A Theory of Economic Unions

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Abstract

After decades of successful growth, economic unions have recently become the focus of heightened political controversy. We argue that this is partly due to the growth of trade between countries that are increasingly dissimilar. We develop a theoretical framework to study the effects on trade, income distribution and welfare of economic unions that differ in size ad scope. Our model shows that political support for international unions can grow with their breadth and depth as long as member countries are sufficiently similar. However, differences in economic size and factor endowments can trigger disagreement over the value of unions between and within countries. The model is consistent with same salient features of the process of European integration and statistical evidence from survey data.

JEL Classification: F15, F55, F62, H77, D71, D78

Keywords: Economic unions, Non-tariff barriers, European intergation

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1 Introduction

The development of global markets increasingly relies on international institutions providing common regulation to reduce or remove the frictions that hamper trade across national borders. The growing importance of these non-tariff barriers reflects, on the one hand, the decline of more obvious costs of international trade: progress in transportation and communication technology has steadily reduced shipping costs, while multilateral and regional trade agreements have brought tariffs down to an all-time low of 3% on average.[1] On the other hand, regulatory harmonization has become more important with the increasing complexity of world trade. Recent decades have witnessed the growth of trade in tasks, with different stages of production located in different countries along global value chains. In the future, growth in international trade must increasingly lie in the service sector. Its importance is steadily growing, and it already accounts for almost two thirds of world output; yet it only accounts for less than a quarter of world trade, in part because many services—especially professional and financial services—are bound by distinct national regulations.[2]

The need for common policies to enable market integration and reap the gains from trade has led to the creation of international economic unions. Europe has been at the forefront of this institutional development. Establishing a common market was the core objective of the European Economic Community at its founding in 1957. Over the following six decades, what is now the European Union has grown from 6 to 28 member states, while steadily deepening economic integration and regulatory harmonization in its Single Market. Yet economic unions are far from an exclusively European phenomenon; on the contrary, they are found on every continent.[3] Moreover, recent trade agreements such as the EU–Japan Economic Partnership Agreement have increasingly emphasized regulatory cooperation, common standards and impartial enforcement procedures for the protection of

[1] The world average of effectively applied tariff rates, weighted by the product import shares corresponding to each partner country, was 2.59% in 2017, as reported by the World Development Indicators.

[2] Over the decade to 2016, the share of services in world value added grew from 62% to 65%, as reported by the World Development Indicators. Developed countries had a similar pattern of growth (e.g., 74% to 77% for the US and 64% to 66% for the EU) and developing countries a steeper one (e.g., 43% to 52% for China). In 2016, the share of services in international trade was 23% on average, with higher figures for developed countries (e.g., 26% for the US and 29% for the EU, including intra-EU trade) and lower ones for developing countries (e.g., 16% for China).

[3] International economic unions, with varying levels of economic integration and institutional success, include the Caribbean Single Market (CARICOM), the Central American Common Market (SICA), and the Southern Common Market (Mercosur); the Central African Economic and Monetary Community (CEMAC) and the West African Economic and Monetary Union (UEMOA); the Eurasian Economic Union, the Gulf Cooperation Council, and the ASEAN Economic Community.

