I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 12949

Unintended Consequences: Can the Rise of the Educated Class Explain the Revival of Protectionism?

Paolo E. Giordani
Fabio Mariani

JANUARY 2020

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 12949

Unintended Consequences: Can the Rise of the Educated Class Explain the Revival of Protectionism?

Paolo E. Giordani
LUISS University

Fabio Mariani
IRES/LIDAM, UCLouvain and IZA

JANUARY 2020

ISSN: 2365-9793

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Unintended Consequences: Can the Rise of the Educated Class Explain the Revival of Protectionism?*

This paper provides a rationale for the revival of protectionism, based on the rise of the educated class. In a trade model with heterogeneous workers and entrepreneurs, globalization generates aggregate gains but has distributional effects, which can be attenuated through taxation. By playing a two-stage political game, citizens decide on trade openness and the extent of redistribution. In this setting, trade liberalization is politically viable as long as the losers from trade are compensated through the redistributive mechanism. When skilled workers account for a large share of the population, however, there may be limited political support for redistribution, and those who are left behind by globalization – namely unskilled workers and importing-sector entrepreneurs – can form a coalition to impose protectionist measures. We then build a dynamic version of the model, where human capital accumulation is driven by public education. Our analysis suggests that globalization – by favoring the ascent of the educated class and thus eroding the political support for redistribution – may ultimately breed its own decline.

JEL Classification: D72, F68, I24, J24, O40

Keywords: trade, redistribution, political economy, human capital accumulation

Corresponding author:
Fabio Mariani
IRES, Université Catholique de Louvain
Place Montesquieu, 3
B-1348 Louvain-la-Neuve
Belgique

E-mail: fabio.mariani@uclouvain.be

* We are indebted to Ariell Reshef, Gonzague Vannoorenberghe and Joseph Zeira for their comments at earlier stages of our project. We also thank participants at the 15th WEAI International Conference in Tokyo, the 4th ARC Workshop in Durbuy, the 2019 ABCDE Conference at the World Bank and the 2019 OFCE-Skema Workshop, as well as seminar participants at the University of Siena, for lively and useful discussion. Fabio Mariani acknowledges financial support from the Belgian French-Speaking Community (ARC Project 15/19-063). Research assistance from Lavinia Forcellese is also gratefully acknowledged. All remaining errors are entirely under our own responsibility.

1 Introduction

This paper relates the recent revival of protectionism observed in Western democracies to the rise of the educated class. We argue that the (endogenous) process of human capital accumulation, by eroding the political support for redistribution, may increase the demand for protectionism, if trade openness deepens inequality. As a result, modern societies tend to become progressively more inclined to "empty the baby out with the bath", thus resisting globalization in spite of its possible beneficial effects.

As pointed out by Zeira (2019), the educated class has emerged, over the last few decades, as one of the major winners from the globalization process. For this reason, higher-educated voters have encouraged trade openness and tolerated the gradual rise in inequality. On the other hand, a non-negligible share of the "working class" has seen its status deteriorate with globalization and, in the absence of an adequate redistribution of the gains from trade, has drifted – together with other losers from globalization – towards a strong protectionist political stance. The idea that trade may bring about differential effects on the political attitudes of voters with different levels of education has received empirical support by Aksoy, Guriev, and Treisman (2018). In addition, Piketty (2018) observes that the progressive advancement of globalization and expansion of education may have substantially altered the nature of political competition, reducing the salience of previous class-based redistributive conflict in favor of new cleavages.[1]

To rationalize this process, we first build a trade model in which the international exchange of goods generates aggregate gains but has redistributive effects across workers and firms: while skilled workers and exporting-sector entrepreneurs benefit from globalization, unskilled workers and importing-sector entrepreneurs lose. Trade can thus exacerbate both "between-skill" and "between-industry" inequality, as highlighted by Grossman, Helpman, and Kircher (2017). Inequality, however, can be attenuated through taxation – by redistributing the gains from trade and thus making globalization Pareto-improving *ex post*. Citizens play a two-stage political game, and decide by majority voting on both (the degree of) trade openness and redistribution. In this setting, an increase in the proportion of skilled workers weakens the political support for redistribution, as the median voter on taxation becomes wealthier. Therefore, the lack of redistribution prevents trade from being beneficial for all, and fuels the political opposition against globalization, with the losers from trade forming a protectionist coalition.

A dynamic extension of our model, built around an endogenous mechanism of social mobility, further reveals that globalization may breed its own decline. If human capital

[1] In Piketty's view, however, the main dimension of globalization is migration, rather than trade.

accumulation depends on public education, a high level of redistribution – which makes globalization politically viable in the first place – also drives an increase in the share of skilled workers. Eventually, however, the rise of the educated class weakens the political support for redistribution and thus favors the emergence of protectionist policies.

Before moving on, let us stress that any economic process susceptible – like international trade – of bringing about aggregate gains, while inducing redistributive effects, may be opposed and potentially slowed down by the losers. One may think, for instance, of skill-biased technological progress that, according to Blanchard and Willmann (2018) among others, may bring about the same political conflict as globalization. Different from trade, however, skill-biased technological progress cannot be easily resisted (or reversed) by voting – and this may also explain why the former can be used as a scapegoat of the latter, as pointed out by Rodrik (2018).

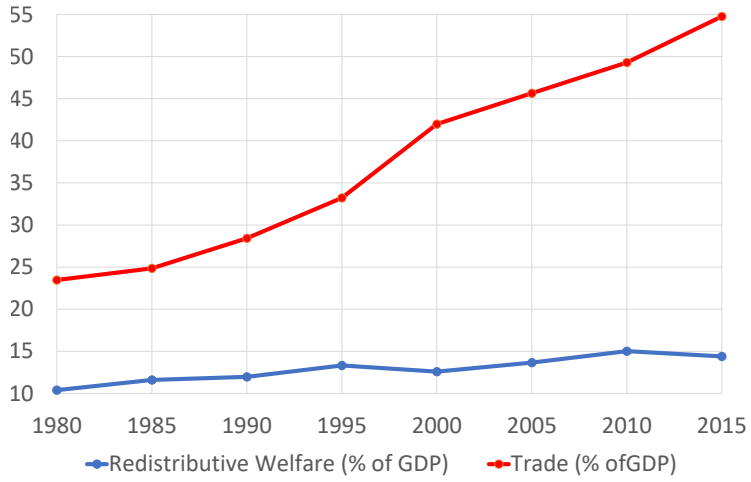
It is also important to clarify that, throughout this paper, we look at trade openness as the main aspect of globalization and abstract from the international mobility of workers. In reality, the growing importance of international migration might also explain, at least partially, the change in political attitudes toward globalization – although this view receives only limited support from the empirical literature.[2] Another dimension of globalization that could drive an increase in income inequality, but remains beyond the scope of our paper, is the internationalization of technological competition, as stressed by Cozzi and Impullitti (2016).

1.1 Stylized facts

Our analysis is essentially motivated by the observation that, after a period of progressive trade liberalization, several Western democracies have been marked by a rising anti-globalization sentiment – as documented by Rodrik (2018), among others. This has brought about dramatic changes in the political landscape, such as the Brexit Referendum in the UK or the electoral success of populist parties with a protectionist agenda (in the US, Italy or Brasil), as well as an increase of trade tensions among the three main commercial actors in the world (i.e. US, China and the EU).

In order to make sense of the recent revival of protectionism, we build a theory based on a few stylized facts. First, it appears that over the last few decades, the redistributive policy across OECD countries has not kept up with the intensive process of globalization. In particular, Figure 1 shows that the trade/GDP ratio has incessantly and remarkably

[2]For instance, Colantone and Stanig (2018a) find that immigration is not associated with higher support for the Leave option in the Brexit referendum – a result similar to Becker, Fetzer, and Novy (2017). Indeed, the effect of immigration on natives' income is not necessary negative: for instance, Ottaviano and Peri (2012) find that immigrants have a small, but positive impact on the remuneration of natives.



Note: trade is measured as the sum of exports and imports in OECD countries. Redistributive welfare includes public expenditure items such as housing, health, family, unemployment and other labor market programs, while excluding old-age pension payments. Source: OECD (2019b), OECD (2018).

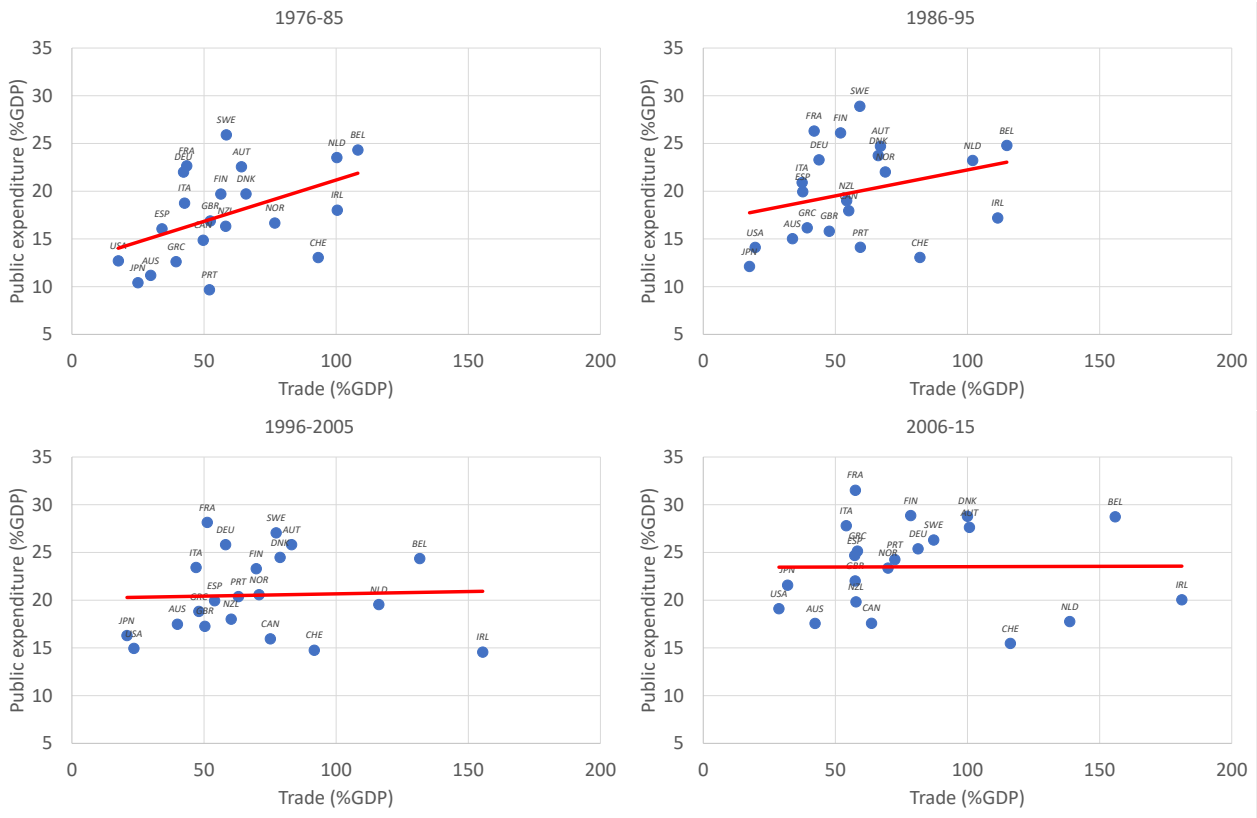
Figure 1: Redistributive welfare and trade: OECD, 1980-2015.

increased for the aggregate of OECD countries between 1980 and 2015, while redistributive public expenditure has remained roughly constant as a share of GDP. This seems coherent with our explanation of neo-protectionism as a response to the lack of appropriate redistribution of the gains from trade.

A significant change in the relationship between trade openness and redistribution is also apparent when looking at the cross-country evidence. Figure 2 illustrates that, up until the mid-1990s, there was a positive cross-country correlation between the degree of trade openness and public expenditure – as also pointed out by Rodrik (1998). In other words, the countries that were more exposed to international trade (thus being potentially more concerned by its consequences for income inequality) seemed to rely more intensively on public expenditure to redistribute the aggregate gains from trade. Interestingly, this seemed to be already the case for early waves of globalization. As documented by Huberman (2008), between the end of the 19th century and the beginning of the 20th, several workers' parties across Europe supported trade liberalization conditional on the introduction of labor market regulation and social insurance programs, which were more extensive in countries more open to international trade.[3] Figure 2 shows, however, the correlation between trade openness and redistribution has flattened out by the late 1990s, thus suggesting that the most recent advancements in trade liberalization have not been followed by a comparable increase in redistribution.

