 L_1(\theta - 1)}{2(1 - \chi - K_1 + 2\chi K_1)} \right) \right]$$

$$= \frac{1}{P} \left(w + w \frac{(1 - 2\chi)K_1 L_1(\theta - 1)}{(1 - \chi - K_1 + 2\chi K_1)[1 + K_1(\theta - 1)]} \frac{K_1(\theta - 1)\left(2(1 - \chi - K_1 + 2\chi K_1) - (1 - 2\chi) \right)}{2(1 - \chi - K_1 + 2\chi K_1)} \right)$$

$$= \frac{\alpha^\alpha (1 - \alpha)^\alpha}{\theta\gamma} \left(1 + \frac{K_1^2(\theta - 1)^2}{2[1 + K_1(\theta - 1)]} B(\chi) \right) \tag{F.1}$$

where $B(\chi) = \frac{L_1(1 - 2\chi)[1 - K_1(1 - 2\chi)]}{(1 - \chi - K_1 + 2\chi K_1)^2}$.

To show that the fraction π_P is monotonically increasing in χ, it suffices to proof that the function $f(\chi) := \hat{w}_A^P(\chi, \theta^A) - \hat{w}_{FT}^M(\chi, \theta)$ is increasing in χ:

I take the derivative of with respect to χ:

$$\frac{\partial f(\chi)}{\partial \chi} = \frac{\partial B(\chi)}{\partial \chi}\left[\frac{\alpha^\alpha(1-\alpha)^\alpha}{(\theta^A)^\gamma}\left(1 + \frac{K_1^2(\theta^A-1)^2}{2[1+K_1(\theta^A-1)]}B(\chi)\right) - \frac{\alpha^\alpha(1-\alpha)^\alpha}{(\theta^{FT})^\gamma}\left(1 + \frac{K_1^2(\theta^{FT}-1)^2}{2[1+K_1(\theta^{FT}-1)]}B(\chi)\right)\right]$$

First, it is straightforward to prove that $\frac{\partial B(\chi)}{\partial \chi} = -\frac{2L_1\chi}{(1-\chi-K_1+2\chi K_1)^3} < 0$. Second, the square bracket terms it is positive if the condition in the lemma holds. The bracket-terms in fact compares the redistributive power of the tax rate under the two regimes. In the next paragraph, I show which is the condition for which it holds.

F.2   Existence

For the equilibrium to exist, $f(\chi,\theta) := \tilde{w}_A^P(\chi,\theta^A) - \tilde{w}_{FT}^M(\chi,\theta)$ has to be negative at $\chi = 0$ and positive at $\chi = \frac{1}{2}$. I take the derivative with respect to θ, recalling that post-tax incomes under free trade are the only one affected by changes in trade θ. First, I rewrite here post-tax income:

$$\tilde{w}(\chi,\theta) = \frac{1}{2}\left(\frac{w^2}{IP}\Upsilon(\chi,\theta) + \frac{I}{P}\right)$$

The derivative of real post-tax income with respect to trade is:

$$\frac{\partial \tilde{w}}{\partial \theta} = \frac{1}{2}\left\{\frac{\partial\left(\frac{w^2}{IP}\right)}{\partial\theta}\Upsilon(\chi,\theta) + \frac{w^2}{IP}\frac{\partial\Upsilon(\chi,\theta)}{\partial\theta} + \frac{\partial\left(\frac{I}{P}\right)}{\partial\theta}\right\}$$

$$= \frac{1}{2}\left\{\frac{\frac{\partial w^2}{\partial\theta}IP - w^2\left(\frac{\partial I}{\partial\theta}P + \frac{\partial P}{\partial\theta}I\right)}{I^2P^2}\Upsilon(\chi,\theta) + \frac{w^2}{IP}\frac{\partial\Upsilon(\chi,\theta)}{\partial\theta} + \frac{\partial\left(\frac{I}{P}\right)}{\partial\theta}\right\}$$