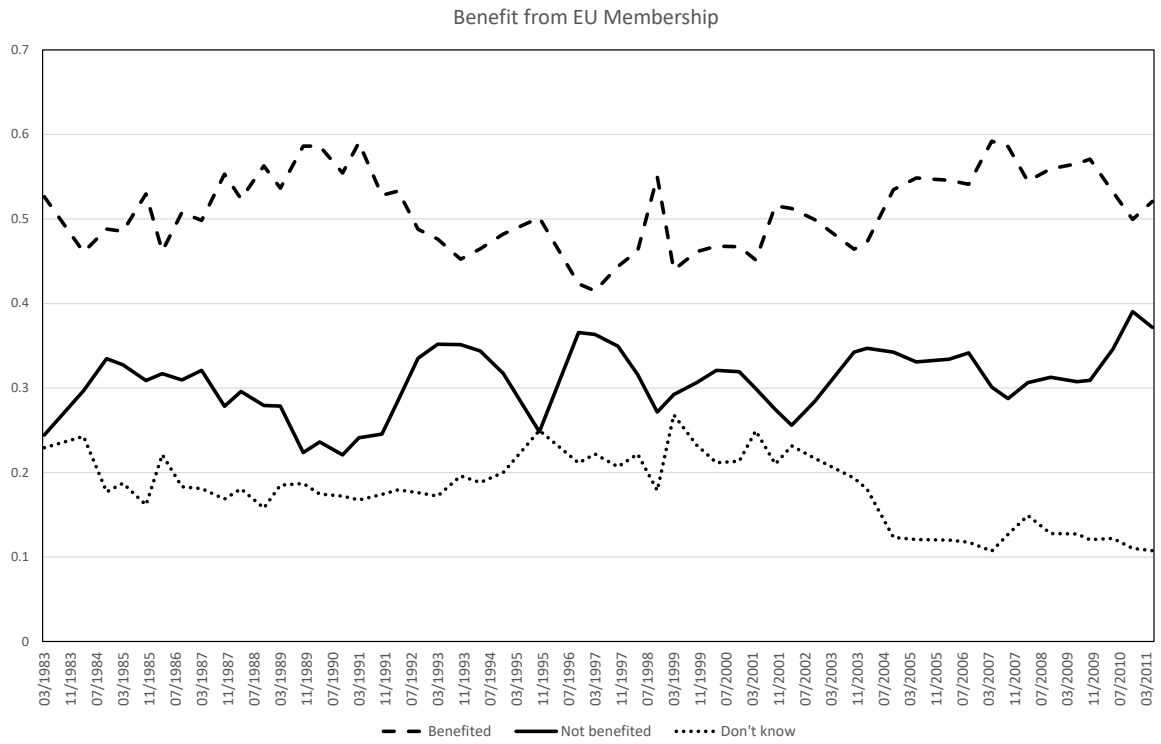

Figure 1: Perceived benefits from EU membership. Shares of responses to the question: "Taking everything into consideration, would you say that (your country) has on balance benefited or not from being a member of the European Union?". Source: Eurobarometer.

investors and intellectual-property owners.

After decades of successful growth, however, economic unions have become the focus of heightened political controversy over the past few years. After the election of President Trump in 2016, the United States abandoned both the Trans-Pacific Partnership and the Transatlantic Trade and Investment Partnership. Also in 2016, the United Kingdom voted in a referendum to leave the EU. Euro-skepticism appears on the rise more broadly, and plans for the enlargement of the euro area are effectively on hold.

These setbacks do not mean that international institution are now facing a universal backlash, just as they did not previously enjoy universal support. Yet, they have become increasingly polarizing. Both President Trump and Brexit won narrow and bitterly divisive victories at the polls. Eurobarometer surveys show that the share of European citizens who perceive net benefits of EU membership has remained quite steady over the decades; however, the share who perceive net costs has been gradually catching up, as the share of undecided respondents fell (Figure 1).

Preference polarization over international economic integration is naturally linked to the

changing nature of international trade. Throughout the second half of the twentieth century, a substantial share of world trade was taking place between similar countries. Likewise, economic unions initially included countries with comparable levels of income and factor endowments. A key feature of this type of economic integration is that it does not imply the reallocation of resources predicted by conventional models of trade driven by differences in factor endowments. Accordingly, one of the original motivations for developing models of trade in differentiated varieties was the need to account for episodes such as the creation of the EEC, in which trade liberalization had faced little political opposition because it had led to rises in real income for owners of all factors in all member states (Helpman and Krugman 1985). Yet, the enlargements of the EU to the East, trade liberalization in developing countries and the rise of China in global markets have brought distributional consideration to the forefront. As a result, many now fear that the negative consequences of import competition can overshadow the benefits of market size.

To shed light on these phenomena, in this paper we develop a theoretical framework to study the effects on trade, income distribution and welfare of economic unions that differ in size and scope. We then apply our model to interpret the process of European integration. Section 2 presents the basic setup of our theory. It considers a multi-country, multi-industry and multi-factor framework that combines the Krugman model of trade and monopolistic competition with the Ricardo-Viner model of specific factors. In particular, countries produce differentiated varieties in a continuum of industries employing sector-specific human capital. They differ both in size and in the distribution of their factor endowment across sectors. These differences entail potential gains from both intra-industry and inter-industry trade.

In Section 3, we add to our framework a theory of border costs. We assume that in some industries trade is possible only in the presence of union policies that overcome non-tariff barriers. For instance, common regulations or standards are often needed for firms to sell their products in foreign markets, especially in certain sectors such as financial services. We explicitly recognize that all economic unions are not the same. In particular, unions vary in their depth, i.e., the measure of industries covered by union policies; and their breadth, i.e., the set of countries included in the union. We study how these aspects of the union determine its impact on the world distribution of income and welfare.