The impression of inadequate redistribution over the last decades is confirmed by

[3]On the role of trade in the diffusion of labor regulation, see also Huberman and Meissner (2010).



Note: trade is measured as export plus import. Public expenditure measures general government spending. Both variables are averaged over 10-year intervals, for all available countries. Source: OECD (2019b), OECD (2019a).

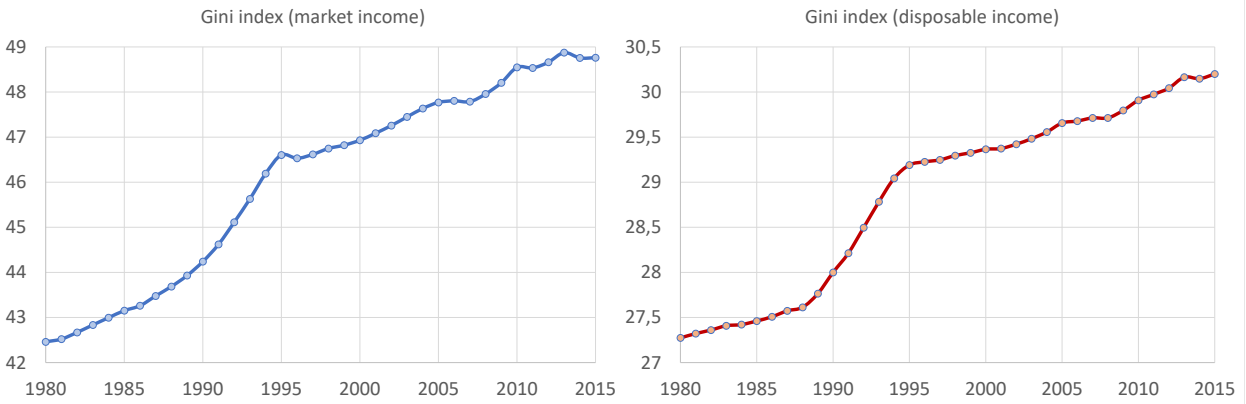
Figure 2: Public expenditure and trade: OECD countries, 1980–2015.

Figure 3, which shows how both *ex ante* (that is, before tax) and *ex post* inequality have increased over time across OECD countries, following a remarkably similar trend. The increase of the Gini index, computed on market incomes, may in turn be related to the progress of globalization, consistent with the idea that globalization may have contributed to deepen within-country inequality – as argued by Antràs, De Gortari, and Itskhoki (2017) and empirical papers cited therein. Interestingly, however, the increase of the after-tax Gini index suggests that redistributive mechanisms have not been strong enough to prevent inequality from rising.[4]

By displaying the steady increase of average schooling over the last 50 years, Figure 4 points to a progressive change in the characteristics of the median voter, who has become significantly more educated and affluent. This process may have been instrumental to the erosion of political support for redistribution, which in our paper explains the mounting opposition to international trade as a vector of increased sperequations.

Finally, Figure 5 shows how the growth trajectory of trade and public expenditure in education almost overlap with each other, thus suggesting that the aggregate gains from

[4] A similar picture emerges from a recent paper (Blanchet, Chancel, and Gethin 2019), which documents the rise of *ex-post* income inequality in Europe and in the US.

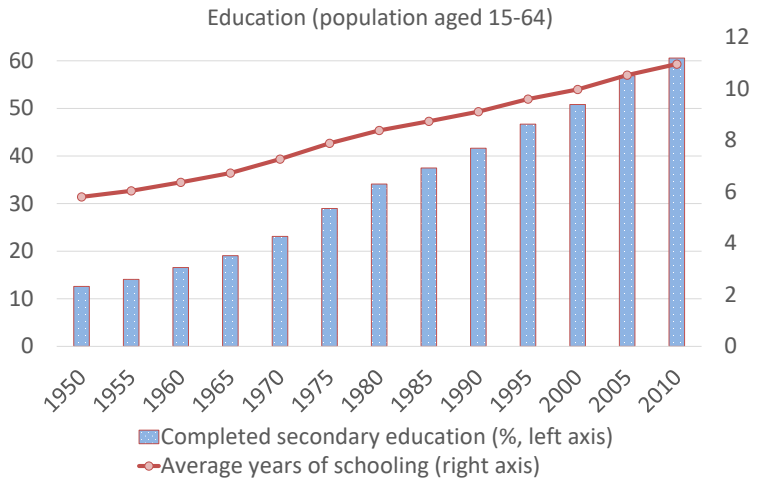


(a) Ex-ante inequality

(b) Ex-post inequality

Note: before- and after-tax Gini indices are computed as end-of-period unweighted averages of within-country coefficients. Source: OECD (2019c).

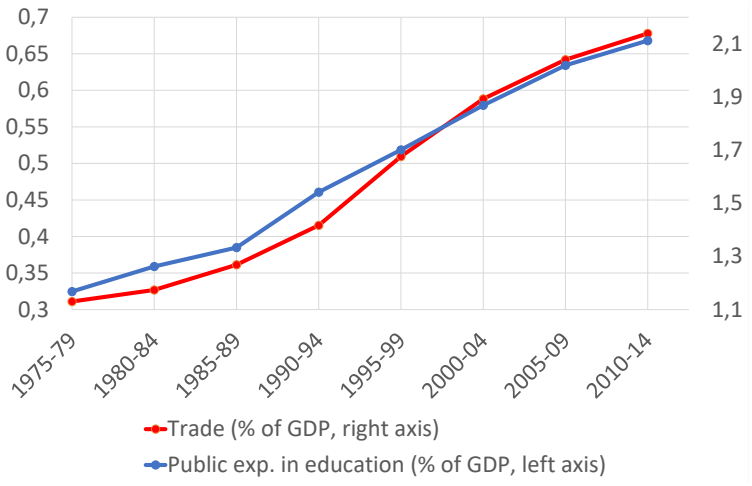
Figure 3: Income inequality: OECD, 1980–2015.



Note: both the share of people who completed at least secondary education and average years of schooling refer to the 15-64 age class, and are computed as unweighted averages across countries labeled as "Advanced Economies" by Barro and Lee (2013).

Figure 4: The rise of the educated class: advanced economies, 1950–2010.

trade, when properly redistributed, may have been instrumental to the rise of the educated class. Taken together with Figure 4, this provides indirect evidence that the spread of education made possible – among others – by a higher degree of trade openness, may have in turn altered the political landscape and limited the extent of redistribution, ultimately fostering the support for protectionism. In this sense, globalization may have bred its own decline.



Note: trade is measured as export plus import. Due to missing data, public expenditure in education (in constant USD) is averaged over each five-year interval for all available countries. Source: OECD (2019b), UNESCO (2019).

Figure 5: Public expenditure on education and trade, 1975-2014.

1.2 Literature

Our paper is primarily motivated by the economic literature concerned with the political attitudes towards globalization. For instance, Autor et al. (2016), Colantone and Stanig (2018b, 2018a), Dippel, Gold, and Heblich (2015), find a causal effect of trade exposure on voting for anti-globalization parties in different Western democracies (namely the US, UK, Germany and a sample of Western European countries). Our politico-economic theory is consistent with the empirical results of these papers, but also explains – by looking at human capital accumulation - why the penetration of trade has resulted in more protectionist attitudes only in recent years, and not in the past.[5]

As far as theory is concerned, our model draws inspiration from the theoretical literature analyzing the redistributive effect of trade, like Grossman, Helpman, and Kircher (2017) and papers cited therein. As mentioned above, our work emphasizes "between-skill" and "between-industry" inequality as the main driver of political change. From the empirical viewpoint, the differential vulnerability to trade shocks across skill groups has been highlighted by Autor, Dorn, and Hanson (2013), Autor et al. (2014) and Autor (2018), among others. Moreover, Aksoy, Guriev, and Treisman (2018) provide large-scale, global evidence that not only the economic outcomes, but also the political attitudes of skilled and unskilled workers respond differently to trade shocks. By considering dif-

[5]A complementary explanation is proposed by Rodrik (2018), who argues that, as globalization intensifies, its distributive costs tend to increase at a faster pace than its aggregate gains, thus justifying the eventual emergence of anti-trades attitudes. While plausible, this theory would, however, leave unexplained why voters demand protection in the form of less globalization rather than more redistribution (as claimed by Piketty (2018), among others).

ferential effects of globalization by skills, our work departs from a related paper by Vannoorenberghe and Janeba (2016), who focus on "between-industry" redistribution and come out with a similar result, namely that the support for trade liberalization depends on the degree of inter-sectoral redistribution. They do not look, however, into the possible causes of redistribution, or the lack thereof – which are instead central to our analysis. In this respect, we identify human capital accumulation and the shift of political preferences as the main obstacle to redistribution, an explanation that is to some extent complementary to that proposed by Antràs, De Gortari, and Itskhoki (2017), according to whom redistribution is inherently costly, and thus cannot prevent trade from increasing after-tax inequality. The idea that the redistributive effects of trade, even in the presence of aggregate gains, result into a protectionist backlash is also present in Blanchard and Willmann (2018). Different from theirs, our framework, in which agents also vote on redistribution, can explain why the effect of trade on inequality may not be properly attenuated by policy. On the other hand, we neglect endogenous education choices and inter-generational issues that are central to their analysis.

Overall, the idea that redistribution may not have kept up with the pace of globalization and thus explain anti-globalization sentiment has been present for a while in academic and policy circles (see for instance Bluth 2017). We believe, however, that we are the first to provide a formal politico-economic model to explain the mounting hostility to free trade with the lack of redistribution and relate it to a long-run process of human capital accumulation.[6]

The dynamic mechanism at the core of our theory, being based on the endogenous access to education of larger shares of population, establishes a link between our paper and the growth literature studying the interplay between human capital accumulation and inequality, such as Galor (2011), Benabou (1996) and Zeira (2007), among others. With respect to this literature, we highlight an additional channel – namely the political economy of trade policies – through which inequality may evolve along the growth path of industrialized economies.

Finally, our research is also related – albeit more tangentially– to two more strands of economic literature. In fact, as long as populist parties advocate protectionist poli-

[6]Let us also mention two complementary theories that both rely on alternative assumptions on the agents' preferences to rationalize the current hostility to trade. Pastor and Veronesi (2018) develop a model in which the backlash against globalization emerges endogenously, as a reaction to the higher inequality brought about by trade and growth. Their results, however, depend directly on the assumption that agents are averse to inequality. Drawing on Social Identity Theory, Grossman and Helpman (2018) also come up with a novel explanation for the current anti-trade backlash: a rise in income inequality (brought about by, say, globalization or skill-biased technical change) may induce a change in the agents' patterns of social identification (for instance, unskilled workers stopping identifying themselves with the "Nation"), which in turn may lead to sudden and dramatic changes in the preferred trade policy.

cies as a priority for their political agenda, we contribute to the understanding of the determinants of populism, and add to a recent literature including Guiso et al. (2017) and Rodrik (2018) among others. In addition, as our dynamic model looks at the link between trade and government spending, our analysis can also be linked to papers such as Rodrik (1998) and Epifani and Gancia (2009).

2 The theoretical framework

2.1 Population and production

We consider a small open economy populated by a unit measure of agents divided in two classes – entrepreneurs and workers – and labeled by K and L, respectively. We denote the share of workers by λ and assume for the sake of realism that $\lambda \in (1/2, 1)$.

Two different goods are produced and traded in this economy: the export good X, and the import good M. In line with some of the original Ricardo-Viner models (such as Mussa 1974 and Mayer 1974, who treat capital as a specific factor), entrepreneurs are considered to be sector-specific. In particular, $K_X = \gamma(1-\lambda)$ is the measure of entrepreneurs active in industry X, while $K_M = (1-\gamma)(1-\lambda)$ are active in industry M.[7]

Differently from entrepreneurs, workers are mobile across sectors. We shall distinguish, however, between two types of workers. A fraction $L_s = \sigma\lambda$ are perfectly mobile from M to X and *vice versa*: we identify them as high-skilled workers. The residual share $L_u = (1-\sigma)\lambda$, are, instead, imperfectly mobile, in that they have to pay a cost (that we formalize below) if they want to operate in sector X: we label them as low-skilled workers. Similar to Mussa (1982), unskilled labor thus becomes a partially sector-specific input, characterized by imperfect sectoral mobility.[8]

Denoting by P_X and P_M the prices of commodities X and M, and by A_X and A_M total factor productivities, the value of production in the two sectors is given by

$$Y_X = P_X A_X K_X^{1-\alpha-\beta} L_{X,s}^{\alpha} L_{X,u}^{\beta} \tag{1}$$

[7] Our characterization of entrepreneur as sector-specific may be regarded as an extreme case of attitudinal specificity, as defined by Bhagwati, Panagariya, and Srinivasan (1998) and discussed by Grossman (1983).