$$= \frac{1}{2}\left\{\frac{\Upsilon(\chi,\theta)}{I^2P^2}\left[-\frac{2\beta_y w^2}{\theta}IP - \frac{w^2PI(\beta_y+\gamma)}{\theta} - \frac{w^2IP\alpha(\beta_x-\beta_y)}{\theta}\right] + \frac{w^2}{IP}\frac{\partial\Upsilon(\chi,\theta)}{\partial\theta} + \frac{\partial\left(\frac{I}{P}\right)}{\partial\theta}\right\}$$

$$= \frac{1}{2}\left\{-\frac{2\Upsilon(\chi,\theta)w^2}{\theta IP}(\beta_x\alpha + \beta_y(1-\alpha)) + \frac{w^2}{IP}\frac{\partial\Upsilon(\chi,\theta)}{\partial\theta} + \frac{\frac{\alpha I}{\theta}\left(1-\frac{P}{I}\right)(\beta_x-\beta_y)}{P^2}\right\}$$

$$= \frac{1}{2P}\left\{-\beta_y\left[\frac{(1-\alpha)2w^2\Upsilon(\chi,\theta)}{\theta I} + \frac{I\alpha\left(1-\frac{P}{I}\right)}{\theta P}\right] + \beta_x\left[-\frac{\alpha 2w^2\Upsilon(\chi,\theta)}{\theta I} + \frac{I\alpha\left(1-\frac{P}{I}\right)}{\theta P}\right] + \frac{w^2}{IP}\frac{\partial\Upsilon(\chi,\theta)}{\partial\theta}\right\}$$

Then, the $\frac{\partial f(\chi)}{\partial\theta} = -\frac{\partial\hat{w}_{FT}^M(\chi,\theta)}{\partial\theta}$ is increasing in θ if:

$$\beta_y < \beta_x\left(\frac{\alpha\frac{I}{P}\left(\frac{I}{P}-1\right) - 2\frac{w^2}{P}\alpha\Upsilon(\chi,\theta)}{\alpha\frac{I}{P}\left(\frac{I}{P}-1\right) + 2\frac{w^2}{P}(1-\alpha)\Upsilon(\chi,\theta)}\right) + \frac{\partial\Upsilon(\chi,\theta)}{\partial\theta}\frac{w^2}{I} \tag{F.2}$$

The bracket term (which is smaller than 1) implies that real wage increase in trade if gains from trade are sufficiently high: a bit more capital should be allocated in the X_1 sector ("pie effect" prevails on "nominal wage effect"). The second term is the "captured tax rate effect". As political

power increases, the tax rate decreases and workers beenfit less from the increase of the pie. Thus, given chi, even more capital needs to be allocated in the X_1 sector for them to benefit from trade.

Notice that condition F.2 when $\chi = 0$ is equal to:

$$\beta_y < \beta_x \left(\frac{\alpha I(I-P) - 2w^2\alpha P}{\alpha I(I-P) + 2w^2(1-\alpha)P} \right) \tag{F.3}$$

Further, when $\chi = \frac{1}{2}$, $\tilde{w} = \frac{w}{P}$, and the real nominal wage is always decreasing in θ.

Finally, notice that:

$$\frac{\partial \Upsilon(\chi, \theta)}{\partial \theta \partial \chi} = -\frac{4K_1^2 \chi(\theta - 1)}{(1 - \chi + \chi K_1)^2} < 0 \tag{F.4}$$

The last condition implies that the effect of trade along χ is monotonic, and pass from negative to positive. This intuition is key for the proof of the next theorem.

G. Proof of theorem 2

1. In a full democracy ($\chi = 0$), losers are better off under free trade, i.e., $\frac{\partial \pi_P}{\partial \theta} < 0$, if $\beta_y < \beta_x \left(\frac{\alpha I(I-P) - 2w^2\alpha P}{\alpha I(I-P) + 2w^2(1-\alpha)P} \right)$ (see F.2).

2. In complete power ($\chi = \frac{1}{2}$), losers are better off under Autarky, i.e., $\frac{\partial \pi_P}{\partial \theta} > 0$ (see F.2).