In Section 4, we determine the sources of political support for specific economic unions and derive predictions on how this political support varies across countries, and how it reacts to changes in the depth and breadth of the union. We find that some of the effects of union policies are homogeneous within each country because they reflect changes in prices that

accrue entirely to consumers. This is the case for the benefits of increased variety that result from intra-industry trade. Inter-industry trade also yields consumer benefits, but in addition it has distributive consequences across workers in the same country. Exporters reap an extra gain from accessing foreign markets, while factor owners in import industries lose from the entry of foreign competitors into their home market. The model paints a rich and realistic picture, which yields the following main results.

If union members are sufficiently similar, there is no disagreement either between or within countries. Support for the union unanimously increases with the size and scope of the union. The intuition for this result is simply that the value of trade-promoting policies increases with the number of potential trading partners and the industries they cover. However, disagreement over the value of unions arises if countries differ in size, income and endowments.

Differences in economic size introduce disagreement over the value of the union between countries, as the benefit from the access to the larger union market is higher for small and poor countries. Comparative advantage due to differences in relative endowments introduces instead disagreement over the union within countries. Workers in comparative-advantage industries support the union because they stand to benefit as exporters. Workers in comparative-disadvantage industries benefit from lower prices, but experience a fall in their income due to import competition from other countries in the union. Hence, the effect of comparative advantage on the support for market integration is nuanced. On the one hand, inter-industry trade increases the value the union. On the other hand, it also generates winners and losers. Various scenarios may arise. For instance, adding dissimilar countries can weaken the support for the union, even when more market integration is beneficial for all countries as a whole. The reason is that, while winners gain more from such an enlargement, the number of sectors and workers threatened by import competition increases.

Section 5 discusses how our theory helps interpret the history of European integration. In the twentieth century, the EU steadily grew in size up to 15 members, while constantly deepening market integration and enjoying broad political support. This pattern is consistent with our prediction that economic unions can grow without triggering opposition when their members are not too dissimilar. In the twenty-first century, however, enlargement has brought into the EU countries that are smaller, poorer and have a different mix of factor endowments. In keeping with our theory, this has led to growing political tensions and discontent among losers in larger, richer countries. We provide new statistical evidence that measures of economic size and exposure to import competition from other EU countries cor-

relate with survey data on attitudes towards the union precisely as predicted by our model. In particular, rich and large countries tend to have a more negative image of the EU. Moreover, support for the EU is weaker in countries with a larger share of workers employed in comparative-disadvantage sectors; finally, this share has increased in many member countries after the 2004-06 enlargements.

Related literature There is a large literature on international and regional trade agreements: Freund and Ornelas (2010) and Maggi (2014, 2016) provide excellent surveys. This literature considers international agreements as coordination and commitment devices to prevent the escalation of negative externalities generated by trade policy and to protect governments from the influence of domestic pressure groups. It has studied the design of rules for achieving these goals, and the merits of multilateral relative to regional negotiations. In contrast, we study the effect of unions at eliminating non-tariff barriers to trade and removing the undesirable "border effect" that these barriers produce. Our focus is on the heterogeneous costs and benefits of these policies. We abstract from coordination and commitment problems, which have been studied extensively.

Our paper is also related to the literature on the size of trade-promoting international unions. Several papers build on the insight from theories of federalism (Oates 1972) that unions, like centralized jurisdictions, reap the benefits of coordination and market integration, but at the cost of imposing uniform policies on members with different preferences (Bolton and Roland 1996, 1997; Alesina and Wacziarg 1999; Alesina, Spolaore and Wacziarg 2000; Casella 2001; Casella and Feinstein 2002; Alesina, Angeloni and Etro 2005; Gancia, Ponzetto and Ventura 2018). These papers have studied how the size of jurisdictions changes with exogenous changes in the costs of trade. In contrast, we study the effect of unions that vary in size and scope on countries that differ in size, productivity and factor endowments. In this respect, our model is also related to a small set of papers studying asymmetric unions (Harstad 2006; Berglof et al. 2008, 2012). This literature has however focused on a different question, namely, whether the possibility of forming "inner clubs" is desirable and/or can sustain more cooperation in the presence of externalities.