[8] Assuming that workers are more mobile than entrepreneurs is not only closer to Ricardo-Viner models recalled above, but also consistent with the idea that entrepreneurs might encounter substantial difficulties to move away from a declining industry (or locations). In fact, according to Guiso and Schivardi (2011), the sector-specificity of entrepreneurial skills may explain to a significant extent why entrepreneurs are imperfectly mobile across locations – a fact which is also documented by Michelacci and Silva (2007), according to whom entrepreneurs tend to be more "local" than workers. Let us also highlight, however, that an alternative version of the model, with sector-specific workers and mobile entrepreneurs, would generate a similar divide in trade attitudes and deliver the same politico-economic implications as the current model.

and

$$Y_M = P_M A_M K_M^{1-\alpha-\beta} L_{M,s}^{\alpha} L_{M,u}^{\beta}, \tag{2}$$

respectively.

Let us now call θ_s and θ_u the *endogenous* shares of skilled and unskilled workers in the exporting sector. We can then write $L_{X,s} = \theta_s L_s$, $L_{X,u} = \theta_u L_u$, $L_{M,s} = (1-\theta_s) L_s$, and $L_{M,u} = (1-\theta_u) L_s$. For simplicity, we further pose $A_M = 1$ and $A_X = A > 0$, and symmetrically $P_M = 1$ and $P_X = P \in \left[\underline{P}, \overline{P}\right]$, thereby taking commodity M as numéraire.

Equations (1) and (2) can thus be re-written as

$$Y_X = PA \left[\gamma (1-\lambda)\right]^{1-\alpha-\beta} \left[\theta_s \sigma \lambda\right]^{\alpha} \left[\theta_u (1-\sigma) \lambda\right]^{\beta} \tag{3}$$

and

$$Y_M = \left[(1-\gamma)(1-\lambda)\right]^{1-\alpha-\beta} \left[(1-\theta_s)\sigma\lambda\right]^{\alpha} \left[(1-\theta_u)(1-\sigma)\lambda\right]^{\beta}. \tag{4}$$

Following the tradition of the trade literature (see for instance Grossman, Helpman, and Kircher 2017), we interpret a rise of P as an increase in trade openness. For our model economy, more openness implies a rise in the relative demand of the exporting good X. As a result, the relative price of commodity X increases. Due to the presence of sector-specific factors, our model lends itself to analyze the implications of trade openness in terms of between-industry inequality; in addition, the assumption of a differential mobility of workers allows us to deal with between-skill inequality.[9]

2.2 Factor prices and intersectoral allocation

We now want to determine the equilibrium values of θ_s and θ_u.

Under perfect competition, all factors are remunerated according to their marginal productivity. We denote by y_s, y_u, y_x and y_m the incomes of high- and low-skilled workers, and entrepreneurs in the exporting and importing sector, respectively.

Sector-specific entrepreneurs are paid $y_x = MP_{K_X}$ and $y_m = MP_{K_M}$, where MP stands for the value of the marginal product.

As far as labor is concerned, the equilibrium allocation of skilled and unskilled workers across the two sectors (θ_s^*, θ_u^*) arises endogenously through the income equalization

[9] As far as the distributive effects of trade are concerned, our simple model is reminiscent of more sophisticated ones, such as Harrigan and Reshef (2015), Burstein and Vogel (2017) and Antràs, De Gortari, and Itskhoki (2017), which in turn belong to the literature championed by Melitz (2003). In particular, our assumption of a differential mobility of workers builds on the same notion as Antràs, De Gortari, and Itskhoki (2017), namely that agents can sell their labor services in export markets only by accepting to pay a given cost. We opted for a simpler, albeit less rich framework of analysis, in order to obtain analytical results that will be convenient to build the politico-economic part of the model, as well as the dynamic extension.

condition. At equilibrium, we must then have $y_{M,i} = y_{X,i}$ for $i = s, u$. For perfectly mobile high-skilled workers, this condition implies

$$MP_{M,s} = MP_{X,s}. \tag{5}$$

For low-skilled workers, the equilibrium condition must take into account that they incur an additional cost if they want to be employed in the exporting sector.[10] The presence of differential sectoral mobility across skill groups is consistent with some available empirical evidence on the consequences of trade shocks. For instance, Autor et al. (2014) use worker-level data to show that labor adjustment costs are unevenly distributed across workers, according to their skill levels. Namely, high-wage workers are better able than low-wage ones to relocate across sectors, as they incur minimal earnings losses when moving out of manufacturing firms that are more exposed to import competition. In addition, Autor, Dorn, and Hanson (2013) find low-educated agents to be more vulnerable to globalization, since workers with lower ability and earnings are more likely to lose their job in the face of an adverse trade shock.

We assume that the access cost, which we introduce in a multiplicative form for analytical convenience, is proportional to P, as it is likely to be larger for more internationalized firms. We then have $y_{X,u} = MP_{X,u}/\phi P$, where $\phi \in [1, +\infty)$, and $y_{M,u} = MP_{M,u}$. The mobility cost is positive only as long as $\phi P > 1$.[11] The relevant equilibrium condition for unskilled workers then becomes

$$MP_{M,u} = \frac{MP_{X,u}}{\phi P}. \tag{6}$$

By solving the system composed by (5) and (6), we obtain

$$\theta_s^* = \frac{\frac{\gamma}{1-\gamma}\left(AP\right)^{\frac{1}{1-\alpha-\beta}}\left(\phi P\right)^{-\frac{\beta}{1-\alpha-\beta}}}{1+\frac{\gamma}{1-\gamma}\left(AP\right)^{\frac{1}{1-\alpha-\beta}}\left(\phi P\right)^{-\frac{\beta}{1-\alpha-\beta}}}, \tag{7}$$

$$\theta_u^* = \frac{\frac{\gamma}{1-\gamma}\left(AP\right)^{\frac{1}{1-\alpha-\beta}}\left(\phi P\right)^{-\frac{1-\alpha}{1-\alpha-\beta}}}{1+\frac{\gamma}{1-\gamma}\left(AP\right)^{\frac{1}{1-\alpha-\beta}}\left(\phi P\right)^{-\frac{1-\alpha}{1-\alpha-\beta}}}. \tag{8}$$

Notice that θ_s^* and θ_u^* are both increasing in P: that is to say, a rise in trade open-

[10] One may think, for instance, that low-skilled workers need to upgrade their skills (by learning a foreign language, etc.) if they want to work for an exporting firm (Doepke and Gaetani 2019).

[11] The value of the access cost paid by unskilled workers is given by $MP_{X,u}\left[1 - 1/\left(\phi P\right)\right]$ and is therefore proportional to their prospective marginal productivity in the exporting sector. Note that, however, such cost is external to the production process and has no direct impact on the productivity of the other production factors.

ness pushes both skilled and unskilled workers to relocate towards the exporting sector. Moreover, it can be proven that $\theta_s^* > \theta_u^*$.[12]

2.3 Incomes

The incomes of the four categories of agents are given by

$$y_x \equiv \frac{\partial Y_X}{\partial K_X} = PA\left(1-\alpha-\beta\right)\left[\frac{\lambda}{\gamma\left(1-\lambda\right)}\right]^{\alpha+\beta}\left(\theta_s^*\sigma\right)^{\alpha}\left[\theta_u^*\left(1-\sigma\right)\right]^{\beta}, \tag{9}$$

$$y_m \equiv \frac{\partial Y_M}{\partial K_M} = \left(1-\alpha-\beta\right)\left[\frac{\lambda}{\left(1-\gamma\right)\left(1-\lambda\right)}\right]^{\alpha+\beta}\left[\left(1-\theta_s^*\right)\sigma\right]^{\alpha}\left[\left(1-\theta_u^*\right)\left(1-\sigma\right)\right]^{\beta}, \tag{10}$$

$$y_s \equiv \frac{\partial Y_M}{\partial L_{M,s}} = \alpha\left[\frac{\left(1-\gamma\right)\left(1-\lambda\right)}{\lambda}\right]^{1-\alpha-\beta}\frac{\left[\left(1-\theta_u^*\right)\left(1-\sigma\right)\right]^{\beta}}{\left[\left(1-\theta_s^*\right)\sigma\right]^{1-\alpha}}, \tag{11}$$

and

$$y_u \equiv \frac{\partial Y_M}{\partial L_{M,u}} = \beta\left[\frac{\left(1-\gamma\right)\left(1-\lambda\right)}{\lambda}\right]^{1-\alpha-\beta}\frac{\left[\left(1-\theta_s^*\right)\sigma\right]^{\alpha}}{\left[\left(1-\theta_u^*\right)\left(1-\sigma\right)\right]^{1-\beta}}, \tag{12}$$

where θ_s^*, θ_u^* are given by equations (7) and (8).

In order to establish a convenient ranking of incomes, we now assume that the parameters of our model satisfy three specific restrictions.

Assumption 1 *Parameters are such that:*

$$\textit{(i)}\ \sigma < \frac{\alpha}{\alpha+\beta};$$

$$\textit{(ii)}\ \underline{P} > \frac{\phi^{\frac{\beta}{1-\beta}}}{A^{\frac{1}{1-\beta}}}\left(\frac{\alpha\left(1-\lambda\right)\left(1-\gamma\right)}{\lambda\sigma\left(1-\alpha-\beta\right)-\alpha\gamma\left(1-\lambda\right)}\right)^{\frac{1-\alpha-\beta}{1-\beta}};$$

$$\textit{(iii)}\ \overline{P} < \frac{\phi^{\frac{\beta}{1-\beta}}}{A^{\frac{1}{1-\beta}}}\left(\frac{\lambda\sigma\left(1-\alpha-\beta\right)-\alpha\left(1-\gamma\right)\left(1-\lambda\right)}{\alpha\gamma\left(1-\lambda\right)}\right)^{\frac{1-\alpha-\beta}{1-\beta}}.$$

We can then obtain the following Lemma.

Lemma 1 *(Ranking of incomes). Under Assumption 1, incomes can be ranked as follows:*

$$y_x, y_m > y_s > y_u. \tag{13}$$

Proof. The proof is contained in Appendix A. ■

[12] It can be checked that $\theta_s^* > \theta_u^*$ if and only if $\beta < 1-\alpha$, which is always true given the assumption of constant returns to scale in production.

Part (i) of Assumption 1 ensures that $y_s > y_u$, as will be explained in the proof of Lemma 1. Parts (ii) and (iii) instead, respectively guarantee that $y_x > y_s$ and $y_m > y_s$. As we clarify later in Section 4, these two inequalities – by somehow constraining "between-occupation" inequality – allow us to simplify the exposition of the paper but are not strictly required for our general argument to hold.

We now want to assess the effects of trade openness on each category of agent. This is a key aspect of our analysis, as it has important implications for the political attitudes of agents. The following Lemma summarizes the main results.

Lemma 2 *(Impact of trade on incomes) An increase in P (more trade openness) (i) raises the income of both exporting-sector entrepreneurs (y_x) and high-skilled workers (y_s); (ii) lowers the income of importing-sector entrepreneurs (y_m); (iii) lowers the income of low-skilled workers (y_u) as long as $\phi P > 1$.*

Proof. The proof is contained in Appendix A. ■

Lemma 2 tells us that trade openness deepens "between-skill" and "between-industry" inequality and creates a fracture in the society between trade winners (exporting-sector entrepreneurs and skilled workers) and losers (importing-sector entrepreneurs and unskilled workers).

Let us highlight that, as far as workers are concerned, in our simple model the redistributive effects of trade can only emerge at the intensive margin, i.e. through variations in wages. In the real world, however, some (or most of the) action may take place at the extensive margin, with low-skilled workers being more exposed to the risk of losing their jobs, when their sector of employment faces increased import competition – as shown, for instance, by Autor, Dorn, and Hanson (2013).

Note also that the redistributive effects of trade that arise in our framework may not be permanent, since the Ricardo-Viner class of models traditionally emphasizes short-run effects (sector-specific factors can only be temporarily immobile, as pointed out by Mayer (1974) among others). Although they may tend to disappear in the long run, we believe that the effects of trade on incomes play a major role in shaping the political attitudes of workers and entrepreneurs with respect to redistribution and trade openness – as will become apparent in Section 3.[13]

[13] Although in a different context, the role of the short-run vs long-run effects of trade is central to the analysis of Blanchard and Willmann (2018). They highlight how in the long run most workers eventually gain from globalization, while in the short run the presence of labor-market frictions may generate losses for those individuals who are less ready to respond to a changing marketplace.