3. Effect of trade is monotonic in political power, i.e., $\frac{\partial^2 \pi_P}{\partial \theta \partial \chi} > 0$ (see F.4).

H. Proof of Proposition 1

To prove proposition 1, I report here the post-tax income rewritten using the normalization, i.e., equation F.1:

$$\hat{w}_{FT}^M(\chi, \theta) = \frac{1}{\theta^{\beta_y}} \left(1 + \frac{K_1^2(\theta - 1)^2}{2[1 + K_1(\theta - 1)]} B(\chi) \right)$$

Now I define the threshold value $\bar{\chi}$ such that the function $\hat{w}_A^M(\bar{\chi}, \theta) - \hat{w}_{FT}^M(\bar{\chi}, \theta) = 0$:

$$\frac{1}{(\theta^A)^{\beta_y}} \left(1 + \frac{K_1^2((\theta^A) - 1)^2}{2[1 + K_1((\theta^A) - 1)]} B(\bar{\chi}) \right) - \frac{1}{(\theta^{FT})^{\beta_y}} \left(1 + \frac{K_1^2((\theta^{FT}) - 1)^2}{2[1 + K_1((\theta^{FT}) - 1)]} B(\bar{\chi}) \right)$$

$$B(\bar{\chi}) = \frac{w^A - w^{FT}}{\frac{w^{FT} K_1^2(\theta^{FT}-1)^2}{2[1+K_1(\theta^{FT}-1)]} - \frac{w^A K_1^2(\theta^A-1)^2}{2[1+K_1(\theta^A-1)]}} \tag{H.1}$$

The right-hand side of H.1 is the ratio of the change ion nominal wage (the pre-tax wage effect),

and the pie effect in a full democracy. Since we know from F that the pie effect prevails on the pre-tax wage effect if $\beta_y < \gamma\left(\frac{I^2 - w^2}{I^2 + w^2}\right)$, it implies that the Right hand side is decreasing in θ.

Further, it is easy tio shoiw that $\frac{\partial B(\chi)}{\partial \chi} < 0$. Thus, as $\uparrow \theta$ then $\uparrow \bar{\chi}$.

I. The Heckscher and Ohlin model and the effect of the tariff

I.0.1 Autarky equilibrium values

The absolute equilibrium values are:

$$p_{xc}^* = \left(\frac{1}{\theta^A}\right)^{\beta_y - \beta_x} \frac{A_y}{A_x} \tag{I.0.1}$$

$$p_{yc}^* = 1 \tag{I.0.2}$$

$$w_c^* = \left(\frac{1}{\theta^A}\right)^{\beta_y} A_y \tag{I.0.3}$$

$$r_c^* = \left(\theta^A\right)^{1-\beta_y} A_y \tag{I.0.4}$$

$$X_c^* = \alpha L_c^{1-\beta_x} K_c^{\beta_x} \frac{(1+\phi)}{\phi^{\beta_x}} A_x \tag{I.0.5}$$

$$Y_c^* = (1-\alpha)L_c^{1-\beta_y} K_c^{\beta_y} \frac{(1+\phi)}{\phi^{\beta_y}} A_y \tag{I.0.6}$$

where $\phi = \frac{\beta_x \alpha + \beta_y (1-\alpha)}{1 - [\beta_x \alpha + \beta_y (1-\alpha)]}$ and $\theta^A = \frac{L_c}{K_c}\phi$, β_g is the cost share of good g, α parametrises preferences from a Cobb-Douglas (CD). A_y and A_x are TFP parameters coming from the CD production function. For sector X, this is: $X_c = A_x \left(\frac{K_c}{\beta_x}\right)^{\beta_x} \left(\frac{L_c}{1-\beta_x}\right)^{1-\beta_x}$ The relative values are:

$$p_i^* = \frac{p_{xc}}{p_{yc}} = \left(\theta^A\right)^{\beta_x - \beta_y} \frac{A_y}{A_x} \tag{I.0.7}$$

$$\rho_c^* = \frac{r_c}{w_c} = \theta^A \tag{I.0.8}$$

$$x_c^* = \frac{X_c}{Y_c} = \frac{\alpha}{(1-\alpha)} \left(\theta^A\right)^{\beta_y - \beta_x} \frac{A_x}{A_y} \tag{I.0.9}$$