Finally, there is a new but fast-growing literature on the recent backlash against globalization. There is evidence that voters exposed to import competition become more protectionist (Feigenbaum and Hall 2015), and that the opposition of import-exposed workers to international economic integration was one of the economic drivers of support for Brexit voters skeptical (Becker, Fetzer and Novy 2017; Colantone and Stanig 2018a). More broadly, a se-

ries of recent papers have investigated empirically the connection of import competition with economic nationalism and political extremism (Che et al. 2016; Autor et al. 2017; Colantone and Stanig 2018b). Dippel, Gold and Heblich (2015) and Jensen, Quinn and Weymouth (2017) have shown that, just as import competition is positively linked to anti-establishment politics, export opportunities have the opposite political effect.

From a theoretical perspective, political opposition to globalization has been associated mostly to a rise in inequality (Grossman and Helpman 2019; Pastor and Veronesi 2019). In this paper, we also consider inequality, but we shows how it interacts with other factors giving rise to a rich set of results. Interestingly, Buera, Monge-Naranjo and Primiceri (2011) warned that, in a model with uncertainty and learning, a large economic shock could trigger a reversal against market-oriented policies. We instead abstract from issues related to information frictions. While all the papers in this literature study unilateral policy choices, we focus on political support for existing international unions.

2 A model of international trade with border costs

This section develops a multi-country, multi-industry and multi-factor framework that combines the Krugman model of trade and monopolistic competition with the Ricardo-Viner model of specific factors. Each industry contains a continuum of monopolistic competitors producing differentiated products and earning zero profits. Labor is the only factor of production. But there are many different types of labor, one for each industry.

As usual, country borders affect trade. In labor markets, border costs are prohibitive and producers hire domestic labor only. Thus, there is a local labor market for each country and labor type. In product markets, border costs vary across industries and country pairs. Thus, some product markets are local, some are global, and some are somewhere in between.

2.1 Economic environment

We consider a world with a discrete set of countries: $\mathcal{N} = \{1, 2, ..., N\}$ with typical element $n \in \mathcal{N}$. Residents of all countries consume products from and work in a continuum of industries: $\mathcal{I} = [0, 1]$ with typical element $i \in \mathcal{I}$. Producers in each industry supply a continuum of differentiated product varieties $\mathcal{Z}^i = [0, Z^i]$ with typical element $z \in \mathcal{Z}^i$. Workers are specialized and each industry uses a different type of worker. Within an industry/country pair all workers and producers are identical, and we refer to them as the "workers in i/n" or the "producers in i/n".

Countries differ in terms of both their sizes and their industry productivities. We normalize the world's labor force (and population) to one and define λ_n as the share of this labor force that resides in country n. We assume that workers are uniformly distributed across industries and, as a result, there are λ_n workers in i/n. Let π_n^i be the productivity of workers in i/n. For convenience, we normalize world average industry productivities to one, i.e., $\sum_{n\in\mathcal{N}} \lambda_n \pi_n^i = 1$. As we shall see, this means that the worker in i/n produces π_n^i times the output produced by the world average worker of industry i.

Industries differ in their sensitivity to borders. In particular, producers in i/n supplying consumers in country m must ship $b_{nm}^i \geq 1$ units of their product varieties to ensure that one unit arrives at destination. Naturally, there are no border costs for internal trade, i.e., $b_{nn}^i = 1$. Thus, if we let $P_n^i(z)$ be the consumer price in country n of a variety z of industry i produced in country n, arbitrage ensures that $P_m^i(z) \leq b_{nm}^i P_n^i(z)$ for all destination markets $m \in \mathcal{N}$.

2.2 Preferences and consumption

All workers have the same preferences. Let $C_n^{i,j}(z)$ be the consumption of variety z of industry j by a worker in i/n. Her preferences are described by the following nested CES utility function:

$$W_n^i = \int_0^1 \ln C_n^{i,j} dj \text{ with } C_n^{i,j} = \left[\int_0^{Z^i} C_n^{i,j}(z)^{\frac{\sigma-1}{\sigma}} dz\right]^{\frac{\sigma}{\sigma-1}}, \tag{1}$$

with $\sigma > 1$. This utility function treats all industries and varieties symmetrically. The elasticity of substitution between varieties of different industries is one, while the elasticity of substitution between varieties of the same industry is σ.

The budget constraint differs across workers because they face different prices and earn different wages. Let $P_n^i(z)$ be the price of variety z of industry i in country n. Let Y_n^i be the wage or income of a worker in i/n. The budget constraint of this worker is:

$$\int_0^1 \int_0^{z^j} P_n^j(z) C_n^{i,j}(z) dz dj \leq Y_n^i. \tag{2}$$

Note that all workers in a country face the same prices, but they do not earn the same wage if they work in different industries.