2.4 Demand

We now turn to the analysis of the demand side of the economy. Recall that we are considering a small open economy: as a result, domestic demand is irrelevant for the determination of goods' prices, but allow us to gauge the consequences of globalization on individual utility and on political attitudes.

Agents derive utility from private consumption (c_X, c_M) and public good consumption (G) according to the following utility function:

$$U(c_X, c_M, G) = c_M^{\mu} c_X^{1-\mu} + \delta \ln G, \tag{14}$$

where $\delta \in R_+$ captures the preference for public good. The provision of G is financed through taxes, so that

$$G = \tau^M Y, \tag{15}$$

where τ^M denotes the prevailing tax rate and Y is the value of the total output produced in the economy, i.e. $Y = PY_X + Y_M$. In particular, aggregate output can be expressed as

$$Y = PA\gamma^{1-\alpha-\beta}\theta_s^{\alpha}\theta_u^{\beta} + (1-\gamma)^{1-\alpha-\beta}(1-\theta_s)^{\alpha}(1-\theta_u)^{\beta}(1-\lambda)^{1-\alpha-\beta}\lambda^{\alpha+\beta}\sigma^{\alpha}(1-\sigma)^{\beta}. \tag{16}$$

Notice that Y is always increasing in P. In fact, in the Ricardo-Viner class of models, having one mobile factor is enough to ensure that globalization brings about aggregate productivity gains. Suppose, for instance, that ϕ and/or P tend to infinity, so that unskilled labor becomes *de facto* a fixed factor: the very fact that skilled workers can still flock to the exporting sector allows the whole economy to increase the value of aggregate production.

Let us also stress that, as far as taxes and government expenditure are concerned, our analysis relies on two implicit assumptions. First, we are assuming that the government collects taxes at the source (under the form of a withholding tax), so that total tax revenues amount to $\tau^M Y$.[14] Second, G is produced according to an "immaterial" process which transforms tax receipts into the public good according to a technical coefficient that we assume equal to 1 for simplicity.

[14] Assuming, alternatively, that taxes were paid on incomes would lead to a different (and lower) tax revenue, $\tau^M \overline{y}$, where $\overline{y}$ is the average income defined by

$$\overline{y} = \lambda\sigma y_s + \lambda(1-\sigma)y_u + (1-\lambda)\gamma y_x + (1-\lambda)(1-\gamma)y_m.$$

In our model, we have $\overline{y} < Y$, because mobility costs do not hinge on production but rather on the income of unskilled workers. Using a withholding rather than an income tax does not affect qualitatively the implications of our analysis, but it significantly simplifies the formal treatment of the dynamic extension of our model.

The solution to the constrained utility maximization problem leads to the following demand for the two private consumption goods:

$$c_{M,i} = \mu \left(1 - \tau^M\right) y_i, \tag{17}$$

$$c_{X,i} = \frac{(1-\mu)\left(1-\tau^M\right) y_i}{P}. \tag{18}$$

for $i = \{s, u, x, m\}$.

3 Political economy

Agents' utility depends on both redistribution and the extent of trade openness. Redistribution is summarized by the tax rate τ. As already discussed above, we follow a consolidated tradition in the international economics literature spanning from Mussa (1974) to Grossman, Helpman, and Kircher (2017), and proxy trade openness by the price level of the exporting commodity, P. In particular, a rise (fall) in P corresponds to an increase (decrease) in trade openness. For instance, protectionist policies such as raising a country's import barriers would bring about a decrease in the relative price of a country's export good, as pointed out by Grossman, Helpman, and Kircher (2017).[15]

In our model, both τ and P arise endogenously through a political process. The choice of P as a policy instrument is coherent with our small open economy setting: any change in traditional trade instruments, such as import tariffs or export subsidies, would be automatically reflected in a variation of the relative export price, P. In other words, voting on the tariff rate (as in Blanchard and Willmann 2018) boils down to voting on P.

We consider a two-stage voting process in which the four types of agents (s, u, x, m) vote first on trade openness and then on redistribution. In both stages, individual preferences are aggregated by majority voting. At the end of Section 4 we discuss how a probabilistic voting rule would alter our results.

The two-stage voting structure, which is similar to that of Vannoorenberghe and Janeba (2016), allows us to capture the fact that trade policy choices tend to be rarer and somewhat more irreversible than redistributive policy choices. For instance, ratifying trade agreements, joining a single market or the WTO are sort of once-in-a-lifetime decisions, which are typically more difficult to overrule than taxation/compensation choices.[16] This time frame implies that, when choosing the optimal extent of trade open-

[15] This applies to all trade policy measures intended to reduce the difference between export and import prices, provided that the conditions for the Metzler paradox do not hold.

[16] In a different context, Mariani (2013) uses a similar two-stage policy game, in which agents first vote

ness, our agents take into account the potential impact of redistribution on their utility.[17]

Let us now characterize the political preferences of the four types of agents along these two political dimensions, starting from redistribution.

3.1 Political preferences for redistribution

Agent i's preferred tax rate, denoted by τ_i^*, maximizes her indirect utility function, obtained after substituting for (17) and (18) into (14). Solving the problem for $i = s, u, x, m$, we get

$$\tau_i^* = \frac{\delta \left(\frac{P}{1-\mu}\right)^{1-\mu} \left(\frac{1}{\mu}\right)^{\mu}}{y_i}. \tag{19}$$

The tax rate τ_i^* is increasing in δ and decreasing in y_i. A stronger preference for the public good induces voters to prefer a higher tax rate, regardless of their income. On the other hand, given the redistributive nature of public good provision, poorer agents will demand higher taxation.

As a result, the ordering of incomes described in (13) translates into an unambiguous ranking of political preferences for redistribution.

Lemma 3 *(Political preferences for redistribution). The political attitudes towards redistribution of the different types of agents are described by the following ranking:*

$$\tau_u^* > \tau_s^* > \tau_m^*, \tau_x^*.$$

Proof. Follows directly from τ_i^* being strictly decreasing in y_i. ■

Lemma 3 tells us that workers prefer a more generous redistribution policy than (either exporting- or importing-sector) entrepreneurs. In particular, low-skilled workers favor the greatest extent of redistribution.

Under majority voting, the tax rate supported by the median voter, denoted by τ^M, emerges as the outcome of the political process. In turn, the identity of the median voter depends on the demographic structure of the economy, as described by λ and σ.

Proposition 1 *(Voting on redistribution). The median voter on τ is always a worker, unskilled*

on immigration policy (which may be considered as an additional dimension of globalization) and then on the optimal provision of a public good.

[17] Although we believe that this time structure is the most natural to tackle our research question, one may wonder whether the results change if voters decide simultaneously on trade openness and redistribution. It is well known, however, that in the case of multiple policy dimensions a median-voter equilibrium (i.e. a Condorcet winner) may not exist. See for instance Persson and Tabellini (2002).

if $\lambda(1-\sigma) \geq 1/2$, *skilled otherwise. Therefore,*

$$\tau^M = \begin{cases} \tau_u^* \text{ if } \sigma \leq 1 - \dfrac{1}{2\lambda} \\ \tau_s^* \text{ if } \sigma > 1 - \dfrac{1}{2\lambda}. \end{cases}$$

Proof. The proof is a direct consequence of Lemma 3, together with part (i) of Assumption 1. ■

Based on the previous Lemma, it is useful to define

$$\sigma' \equiv 1 - \frac{1}{2\lambda},$$

which represents the threshold of σ below (above) which the median voter on redistribution is an unskilled (skilled) worker. Given that $\tau_s^* < \tau_u^*$, Proposition 1 implies that a rise of σ from below σ' to above σ' brings about a shift in the identity of the median voter from unskilled to skilled worker, and thus a less generous redistributive policy. Notice that σ' is increasing in λ; this means that, when λ is higher, it takes a larger proportion of skilled for the unskilled to lose their pivotal role in the society.

3.2 Political preferences for trade openness

The level of trade openness that maximizes agent i's utility can be defined as

$$P_i^*\left(\tau^M\right) = \arg\max\left[\frac{y_i}{P^{1-\mu}}\left(1-\tau^M\right)\mu^\mu\left(1-\mu\right)^{1-\mu} + \delta\log\tau^M Y\right], \tag{20}$$

where the expression in square brackets is the indirect utility of agent i (obtained after substituting for (17) and (18) into (14)), and τ^M is the redistributive policy chosen in the second stage of the voting process (and perfectly anticipated by the agents in the first stage).

P affects the welfare of agents through three distinct channels. The first two are the usual channels highlighted for instance by Mussa (1974): the gross income effect (y_i as a function of P) and the direct demand effect (the presence of P on the denominator of the expression above). The third channel runs through the redistributive policy, whereby a change in P modifies τ^M and Y. Since the demand and the redistribution channels do not depend on the type of agent, the ranking of preferences for trade openness across the four categories of agents is only determined by the income channel. The following Lemma characterizes this ranking.

Lemma 4 *(Preferences for trade openness). As far as trade openness is concerned, we can order political preferences as follows:*

$$P_x^*(\tau^M) > P_s^*(\tau^M) > P_u^*(\tau^M) > P_m^*(\tau^M).$$

Proof. The proof is contained in Appendix A. ■

Lemma 4 tells us that importing-sector entrepreneurs, being totally immobile, have a more hostile attitude towards globalization than unskilled workers, who are only partially immobile. In turn, unskilled workers prefer less globalization than skilled workers, who are completely mobile. Finally, and consistent with the Ricardo-Viner tradition, entrepreneurs who are specific to the exporting sector are those who gain the most from trade openness.

After showing how the political attitude over trade openness varies across groups, we can also look at how the attitude of a given type depends on the identity of the median voter on τ. Let us focus, in particular, on low-skilled workers.

Lemma 5 *(Unskilled workers' attitude to trade). Unskilled workers are more hostile to trade when the median voter on τ is a skilled worker, i.e. $P_u^*(\tau_u^*) > P_u^*(\tau_s^*)$.*

Proof. The proof is contained in Appendix A. ■

Lemma 5 rationalizes the rise of an anti-trade sentiment among low-skilled workers. An increase in σ (from below σ' to above σ') triggers a change in the median voter on redistribution. Such change weakens the political support for redistribution (as $\tau_s < \tau_u$) and thus fuels the low-skilled workers' political opposition against trade. [18] We now study the demographic and political conditions under which such opposition may become electorally successful.

Let us first analyze how political preferences for trade openness are aggregated under majority voting. After denoting by P^M the level of trade openness that maximizes the utility of the median voter, we can state the following.

Proposition 2 *(Voting on trade openness). The median voter on P is always a worker, unskilled*

[18] According to Huberman (2008), in the late 19th century Belgian workers supported trade liberalization "in exchange" of more labor-market regulation and social insurance programs. As a result, workers benefited from that early wave of globalization through better social legislation, rather than higher wages. This historical example fits well with our theory, in which the political stance on international trade depends on the extent of redistribution, as the latter can compensate for trade-induced income losses in the agents' utility function.

if $\lambda(1-\sigma)+(1-\lambda)(1-\gamma) \geq 1/2$, *skilled otherwise. Equivalently,*

$$P^M = \begin{cases} P_u^* \text{ if } \sigma \leq \dfrac{1}{2\lambda} - \frac{\gamma(1-\lambda)}{\lambda} \\ P_s^* \text{ if } \sigma > \dfrac{1}{2\lambda} - \frac{\gamma(1-\lambda)}{\lambda} \end{cases} \tag{21}$$

Proof. The proof is a direct consequence of Lemma 4 and $\lambda \in (1/2, 1)$. ■

Let us now define

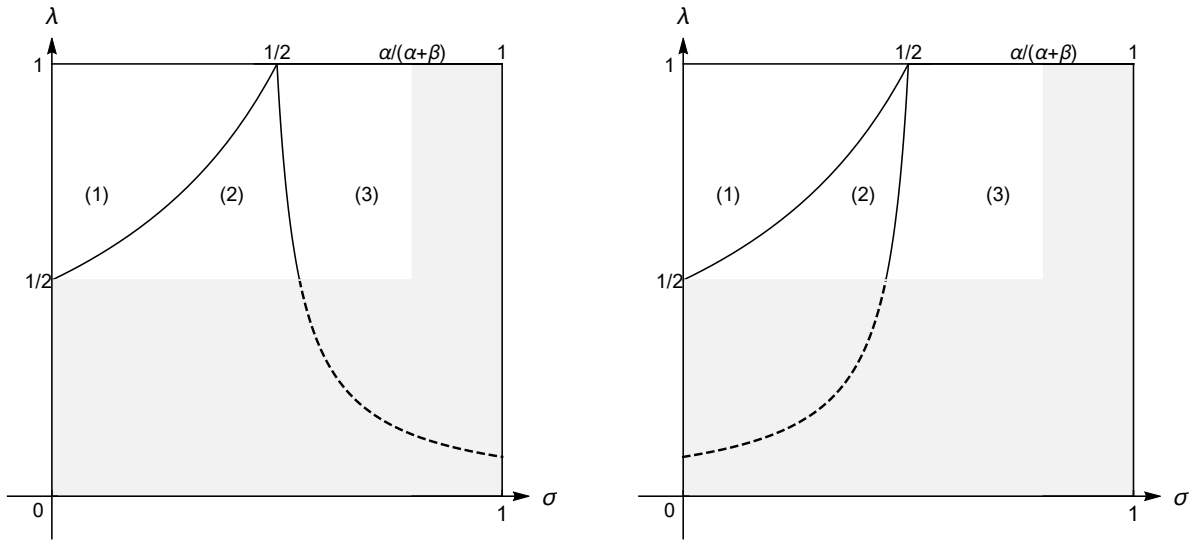
$$\sigma'' \equiv \frac{1}{2\lambda} - \frac{\gamma(1-\lambda)}{\lambda},$$

which represents the threshold below (above) which the median voter on trade openness is an unskilled (skilled) worker. It can be checked that $\sigma' < \sigma''$ for any value of λ and γ belonging to $(0, 1)$. This means that the conditions for the unskilled workers to be pivotal when voting on trade openness are less restrictive than those on redistribution. The intuition for this result is that the median voter on P is an unskilled worker (i) not only when agents of this type are the majority (as it happens with τ) but also (ii) when they do not account for more than a half of the electorate but can form a majority with importing-sector entrepreneurs, who are even more hostile to trade openness (as implied by Lemma 4). Note also that σ'' is decreasing in γ: the median voter is less likely to be an unskilled worker when γ is larger, i.e. when there are few importing-sector entrepreneurs.