I.0.2 FT equilibrium values

Solving the system using the same method as in autarky, and treating the two countries world as an integrated economy, I get the FT equilibrium values (denoted by $\star$):

$$p_x^{FT} = \left(\frac{1}{\theta}\right)^{\beta_y - \beta_x} \frac{A_y}{A_x} \tag{I.0.10}$$

$$p_y^{FT} = 1 \tag{I.0.11}$$

$$w^{FT} = \frac{1}{\theta^{\beta_y}} A_y \tag{I.0.12}$$

$$r^{FT} = (\theta)^{1-\beta_y} A_y \tag{I.0.13}$$

$$X^{FT} = \alpha \bar{L}^{1-\beta_x} \bar{K}^{\beta_x} \frac{(1+\phi)}{\phi^{\beta_x}} A_x \tag{I.0.14}$$

$$Y^{FT} = (1-\alpha) \bar{L}^{1-\beta_y} \bar{K}^{\beta_y} \frac{(1+\phi)}{\phi^{\beta_y}} A_y \tag{I.0.15}$$

I recall that $\phi = \frac{\beta_x \alpha + \beta_y (1-\alpha)}{1 - [\beta_x \alpha + \beta_y (1-\alpha)]}$ and $\theta = \frac{\bar{L}}{\bar{K}} \phi$.

The optimal supply equations by country are:

$$X_c^{S\star} = \frac{1}{(\beta_x - \beta_y)} L_c \left(\frac{\varkappa}{\phi}\right)^{\beta_x} \left((1-\beta_y)\phi \frac{\varkappa_c}{\varkappa} A_x - \beta_y A_y\right) \tag{I.0.16}$$

$$Y_c^{S\star} = \frac{1}{(\beta_y - \beta_x)} L_c \left(\frac{\varkappa}{\phi}\right)^{\beta_y} \left((1-\beta_x)\phi \frac{\varkappa_c}{\varkappa} A_y - \beta_x A_x\right) \tag{I.0.17}$$

where I recall that $\varkappa = \frac{\bar{K}}{\bar{L}}$ and $\varkappa_c = \frac{K_c}{L_c}$.

And the optimal demand by country are:

$$X_c^{D\star} = \alpha L_c \left(\frac{\varkappa}{\phi}\right)^{\beta_x} \left(1 + \phi \frac{\varkappa_c}{\varkappa}\right) \tag{I.0.18}$$

$$Y_c^{D\star} = (1-\alpha) L_c \left(\frac{\varkappa}{\phi}\right)^{\beta_y} \left(1 + \phi \frac{\varkappa_c}{\varkappa}\right) \tag{I.0.19}$$

And the optimal export and imports by country are:

$$Y_1^{S*} - Y_1^{D*} = \frac{\gamma(s_{K1} - s_{L1})}{(\beta_x - \beta_y)\phi^{\beta_y}} \bar{L}^{1-\beta_y} \bar{K}^{\beta_y} \tag{I.0.20}$$

$$X_1^{S*} - X_1^{D*} = \frac{\gamma(s_{K1} - s_{L1})}{(\beta_x - \beta_y)\phi^{\beta_x}} \bar{L}^{1-\beta_x} \bar{K}^{\beta_x} \tag{I.0.21}$$

Hence if sector X is K-intensive ($\beta_x > \beta_y$) and country 1 is relatively K-abundant ($s_{K1} > s_{L1}$), expression I.0.21 is positive so that country 1 is an exporter of good X. This corresponds to the Heckscher-Ohlin Theorem: a country tends to export the good which is using relatively more of the factor that the country is relatively well endowed with.