Maximizing the utility function in Equation (1) subject to the budget constraint in Equa-

tion (2) we find the following spending shares:

$$\frac{P_n^j(z)\,C_n^{i,j}(z)}{Y_n^i} = \frac{P_n^j(z)^{1-\sigma}}{\int_0^{z^j} P_n^j(z')^{1-\sigma}\,dz'}, \tag{3}$$

for all $z \in \mathcal{Z}^j$ and $j \in \mathcal{I}$. Equation (3) describes how the worker in i/n distributes her spending across product varieties of different industries. Note that all workers distribute their spending uniformly across industries regardless of prices.[4] This is the key simplification that we obtain by assuming a unit elasticity of substitution between varieties of different industries. The distribution of spending across varieties within a given industry is not uniform, though. Since the elasticity of substitution between varieties of the same industry is higher than one, a larger share of spending goes to cheaper varieties.

Substituting the consumptions implicit in Equation (3) into the utility function in Equation (1), we obtain the indirect utility function:

$$W_n^i = \ln Y_n^i - \int_0^1 \ln P_n^j dj, \tag{4}$$

where P_n^j is the ideal price index of industry j in country n:

$$P_n^j = \left[\int_0^{z^j} P_n^j(z)^{1-\sigma}\,dz\right]^{\frac{1}{1-\sigma}}. \tag{5}$$

The welfare of the worker in i/n depends positively on her wage and negatively on industry prices. Thus, we will focus on the effects of an economic union on industry incomes $\{Y_n^i\}$ and prices $\{P_n^i\}$ later to predict attitudes towards the union.

2.3 Technology and production

In all industries, there is an arbitrarily large set of product varieties that can be potentially produced. In each industry/country pair, there is an arbitrarily large set of potential producers that can produce these varieties. To produce $Q_n^i(z) > 0$ units of variety z, producers in i/n need $L_n^i(z)$ units of labor as given by:

$$L_n^i(z) = \frac{\phi + Q_n^i(z)}{\pi_n^i}, \tag{6}$$

[4] That is, $\int_0^{z^j} P_n^j(z)\,C_n^{i,j}(z)\,dz = Y_n^i$ for all j.

where $\phi > 0$ is a fixed cost that is paid only if production is positive; and recall that π_n^i is the productivity of workers in i/n. This formulation of labor requirements can be interpreted as the sum of a fixed cost, i.e., ϕ/π_n^i workers are required to start producing; and a variable cost, i.e., $1/\pi_n^i$ additional workers are required per unit of output produced. Labor productivity affects both aspects of production. Thus, productivity differences are not only industry/country specific, but also labor-augmenting.

The main results of this setup are well known: (i) active producers choose to produce differentiated products and act as monopolists in product markets; (ii) potential producers pay the fixed cost and become active until profits are eliminated. Thus, each industry contains a continuum of monopolistic competitors, each of them producing a differentiated product in a single location and earning zero profits. Since there is a single producer for each product variety, we have that for any variety z of industry i produced in country n:

$$P_m^i(z) = b_{nm}^i P_n^i(z) \tag{7}$$

for all industries and origin/destination pairs. Thus, we can construct the demand schedule for any product variety by adding the demands from workers in all country/industry pairs:[5]

$$P_n^i(z) Q_n^i(z) = \sum_{m \in \mathcal{N}} \frac{\left[b_{nm}^i P_n^i(z)\right]^{1-\sigma}}{\int_0^{Z^i} P_m^i(z')^{1-\sigma} dz'} \lambda_m \int_0^1 Y_m^j dj. \tag{8}$$

Equation (8) says that sales are a declining function of the price. In particular, an increase in the price of a product variety by one percent leads to a $\sigma - 1$ percent increase in sales. Sales also depend negatively on border costs, and positively on the incomes of all countries and the prices of other product varieties in the industry. These additional determinants of sales, however, are taken as given by producers.

Producers in i/n maximize profits subject to the technology in Equation (6), the wage Y_n^i, and the demand schedule in Equation (8). Free entry ensures that there are enough active producers in i/n to bring profits down to zero. These observations imply that:

$$P_n^i = \frac{\sigma}{\sigma - 1} \frac{Y_n^i}{\pi_n^i}, \tag{9}$$

$$Q_n^i(z) = \phi(\sigma - 1). \tag{10}$$

[5] Note that $Q_n^i(z) = \sum_{m \in \mathcal{N}} b_{nm}^i \int_0^1 C_m^{j,i}(z)\, dj$ and then use the consumptions implicit in Equation (3).