4 Political equilibrium

In our model, a *political equilibrium* is defined as a pair $\left(P^M, \tau^M\right)$ that satisfies (20) for the median voter on trade and (19) for the median voter on redistribution. We can now relate the characteristics of the political equilibria to the demographic characteristics of our economy. In particular, Propositions 1 and 2 allow us to distinguish between three regions depending on the values taken by σ and λ.

When $\sigma \leq \sigma'$ (region 1), unskilled workers are the majority, so that they are the median voter on both redistribution and trade openness: $\tau^M = \tau_u^*$ and $P^M = P_u^*(\tau_u^*)$. When $\sigma' < \sigma \leq \sigma''$ (region 2), unskilled workers are no longer the majority. Concerning redistribution, Proposition 1 tells us that the median voter is a skilled worker. However, unskilled workers are still the median voter on trade openness because they can form a political majority with importing-sector entrepreneurs. Thus, in region 2, unskilled workers choose their preferred P by taking into account that the tax rate τ is decided by high-skilled workers, i.e., $\tau^M = \tau_s^*$ and $P^M = P_u^*(\tau_s^*)$. Finally, when $\sigma > \sigma''$ (region 3), low-skilled workers and importing-sector entrepreneurs are not sufficiently numerous to form a majority on trade openness. The median voter on both P and τ is then a high-



(a) $\gamma < 1/2$ (b) $\gamma > 1/2$

Note: the shaded areas are excluded by our parametric restrictions on the demography of the model, namely $\lambda \in (1/2, 1)$ and $\sigma < \alpha/(\alpha + \beta)$.

Figure 6: Political equilibrium: parametric regions.

skill worker, so that $\tau^M = \tau_s^*$ and $P^M = P_s^*(\tau_s^*)$. A graphical representation of the three regions in the (λ, σ) space, for $\lambda \in [0, 1]$ and $\sigma \in [0, \alpha/(\alpha + \beta)]$, is provided in Figure 6. Panels (a) and (b) are drawn for $\gamma < 1/2$ and $\gamma > 1/2$, respectively. Compared to each other, they illustrate that, as γ increases, region 2 shrinks relative to region 3. This means that the larger the share of exporting-sector entrepreneurs, the smaller is the portion of the parameter space compatible with an anti-trade political majority.

We can then characterize the political equilibrium.

Proposition 3 *(Political equilibrium) The political equilibrium is such that*

$$(P^M, \tau^M) = \begin{cases} (P_u^*(\tau_u^*), \tau_u^*) \text{ if } \sigma \leq \sigma' \text{ (region 1)} \\ (P_u^*(\tau_s^*), \tau_s^*) \text{ if } \sigma' < \sigma \leq \sigma'' \text{ (region 2)} \\ (P_s^*(\tau_s^*), \tau_s^*) \text{ if } \sigma > \sigma'' \text{ (region 3)} \end{cases} \tag{22}$$

where the expression for τ_i^* $\forall i = s, u$ is given by Equation (19).

Proof. The proof is a direct consequence of Propositions 1 and 2. ■

Proposition 3 allows us to understand how the society's political stance towards trade evolves as σ rises. In particular, it highlights the role of the skill composition of the society in shaping redistributive policies, which in turn affect the choice over trade openness.

Consider the political equilibrium arising in region 1: since low-skilled workers are predominant, they are able to command a high level of redistribution. The possibility to effectively redistribute the gains from trade elicits a wide social consensus in favor

of trade openness. In terms of the model, we have $\left(P^M, \tau^M\right)_1 = \left(P_u^*\left(\tau_u^*\right), \tau_u^*\right)$, with unskilled workers playing a pivotal role on both policy dimensions.

The political equilibrium associated to region 2, instead, describes a situation in which low-skilled workers have lost control of redistributive policy. Even though trade is beneficial for the economy as a whole (as it increases total production, Y), it is more difficult for the losers to be compensated. When the political power on redistribution shifts from low-skilled to high-skilled workers, a protectionist mood mounts among low-skilled workers. In region 2, the demography of our model is such that low-skilled workers and importing-sector entrepreneurs may form a successful political alliance against trade.[19] The resulting political equilibrium reflects skilled workers' preferences for redistribution and unskilled workers' preferences for trade, that is: $\left(P^M, \tau^M\right)_2 = \left(P_u^*\left(\tau_s^*\right), \tau_s^*\right)$. This new equilibrium, characterized by a lower degree of trade openness (since $P_u^*\left(\tau_s^*\right) < P_u^*\left(\tau_u^*\right)$, as can be seen from Lemma 5), imposes efficiency losses on the society.

Finally, within region 3 high-skilled workers are able to impose their preferences over both policy dimensions. The resulting political equilibrium, defined by $\left(P^M, \tau^M\right)_3 = \left(P_s^*\left(\tau_s^*\right), \tau_s^*\right)$, is characterized by the highest level of trade openness (as $P_s^*\left(\tau_s^*\right) > P_u^*\left(\tau_u^*\right)$) and the lowest level of redistribution.[20]

Let us close this section by discussing the role of two hypotheses of our model, concerning respectively the political process and the structure of inequality. First, it can be shown that replacing majority voting with probabilistic voting on either policy dimension would not substantially alter our results. In fact, the tax rate chosen by probabilistic voting is a decreasing function of σ. As a result, when σ rises, the less generous redistribution policy would still fuel the unskilled workers' resentment against trade, so that a "continuous" version of Lemma 5 would hold also in this alternative political environment. The "extensive margin" of the workers' attitude towards trade would then carry on unchanged, with skilled (unskilled) preferring more (less) trade openness, as σ rises. Under probabilistic voting, however, also the "intensive margin" (that is, by how much the agents' attitude towards trade changes as σ rises) becomes relevant for the choice of trade policy. It is then possible - although not strictly necessary as before - that, as σ goes up and the tax rate goes down, the increasing hostility of unskilled workers drives the resurgence of protectionist policies.

Secondly, our findings do not hinge on the hypothesis that entrepreneurs' income is higher than workers' (see Lemma 1 above). If, for instance, we had $y_m < y_s$, then it

[19] In Piketty's (2018) terminology, this would be a situation in which the "nativist" coalition (made up of low-income, low-education voters) prevails over the "globalists" (high-income, high-education).

[20] The values of τ_s^* in regions 2 and 3, although chosen by the same type of median voter, are not equal as they depend on a changing economic environment. It can be proven that the τ_s of region 3 is lower than that of region 2.

would follow that $\tau_m > \tau_s$. This only implies that, within region 2, importing-sector entrepreneurs (instead of skilled workers) become pivotal voters on taxation – while the identity of the median voter along regions 1 and 3 remains unaltered. As a result, the political equilibrium in region 2 is defined by $(P^M, \tau^M) = (P_u^*(\tau_m^*), \tau_m^*)$ for $\sigma' < \sigma \leq \sigma''$. Given that $\tau_m < \tau_u$, it remains true that moving from region 1 to region 2 implies the surge of a less benevolent attitude towards trade openness (as $P_u^*(\tau_m^*) < P_u^*(\tau_u^*)$), so that the political equilibrium prevailing in region 2 can still be characterized as a protectionist equilibrium. A similar analysis can be carried out for the case $y_x < y_s$.

5 Dynamics

We now study a dynamic extension of our model, in which the skill composition of the working population varies over time as a result of public expenditure on education financed through tax revenues.[21]

5.1 The dynamic model: setup

Time is discrete and indexed by $t = 0, 1, ..., \infty$. Our economy is populated by non-overlapping generations of agents, whose composition by skill and occupation is defined by the parameters λ_t, γ_t and σ_t, as specified in Section 2.1. Successive generations have the same size, as the fertility rate of different types of agents is assumed to be exogenous and set equal to 1. For simplicity, we also impose that the share of workers and the proportion of exporting- *vs* importing-sector entrepreneurs is constant over time, i.e. $\lambda_t = \lambda$ and $\gamma_t = \gamma$ for any t. On the contrary, the share of skilled workers σ evolves endogenously across generations according to the following law of motion:

$$\sigma_{t+1} = \pi^{SS}\sigma_t + \pi^{US}(1 - \sigma_t), \tag{23}$$

where π^{SS} and π^{US} denote the probabilities that a skilled or an unskilled parent, respectively, has a skilled offspring.[22] Such probabilities encompass the role of both family background and public education. In particular,

$$\pi^{SS} = (1 - \zeta)\chi^{SS} + \zeta\frac{\eta G_t}{1 + G_t}, \tag{24}$$

[21] One may also think that redistribution positively affects human capital accumulation through alternative channels – other than public investment in schooling. For instance, redistribution may help contrasting those capital market imperfections that, as highlighted by Galor and Zeira (1993), tend to hamper human capital accumulation and economic growth.

[22] We assume that reproduction occurs asexually. In an alternative framework with sexual reproduction, our results would hold unchanged if mating is perfectly assortative.

$$\pi^{US} = (1-\zeta)\,\chi^{US} + \zeta\frac{\eta G_t}{1+G_t}, \tag{25}$$

with $\zeta \in (0,1)$. We thus have that π^{SS} and π^{US} are a weighted average between type-specific characteristics (χ^{SS} and χ^{US}, respectively) and public investment in education. The parameter $\eta \in (0,1)$ captures the effectiveness of public schooling in promoting social mobility. We restrict our attention to the case of $\chi^{SS} > \chi^{US}$, in which the probability of producing skilled offspring is higher for skilled parents. For the sake of analytical tractability, and without loss of generality, we also set $\chi^{SS} = 1$.

Our economy is characterized in every period by a specific value of σ, which pins down the composition of the population and determines a politico-economic equilibrium along the lines of Section 4.

As far as trade is concerned, the time-evolution of our economy in the long run is described by a sequence of Ricardo-Viner equilibria, characterized by the imperfect mobility of factors. This allows us to emphasize how the short-run redistributive effects of trade shape political attitudes, which in turn drive the dynamics of our model.[23] In this setting, we require the support of the trade policy space $\left[\underline{P}, \overline{P}\right]$ to be small enough, so that $P_u^*(\tau_s^*) = \underline{P}$ and $P_u^*(\tau_u^*) = P_s^*(\tau_s^*) = \overline{P}$. [24] As we will see, this simplification, by constraining the political decision over trade openness to a binary choice, allows us to obtain a closed-form solution for the dynamic model.

The only endogenous variable affecting the evolution of σ between t and $t+1$ is G_t. In turn, G_t is influenced by σ_t, since the share of skilled workers is a key determinant of the total amount of taxable income, but also concurs to characterize the prevailing political equilibrium, as defined by the tax rate τ^M and the degree of openness P^M chosen by majority voting. In particular, the value of σ_t determines whether at time t the economy belongs to region 1,2 or 3, as defined in Section 4. We can then write

$$G_t = G\left(\sigma_t, \tau^M(\sigma_t), P^M(\sigma_t)\right) = \begin{cases} G_{1,t}\left(\sigma_t, \tau_u^*(\sigma_t), \overline{P}\right) \text{ if } \sigma_t \leq \sigma' \\ G_{2,t}\left(\sigma_t, \tau_s^*(\sigma_t), \underline{P}\right) \text{ if } \sigma' < \sigma_t \leq \sigma'' \\ G_{3,t}\left(\sigma_t, \tau_s^*(\sigma_t), \overline{P}\right) \text{ if } \sigma_t > \sigma''. \end{cases} \tag{26}$$

After plugging the expression for G_t as given by (26) into equations (24) and (25), and

[23] Within every period, i.e. over the time span of one generation, one may think that even specific factors eventually become mobile – but we believe that the short-run effects of trade are key determinants of voters' behavior.

[24] In fact, as proven in Lemmas 4 and 5, we have $P_u^*(\tau_s^*) < P_u^*(\tau_u^*), P_s^*(\tau_s^*)$. It is then possible to choose $\underline{P}$ so that $\arg\max\left[U_u\left(P(\tau_s^*)\right)\right] \leq \underline{P}$ and $\overline{P}$ so that $\min\left\{\arg\max\left[U_s\left(P(\tau_s^*)\right)\right], \arg\max\left[U_u\left(P(\tau_u^*)\right)\right]\right\} \geq \overline{P}$, thus respectively implying that $P_u^*(\tau_s^*) = \underline{P}$ and $P_u^*(\tau_u^*) = P_s^*(\tau_s^*) = \overline{P}$.

then (24) and (25) into (23), we obtain the following transition function for σ:

$$\sigma_{t+1} = \begin{cases} f_1(\sigma_t) \text{ if } \sigma_t \leq \sigma' \\ f_2(\sigma_t) \text{ if } \sigma' < \sigma_t \leq \sigma'' \\ f_3(\sigma_t) \text{ if } \sigma_t > \sigma'', \end{cases} \tag{27}$$

where

$$f_1(\sigma_t) = (1-\zeta)\left[\chi^{US} + \sigma_t\left(1-\chi^{US}\right)\right] + \zeta\frac{\eta\Psi_1(1-\sigma_t)}{1+\eta\Psi_1(1-\sigma_t)}, \tag{28}$$

$$f_2(\sigma_t) = (1-\zeta)\left[\chi^{US} + \sigma_t\left(1-\chi^{US}\right)\right] + \zeta\frac{\eta\Psi_2\sigma_t}{1+\eta\Psi_2\sigma_t}, \tag{29}$$

$$f_3(\sigma_t) = (1-\zeta)\left[\chi^{US} + \sigma_t\left(1-\chi^{US}\right)\right] + \zeta\frac{\eta\Psi_3\sigma_t}{1+\eta\Psi_3\sigma_t}. \tag{30}$$

In the above equations, Ψ_1, Ψ_2 and Ψ_3 (whose complete expressions are given in Appendix B) reflect the political equilibrium arising in each of the three regions. In particular, they are combinations of the parameters of the static model, thus excluding σ_t and the "dynamic" parameters that shape social mobility, such as ζ, χ^{US} and η.

5.2 Steady states

We define as a stationary equilibrium (steady state) of this economy any fixed point of function (27). The next Proposition identifies, for each region, the parameter configurations under which a stable steady state exists. In particular, we proceed to establish conditions on η, whose effect on social mobility is both unambiguous and easy to interpret.

Proposition 4 *(Existence and stability of steady states). Consider regions 1, 2 and 3 as defined in Proposition 3. The economy converges monotonically to a unique stable steady state*

(i) within region 1, if

$$\frac{(1-\zeta)\left(1-\chi^{US}\right)}{\Psi_1\zeta} < \eta < \frac{2\lambda}{\Psi_1}\left(\frac{2\zeta\lambda}{\zeta+(1-\zeta)\chi^{US}} - 1\right);$$

(ii) within region 2, if

$$\frac{2\lambda\left[\chi^{US} - \zeta\left(2\lambda+\chi^{US}-1\right)\right]}{\Psi_2(1-2\lambda)\left(\zeta+\chi^{US}-\zeta\chi^{US}\right)} < \eta < \frac{\left[2\lambda\left(\frac{\zeta}{1+2\gamma(\lambda-1)-2\lambda} - \frac{\chi^{US}(\zeta-1)}{1+2\gamma(\lambda-1)}\right)\right]}{\Psi_2\left[\zeta\left(\chi^{US}-1\right)-\chi^{US}\right]};$$

(iii) within region 3, if

$$\eta > \frac{\left[2\lambda\left(\frac{\zeta}{1+2\gamma(\lambda-1)-2\lambda} - \frac{\chi^{US}(\zeta-1)}{1+2\gamma(\lambda-1)}\right)\right]}{\Psi_3\left[\zeta\left(\chi^{US}-1\right)-\chi^{US}\right]}.$$

Proof. The proof of Proposition 4, as well as the expressions for the steady states, are contained in Appendix B. ■

Note that the conditions on η in Proposition 4 are not mutually exclusive, thus implying that in principle our dynamic model may admit multiple stable steady states. In particular, we might be interested in understanding whether, depending on initial conditions, the dynamic system may converge towards a "protectionist" or a more liberal equilibrium. The possibility of non-ergodicity is addressed by the following corollary.

Corollary 1 *(Multiple equilibria). If $\Psi_3 > \Psi_2$, there may exist two stable steady states located in regions 2 and 3 respectively. Otherwise, equilibrium multiplicity can be ruled out.*

Proof. The proof is contained in Appendix B. ■

As can be inferred from Equations (29) and (30), the condition highlighted in Corollary 1, namely $\Psi_3 > \Psi_2$, implies that the political equilibrium arising in region 3 is more conducive to human capital accumulation than that of region 2.

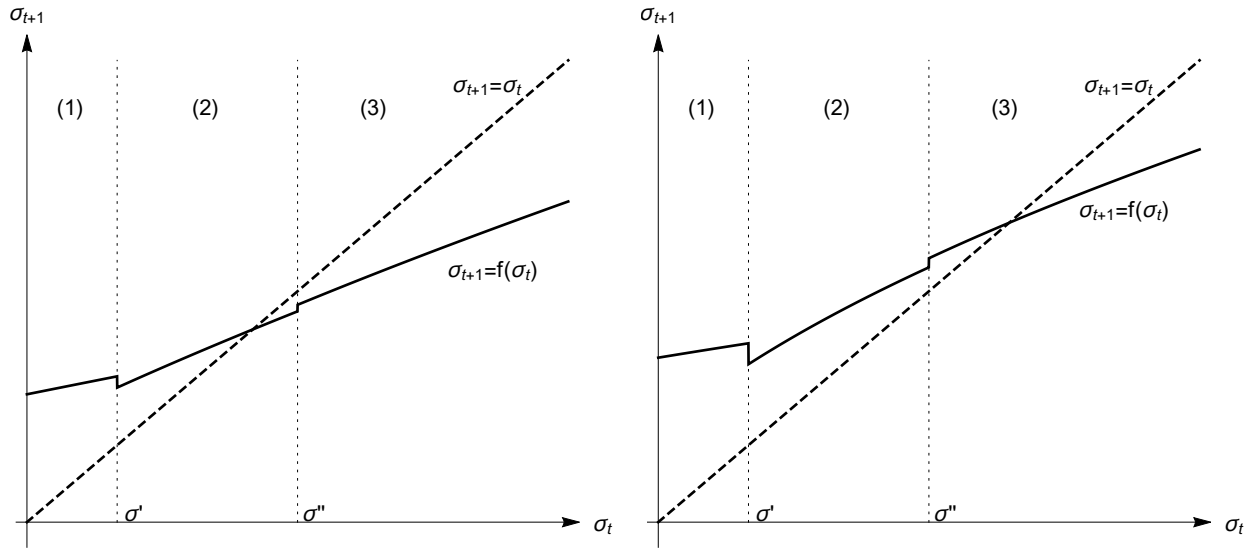
Taken together, Proposition 4 and Corollary 1 imply that our economy might well admit a stationary equilibrium only in region 2. In such a case, which is represented by the left panel of Figure 7, where the transition function crosses the 45° line in region 2, the economy ends up in a steady state characterized by a lower degree of trade openness.

For alternative values of the parameters, however, a unique steady state may be located in region 3, as depicted in the right panel of Figure 7. In such a case, protectionism is only a transitory phase, which is eventually overcome by a more sustained process of human capital accumulation - made possible, for instance, by a larger η. At the steady state, the share of skilled workers is sufficiently large to promote trade openness associated with moderate redistribution. In this case, free trade reemerges as a long-run political equilibrium, as the losers from globalization are not sufficiently numerous to impose protectionist policies.

5.3 Discussion

Through the lens of our dynamic model, we can try to interpret the evolution of political attitudes – towards both redistribution and trade/globalization – in the Western world, over the last decades.

Let us start from region 1 in Figure 7, which may describe most Western democracies from World War II to the '90s. In this region, the economy is characterized by both high



(a) Protectionist equilibrium (low η) (b) Free-trade equilibrium (high η)

Figure 7: Dynamics.

redistribution and trade openness. Throughout this region, the gains from trade are effectively redistributed, thus fueling social mobility, and globalization proceeds hand-in-hand with human capital accumulation.

In the example depicted in Figure 7, the economy eventually transits out of region 1, and two distinct cases are possible. The left panel has our economy ending up in a protectionist equilibrium: as explained above, the rise of the educated class determines a change in the political equilibrium, such that the extent of redistribution is significantly reduced and a coalition of the losers from trade enforces anti-globalization policies. The dynamic system reaches a long-run equilibrium within region 2, so that globalization breeds its own (irreversible) decline.[25] The alternative scenario is illustrated by the right panel of Figure 7, in which the long-run equilibrium is instead located in region 3. In this case, after the low-redistribution/protectionism phase, the continuing accumulation of human capital drives the economy towards a different political equilibrium: political preferences are as in region 2 (marked by a protectionist mood), but the number of unskilled, anti-trade workers eventually becomes so small that they cannot form a majority with the entrepreneurs impoverished by international trade, and protectionist measures are replaced by free-trade policies – even in the absence of adequate redistribution. Our model thus allows for a spontaneous return to free trade, essentially driven by human capital accumulation.[26] Given the discrete nature of our dynamical system, the economy

[25] Although not based on human capital formation, the idea that globalization – by pitching winners and losers against each other – may plant the seeds for its own demise is also present in Williamson (1996), who analyzes the emergence of a "deglobalization" phase after the globalization wave of the late 19th century.

[26] This stands somewhat in contrast with Piketty (2018), who believes that in the long run globalization

may even jump from region 1 to region 3, so that the progressive weakening of redistribution never translates in the adoption of anti-trade policies. This theoretical case may correspond to a number of countries that, although less and less effective in redistributing the gains from trade, are not witnessing an ascent to power of anti-globalization parties – maybe thanks to the effectiveness of the public education system.

Notice also that, whatever the consequences for trade policy, the dynamic version of our model has an interesting feature related to the redistributive role of public expenditure. By allowing increasing shares of the population to become skilled, public education ends up – somewhat paradoxically – curbing redistribution through the politico-economic mechanism of the model. Otherwise said, redistribution promotes social mobility through education, but the newly educated generations, being richer than their parents, are less inclined to accept high tax rates, and join forces with entrepreneurs and other educated people on the political arena to slow down redistribution (thus leaving behind the unskilled, as suggested by Zeira 2019).

6 Concluding remarks

In this paper, we have shown how the recent resurgence of protectionism in Western democracies may be explained, at least partially, by the inability to redistribute the gains from trade towards the losers from globalization - namely unskilled workers and entrepreneurs exposed to import competition. This lack of redistribution may in turn be due to the ascent of the educated class: since the median voter has become more and more educated over the last few decades, the support for redistribution has substantially eroded. As a consequence, workers and entrepreneurs who experience significant losses from globalization tend to form an anti-trade coalition when voting on trade policy.

Our analysis suggests, however, that neo-protectionism may only be a transitory phase if – thanks to social mobility – the number of unskilled workers progressively shrinks, and most people see their income increase because of globalization. Under such conditions, an anti-globalization majority cannot be sustained for long, because the number of the losers from trade tend to decrease substantially over time.

In this framework, the role of public education and human capital accumulation, which can be partially financed through the gains from trade, is not trivial and changes over time. In a first phase, by favoring the rise of the educated class, public education limits redistribution, and brings about a political resistance to trade openness. Even-

can only be sustained through the implementation of policies that make redistribution and globalization compatible. In our case, the resurgence of free trade would not correspond to an increase in redistribution.

tually, however, the sustained process of human capital accumulation (at the extensive margin) may reduce the size of losers from trade to an extent that – as hinted at above – the majority of voters would not oppose globalization any more, even in the absence of an adequate compensation for the losers.

Finally, let us stress that our model, although it does not address directly the issue of populism, may help explain the recent success of populist parties. In fact, some of these political formations advocate anti-trade policies as a response to the demand for protection of economically distressed workers, who – right or wrong – believe that the deterioration of their economic position is related to globalization.

References

Aksoy, Cevat G, Sergei Guriev, and Daniel S Treisman. 2018. "Globalization, Government Popularity, and the Great Skill Divide." *NBER Working Paper*, no. 25062.

Antràs, Pol, Alonso De Gortari, and Oleg Itskhoki. 2017. "Globalization, inequality and welfare." *Journal of International Economics* 108:387–412.

Autor, David. 2018. "Trade and labor markets: Lessons from China's rise." *IZA World of Labor*, no. 431.

Autor, David, David Dorn, Gordon Hanson, and Kaveh Majlesi. 2016. "Importing political polarization? The electoral consequences of rising trade exposure." *NBER Working Paper*, no. 22637.

Autor, David, David Dorn, and Gordon H Hanson. 2013. "The China syndrome: Local labor market effects of import competition in the United States." *American Economic Review* 103 (6): 2121–68.

Autor, David H, David Dorn, Gordon H Hanson, and Jae Song. 2014. "Trade adjustment: Worker-level evidence." *The Quarterly Journal of Economics* 129 (4): 1799–1860.

Barro, Robert J, and Jong Wha Lee. 2013. "A new data set of educational attainment in the world, 1950–2010." *Journal of Development Economics* 104:184–198.

Becker, Sascha O, Thiemo Fetzer, and Dennis Novy. 2017. "Who voted for Brexit? A comprehensive district-level analysis." *Economic Policy* 32 (92): 601–650.

Benabou, Roland. 1996. "Inequality and growth." *NBER Macroeconomics Annual* 11:11–74.

Bhagwati, Jagdish N, Arvind Panagariya, and Thirukodikaval N Srinivasan. 1998. *Lectures on International Trade*. MIT press.

Blanchard, Emily J, and Gerald Willmann. 2018. "Unequal Gains, Prolonged Pain: A Model of Protectionist Overshooting and Escalation." *CEPR Discussion Paper*, vol. 13160.

Blanchet, T, L Chancel, and A Gethin. 2019. "How unequal is Europe? Evidence from distributional national accounts." *WID. World Working Paper*, vol. 6.

Bluth, Christian. 2017. "Globalisation and the Welfare State: Can the Welfare State Still Keep Up with Globalisation?" Technical Report, GED Focus Paper.

Burstein, Ariel, and Jonathan Vogel. 2017. "International trade, technology, and the skill premium." *Journal of Political Economy* 125 (5): 1356–1412.

Colantone, Italo, and Piero Stanig. 2018a. "Global competition and Brexit." *American Political Science Review* 112 (2): 201–218.

———. 2018b. "The trade origins of economic nationalism: Import competition and voting behavior in Western Europe." *American Journal of Political Science* 62 (4): 936–953.

Cozzi, Guido, and Giammario Impullitti. 2016. "Globalization and wage polarization." *Review of Economics and Statistics* 98 (5): 984–1000.

Dippel, Christian, Robert Gold, and Stephan Heblich. 2015. "Globalization and its (dis-) content: Trade shocks and voting behavior." *NBER Working Paper*, no. 21812.

Doepke, Matthias, and Ruben Gaetani. 2019. "Employment protection, investment in job-specific skills, and inequality trends in the United States and Europe." *Mimeo*.

Epifani, Paolo, and Gino Gancia. 2009. "Openness, government size and the terms of trade." *The Review of Economic Studies* 76 (2): 629–668.

Galor, Oded. 2011. "Inequality, human capital formation, and the process of development." In *Handbook of the Economics of Education*, Volume 4, 441–493. Elsevier.

Galor, Oded, and Joseph Zeira. 1993. "Income distribution and macroeconomics." *The Review of Economic Studies* 60 (1): 35–52.

Grossman, Gene M. 1983. "Partially mobile capital: A general approach to two-sector trade theory." *Journal of International Economics* 15 (1-2): 1–17.

Grossman, Gene M, and Elhanan Helpman. 2018. "Identity Politics and Trade Policy." *NBER Working Paper*, no. 25348.

Grossman, Gene M, Elhanan Helpman, and Philipp Kircher. 2017. "Matching, sorting, and the distributional effects of international trade." *Journal of Political Economy* 125 (1): 224–264.

Guiso, Luigi, Helios Herrera, Massimo Morelli, and Tommaso Sonno. 2017. "Demand and supply of populism." *Mimeo*.

Guiso, Luigi, and Fabiano Schivardi. 2011. "What Determines Entrepreneurial Clusters?" *Journal of the European Economic Association* 9 (1): 61–86.

Harrigan, James, and Ariell Reshef. 2015. "Skill-biased heterogeneous firms, trade liberalization and the skill premium." *Canadian Journal of Economics/Revue canadienne d'économique* 48 (3): 1024–1066.

Huberman, Michael. 2008. "Ticket to trade: Belgian labour and globalization before 1914 1." *The Economic History Review* 61 (2): 326–359.

Huberman, Michael, and Christopher M Meissner. 2010. "Riding the wave of trade: the rise of labor regulation in the golden age of globalization." *The Journal of Economic History* 70 (3): 657–685.

Mariani, Fabio. 2013. "The political economy of naturalization." *Canadian Journal of Economics/Revue canadienne d'économique* 46 (2): 656–688.

Mayer, Wolfgang. 1974. "Short-run and long-run equilibrium for a small open economy." *Journal of Political Economy* 82 (5): 955–967.

Melitz, Marc J. 2003. "The impact of trade on intra-industry reallocations and aggregate industry productivity." *Econometrica* 71 (6): 1695–1725.

Michelacci, Claudio, and Olmo Silva. 2007. "Why so many local entrepreneurs?" *The Review of Economics and Statistics* 89 (4): 615–633.

Mussa, Michael. 1974. "Tariffs and the distribution of income: The importance of factor specificity, substitutability, and intensity in the short and long run." *Journal of Political Economy* 82 (6): 1191–1203.

———. 1982. "Imperfect factor mobility and the distribution of income." *Journal of International Economics* 12 (1-2): 125–141.

OECD. 2018. *Social Expenditure Database*.

———. 2019a. *Government at a Glance*.

———. 2019b. *Quarterly International Trade Statistics*.

———. 2019c. *Social and Welfare Statistics*.

Ottaviano, Gianmarco I.P., and Giovanni Peri. 2012. "Rethinking the effect of immigration on wages." *Journal of the Europeanl Economic Association* 10 (1): 152–197.

Pastor, Lubos, and Pietro Veronesi. 2018. "Inequality aversion, populism, and the backlash against globalization." *NBER Working Paper*, no. 24900.

Persson, Torsten, and Guido Enrico Tabellini. 2002. *Political economics: explaining economic policy*. MIT press.

Piketty, Thomas. 2018. "Brahmin Left vs Merchant Right: Rising Inequality and the Changing Structure of Political Conflict." *WID.World Working Paper*, no. 2018/7.

Rodrik, Dani. 1998. "Why do more open economies have bigger governments?" *Journal of Political Economy* 106 (5): 997–1032.

———. 2018. "Populism and the Economics of Globalization." *Journal of International Business Policy*, pp. 1–22.

UNESCO. 2019. *UIS Database*.

Vannoorenberghe, Gonzague, and Eckhard Janeba. 2016. "Trade and the political economy of redistribution." *Journal of International Economics* 98:233–244.

Williamson, Jeffrey G. 1996. "Globalization, convergence, and history." *The Journal of Economic History* 56 (2): 277–306.

Zeira, Joseph. 2007. "Wage inequality, technology, and trade." *Journal of Economic Theory* 137 (1): 79–103.

———. 2019. "The rise of the educated class." *Mimeo*.

A Proofs of the static model

Here, we report the proofs of Lemmas 1, 2, 4 and 5.

A.1 Proof of Lemma 1

We need to show that, under Assumption 1, the income ranking specified by the chain of inequalities contained in (13) holds.

Let us start by $y_s > y_u$. From (11) and (12), we obtain that $y_s > y_u$ holds if and only if

$$\alpha \left[\left(1 - \theta_u^*\right) \left(1 - \sigma\right) \right] > \beta \left[\left(1 - \theta_s^*\right) \sigma \right].$$

Knowing that $\theta_s^* > \theta_u^*$, the (sufficient) condition ensuring that the above inequality holds is given by

$$\sigma < \frac{\alpha}{\alpha + \beta},$$

which is part (i) of 1.

As far as $y_m > y_s$ is concerned, given (10), (11) and (7), we obtain that the inequality is satisfied if and only if

$$P < \frac{\phi^{\frac{\beta}{1-\beta}}}{A^{\frac{1}{1-\beta}}} \left(\frac{\lambda\sigma \left(1 - \alpha - \beta\right) - \alpha \left(1 - \gamma\right) \left(1 - \lambda\right)}{\alpha\gamma \left(1 - \lambda\right)} \right)^{\frac{1-\alpha-\beta}{1-\beta}}, \tag{31}$$

which leads to part (ii) of 1.

After rewriting the high-skilled income as

$$y_s \equiv \frac{\partial Y_X}{\partial L_{X,s}} = PA\alpha \left[\gamma \left(1 - \lambda\right)\right]^{1-\alpha-\beta} \left[\left(1 - \sigma\right) \lambda\right]^{\beta} \left(\sigma\lambda\right)^{\alpha-1} \frac{\left(\theta_u^*\right)^{\beta}}{\left(\theta_s^*\right)^{1-\alpha}}, \tag{32}$$

we can then compare (32) with (9) and obtain that $y_x > y_s$ if and only if

$$P > \frac{\phi^{\frac{\beta}{1-\beta}}}{A^{\frac{1}{1-\beta}}} \left(\frac{\alpha \left(1 - \lambda\right) \left(1 - \gamma\right)}{\lambda\sigma \left(1 - \alpha - \beta\right) - \alpha\gamma \left(1 - \lambda\right)} \right)^{\frac{1-\alpha-\beta}{1-\beta}}, \tag{33}$$

which leads to part (iii) of 1.

A.2 Proof of Lemma 2

Points (i) and (ii). Given that both θ_s^* and θ_u^* are increasing in P, it follows that (9) is increasing in P and (10) is decreasing in P.

Point (iii). Plugging (7) and (8) into (11), we obtain:

$$y_s(P) = \alpha\left[(1-\gamma)(1-\lambda)\right]^{1-\alpha-\beta}(\sigma\lambda)^{\alpha-1}\left[(1-\sigma)\lambda\right]^{\beta}\frac{\left[1+\frac{\gamma}{1-\gamma}(AP)^{\frac{1}{1-\alpha-\beta}}(\phi P)^{-\frac{\beta}{1-\alpha-\beta}}\right]^{1-\alpha}}{\left[1+\frac{\gamma}{1-\gamma}(AP)^{\frac{1}{1-\alpha-\beta}}(\phi P)^{-\frac{1-\alpha}{1-\alpha-\beta}}\right]^{\beta}}.$$

Since $\alpha+\beta<1$, we have that $\partial y_s/\partial P>0$.

Point (iv). Plugging (7) and (8) into (12), we obtain:

$$y_u(P) = \beta\left[(1-\gamma)(1-\lambda)\right]^{1-\alpha-\beta}(\sigma\lambda)^{\alpha}\left[(1-\sigma)\lambda\right]^{\beta-1}\frac{\left[1+\frac{\gamma}{1-\gamma}(AP)^{\frac{1}{1-\alpha-\beta}}(\phi P)^{-\frac{1-\alpha}{1-\alpha-\beta}}\right]^{1-\beta}}{\left[1+\frac{\gamma}{1-\gamma}(AP)^{\frac{1}{1-\alpha-\beta}}(\phi P)^{-\frac{\beta}{1-\alpha-\beta}}\right]^{\alpha}}.$$

It follows that $\partial y_u/\partial P \gtreqless 0$ if $P \lesseqgtr 1/\phi$.

A.3 Proof of Lemma 4

The indirect utility of agent i can be written as

$$U_i(P) = \frac{y_i(P)}{P^{1-\mu}}\left[1-\tau^M(P)\right]\mu^{\mu}(1-\mu)^{1-\mu} + \delta\log\tau^M(P)\,Y(P), \tag{34}$$

where the only individual-specific term is $y_i(\cdot)$.

We can then look at the three income ratios, which write as

$$\frac{y_x}{y_s} = \frac{1-\alpha-\beta}{\alpha}\frac{\sigma\lambda}{\gamma(1-\lambda)}\theta_s^*;$$

$$\frac{y_s}{y_u} = \frac{\alpha}{\beta}\frac{1-\sigma}{\sigma}\frac{1-\theta_u^*}{1-\theta_s^*};$$

$$\frac{y_u}{y_m} = \frac{\beta}{1-\alpha-\beta}\frac{(1-\gamma)(1-\lambda)}{(1-\sigma)\lambda}\frac{1}{1-\theta_u^*}.$$

The income ratios y_x/y_s and y_u/y_m are increasing in P as $\partial\theta_i^*/\partial P>0$ for $i=s,u$. Furthermore, given that (i) $\theta_i^*(P)$ for $i=s,u$ is a strictly concave function in P, (ii) $\theta_s^*(0)=\theta_u^*(0)=0$ and (iii) $\theta_u^*(P)<\theta_s^*(P)$ for any P, it follows that $\partial\theta_u^*/\partial P|_P < \partial\theta_s^*/\partial P|_P$ for any P; we then have $d(y_s/y_u)/dP>0$.

Given that all the three income ratios are increasing functions of P, we can conclude that $P_x^*(\tau^M) > P_s^*(\tau^M) > P_u^*(\tau^M) > P_m^*(\tau^M)$.

A.4 Proof of Lemma 5

The intuition for the proof is that, when $\tau = \tau_s^*$, net marginal benefits from globalization for unskilled workers are lower than if $\tau = \tau_u^*$. Hence, we have $P_u^*(\tau_s^*) < P_u^*(\tau_u^*)$. Write the indirect utility of unskilled workers as

$$U_u\left(P, \tau^M\right) = \frac{y_u(P)}{P^{1-\mu}}\left[1 - \tau^M(P)\right]\mu^\mu(1-\mu)^{1-\mu} + \delta \ln \tau^M(P) Y(P),$$

where $\tau^M = \{\tau_u^*, \tau_s^*\}$.

Start from a situation in which $\tau^M = \tau_u^*$. $P_u^*(\tau_u^*)$ solves the following FOC:

$$\frac{dU_u(P, \tau = \tau_u^*)}{dP} = (1-\mu)^{1-\mu}\mu^\mu \frac{d\left(\frac{y_u(P)}{P^{1-\mu}}\left[1 - \tau_u^*(P)\right]\right)}{dP} + \delta \frac{d\left(\ln \tau_u^*(P) Y(P)\right)}{dP} = 0, \quad (35)$$

The value $P_u^*(\tau_u^*)$ equalizes the marginal costs from globalization (first addend) to its marginal benefits (second addend). When the tax rate goes down, $\tau^M = \tau_s^*$, marginal costs (first addend) go up and marginal benefits (second addend) go down. Hence P^* must decrease in order to satisfy the new FOC. As a result,

$$\frac{dU_u(P, \tau = \tau_s^*)}{dP} = (1-\mu)^{1-\mu}\mu^\mu \frac{d\left(\frac{y_u(P)}{P^{1-\mu}}\left[1 - \tau_s^*(P)\right]\right)}{dP} + \delta \frac{d\left(\ln \tau_s^*(P) Y(P)\right)}{dP} = 0,$$

for $P_u^*(\tau_s^*) < P_u^*(\tau_u^*)$.

B Dynamics: proofs and additional material

Here, we provide supplemental material to the main results of Section 5.

B.1 Expressions for Ψ_1, Ψ_2 and Ψ_3.

We now derive the explicit expressions for Ψ_1, Ψ_2, Ψ_3 introduced in Section 4. Using the expression for τ_i^*, for $i = u, s$, as given in (19), and the expressions for total production and workers' incomes, as respectively given in (16), (11) and (12), into (15), we can rewrite public expenditure as

$$G_t = \begin{cases} \Psi_1(1-\sigma_t) \text{ if } 0 \leq \sigma_t \leq \sigma' \\ \Psi_2 \sigma_t \text{ if } \sigma' < \sigma_t \leq \sigma'' \\ \Psi_3 \sigma_t \text{ if } \sigma'' < \sigma_t \leq 1, \end{cases} \quad (36)$$

where

$$\Psi_1 \equiv \frac{\left(\overline{P}A\gamma^{1-\alpha-\beta}\left(\theta_s\left(\overline{P}\right)\right)^{\alpha}\left(\theta_u\left(\overline{P}\right)\right)^{\beta}+(1-\gamma)^{1-\alpha-\beta}\left(1-\theta_s\left(\overline{P}\right)\right)^{\alpha}\left(1-\theta_u\left(\overline{P}\right)\right)^{\beta}\right)\lambda\delta\overline{P}^{1-\mu}}{\beta\left(1-\gamma\right)^{1-\alpha-\beta}\left(1-\theta_s\left(\overline{P}\right)\right)^{\alpha}\left(1-\theta_u\left(\overline{P}\right)\right)^{\beta-1}\left(1-\mu\right)^{1-\mu}\left(\mu\right)^{\mu}},$$

$$\Psi_2 \equiv \frac{\left(\underline{P}A\gamma^{1-\alpha-\beta}\left(\theta_s\left(\underline{P}\right)\right)^{\alpha}\left(\theta_u\left(\underline{P}\right)\right)^{\beta}+(1-\gamma)^{1-\alpha-\beta}\left(1-\theta_s\left(\underline{P}\right)\right)^{\alpha}\left(1-\theta_u\left(\underline{P}\right)\right)^{\beta}\right)\lambda\delta\underline{P}^{1-\mu}}{\alpha\left(1-\gamma\right)^{1-\alpha-\beta}\left(1-\theta_s\left(\underline{P}\right)\right)^{\alpha-1}\left(1-\theta_u\left(\underline{P}\right)\right)^{\beta}\left(1-\mu\right)^{1-\mu}\left(\mu\right)^{\mu}},$$

and

$$\Psi_3 \equiv \frac{\left(\overline{P}A\gamma^{1-\alpha-\beta}\left(\theta_s\left(\overline{P}\right)\right)^{\alpha}\left(\theta_u\left(\overline{P}\right)\right)^{\beta}+(1-\gamma)^{1-\alpha-\beta}\left(1-\theta_s\left(\overline{P}\right)\right)^{\alpha}\left(1-\theta_u\left(\overline{P}\right)\right)^{\beta}\right)\lambda\delta\overline{P}^{1-\mu}}{\alpha\left(1-\gamma\right)^{1-\alpha-\beta}\left(1-\theta_s\left(\overline{P}\right)\right)^{\alpha-1}\left(1-\theta_u\left(\overline{P}\right)\right)^{\beta}\left(1-\mu\right)^{1-\mu}\left(\mu\right)^{\mu}}.$$

Note that, in the expressions above, P^* has been replaced by the political choice relevant for each region, i.e. $\overline{P}$ in regions 1 and 3, $\underline{P}$ in region 2.

B.2 Proof of Proposition 4

We successively examine the three cases described in the Proposition.

Case (i): steady state in region 1. Solving $f_1(\sigma) = \sigma$ where $f_1(\sigma)$ is given by (28), we obtain two possible solutions, only one of which can be comprised between 0 and 1 (the other being always strictly larger than 1). It is given by

$$\sigma_1^* = 1 + \frac{1}{2\eta\left(1-\lambda\right)} - \frac{\sqrt{\left(\zeta\left(1-\chi^{US}\right)+\chi^{US}\right)\left(\chi^{US}-\zeta\left(\chi^{US}-1-4\eta\left(1-\lambda\right)\right)\right)}}{2\eta\left(1-\lambda\right)\left(\zeta\left(1-\chi^{US}\right)+\chi^{US}\right)}. \quad (37)$$

We then study the conditions under which σ_1^* belongs to region 1. It can be checked that $\sigma_1^* < \sigma'$ if

$$\eta < \frac{2\lambda}{\Psi_1}\left(\frac{2\zeta\lambda}{\zeta+\left(1-\zeta\right)\chi^{US}}-1\right). \quad (38)$$

The next step consists in understanding whether such steady state is stable. The first partial derivative of $f_1(\sigma)$ can be written as

$$\frac{\partial f_1(\sigma)}{\partial\sigma} = \left(1-\zeta\right)\left(1-\chi^{US}\right) - \frac{\Psi_1\zeta\eta}{\left(1+\Psi_1\eta\left(1-\sigma\right)\right)^2},$$

and is always smaller than 1. This guarantees that σ_1^* is a stable steady state. Finally, for convergence to the steady state to occur monotonically, we need the above partial

derivative to be positive. This occurs if

$$\eta > \frac{(1-\zeta)\left(1-\chi^{US}\right)}{\Psi_1 \zeta}. \tag{39}$$

Putting the two conditions (38) and (39) together, we obtain the parametric restrictions contained in point (i) of Proposition 4.

Case (ii): steady state in region 2. We proceed as we did for region 1. Solving $f_2(\sigma) = \sigma$ where $f_2(\sigma)$ is given by (29), we obtain two possible solutions, only one of which can be comprised between 0 and 1 (the other being always strictly negative). It is given by

$$\sigma_2^* = \frac{\sqrt{\left(1+\eta\Psi_2\right)^2 - \frac{4\zeta\Psi_2\eta}{\left(1-\chi^{US}\right)\zeta+\chi^{US}}} + \eta\Psi_2 - 1}{2\eta\Psi_2}.$$

By comparing σ_2^* with σ' and σ'', we can show that σ_2^* belongs to region 2 if

$$\frac{2\lambda\left[\chi^{US} - \zeta\left(2\lambda + \chi^{US} - 1\right)\right]}{\Psi_2\left(1-2\lambda\right)\left(\zeta + \chi^{US} - \zeta\chi^{US}\right)} < \eta < \frac{\left[2\lambda\left(\frac{\zeta}{1+2\gamma(\lambda-1)-2\lambda} - \frac{\chi^{US}(\zeta-1)}{1+2\gamma(\lambda-1)}\right)\right]}{\Psi_2\left[\zeta\left(\chi^{US}-1\right) - \chi^{US}\right]}.$$

The first partial derivative of $f_2(\sigma)$ can be written as

$$\frac{\partial f_2(\sigma)}{\partial\sigma} = (1-\eta)\left(1-\chi^{US}\right) + \frac{\zeta\Psi_2\eta}{\left(1+\Psi_2\eta\sigma\right)^2},$$

which is always positive and decreasing in σ. It follows that the transition function in region 2 is increasing and concave. This guarantees that σ_2^* is stable, and that convergence to this steady state occurs monotonically.

Case (iii): steady state in region 3. Looking at the expression for $f_3(\sigma_t)$ as given in (30), we can see that $f_3(\sigma_t)$ is identical to $f_2(\sigma_t)$, with the only difference that Ψ_3 replaces Ψ_2. As a result, $f_3(\sigma_t)$ is always increasing and concave, and there exists only one positive, stable steady state towards which the economy monotonically converges. It is given by

$$\sigma_3^* = \frac{\sqrt{\left(1+\eta\Psi_3\right)^2 - \frac{4\zeta\Psi_3\eta}{\left(1-\chi^{US}\right)\zeta+\chi^{US}}} + \eta\Psi_3 - 1}{2\eta\Psi_3}.$$

The stationary proportion of skilled worker, σ_3^*, is always lower than 1. Moreover, it can be shown to be larger than σ'' if

$$\eta > \frac{\left[2\lambda\left(\frac{\zeta}{1+2\gamma(\lambda-1)-2\lambda} - \frac{\chi^{US}(\zeta-1)}{1+2\gamma(\lambda-1)}\right)\right]}{\Psi_3\left[\zeta\left(\chi^{US}-1\right) - \chi^{US}\right]}.$$

B.3 Proof of Corollary 1

The proof is organized in two steps. We first show that, for a given configuration of parameters, there cannot be two steady states in regions 1 and 2, respectively. In fact, we know that the transition function jumps downward between region 1 and region 2. Therefore, if there is a stable steady state in region 1, the proof of Proposition 4 guarantees that there will be no stable steady state in region 2. The downward shift of the transition function between region 1 and 2 can be explained by the fact that both total income and the equilibrium tax rate decrease from region 1 to region 2. By consequence, public expenditure goes down, thus hampering social mobility. As far as multiple equilibria in regions 2 and 3 are concerned, we can show that non-ergodicity may emerge if $f_3(\sigma) > f_2(\sigma)$ for $\sigma = \sigma''$. This can only happen if $\Psi_3 > \Psi_2$, as can be seen from equations (29) and (30).