Equation (9) says that producers charge a markup over labor costs. Equation (10) says that the production of each variety is increasing in the fixed cost and the demand elasticity. These results are standard.

Since each producer in i/n demands the services of $\phi\sigma/\pi_n^i$ specialized workers (see Equations (6) and (10)) and there is a measure λ_n of specialized workers available in the country, the measure of active producers in i/n must be $\lambda_n \pi_n^i / (\phi\sigma)$. Adding across countries, we find the measure of product varieties of industry i produced in the world:

$$Z^i = \frac{1}{\phi\sigma}, \tag{11}$$

where we have used the normalization $\sum_{n\in\mathcal{N}} \lambda_n \pi_n^i = 1$.

2.4 Solving for industry incomes and prices

Let us now solve for industry prices in country n. To determine those, we make two observations first: (i) the price in country n of all product varieties from country m is given by $[\sigma/(\sigma-1)]\, b_{mn}^i Y_m^i/\pi_m^i$; and (ii) the measure of country varieties produced in country m is $\lambda_m \pi_m^i/(\phi\sigma)$. These observations, together with Equation (5), imply that:

$$P_n^i = \left[\sum_{m\in\mathcal{N}} \frac{\lambda_m \pi_m^i}{\phi\sigma} \left(b_{mn}^i \frac{\sigma}{\sigma-1} \frac{Y_m^i}{\pi_m^i} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}}. \tag{12}$$

Equation (12) describes the ideal price index of industry i for residents of country n as a function of industry incomes and border costs. This index puts a larger weight on prices of products from large and productive countries, since these countries produce a larger measure of varieties.

Let us next solve for industry incomes in country n. Since producers earn zero profits all the sales by producers in i/n go to workers in i/n. To find those, we simply note that the spending of country m on products of country n is given by:

$$\frac{\lambda_n \pi_n^i}{\phi\sigma} \frac{\left(b_{nm}^i \frac{\sigma}{\sigma-1} \frac{Y_n^i}{\pi_n^i} \right)^{1-\sigma}}{\sum_{l\in\mathcal{N}} \frac{\lambda_l \pi_l^i}{\phi\sigma} \left(b_{lm}^i \frac{\sigma}{\sigma-1} \frac{Y_l^i}{\pi_l^i} \right)^{1-\sigma}} \lambda_m \int_0^1 Y_m^j dj. \tag{13}$$

This expression is the product of three terms: (i) the measure of varieties produced by the

workers in i/n; (ii) the share of spending on each of these varieties by workers in country m; and (iii) the combined income of all workers in country m. Thus, the product of these terms gives us the sales in country m of producers in i/n. Adding these sales across all countries, we find the income of workers in i/n:

$$Y_n^i = \sum_{m \in \mathcal{N}} \frac{(\pi_n^i)^\sigma \left(b_{nm}^i Y_n^i\right)^{1-\sigma}}{\sum_{l \in \mathcal{N}} \lambda_l \left(\pi_l^i\right)^\sigma \left(b_{lm}^i Y_l^i\right)^{1-\sigma}} \lambda_m \int_0^1 Y_m^j dj. \tag{14}$$

Equation (14) can be solved for the matrix of incomes $\{Y_n^i\}$ up to a numeraire. For convenience, we use world income as the numeraire and set $\sum_{n \in \mathcal{N}} \lambda_n \int_0^1 Y_n^i di = 1$ from now on. Thus, all incomes can be interpreted as shares of world income.

Equations (12) and (14) define equilibrium industry prices and incomes as a function of border costs. But these costs are not exogenous, and we turn to them now.

3 Modeling an economic union

What determines the matrix of bilateral border costs? How does an economic union affect this matrix? We now add to our framework a theory of border costs and the impact of an economic union on them. This theory recognizes that all economic unions are not the same. In particular, unions vary in their depth, i.e., the measure of industries covered; and their breadth, i.e., the set of countries included. We study how these features of the union affect the distribution of industry incomes and prices.

3.1 A stylized theory of border costs

There is a share of industries that are insensitive to borders. In particular, assume that border costs for products varieties of these industries are negligible. We assign low indices to these industries:

$$\text{if } i \in [0, \tau] \text{, then } b_{nm}^i = 1 \text{ for all } n, m \in \mathcal{N}. \tag{15}$$

The rest of the industries are sensitive to border costs. In particular, assume these costs are prohibitive unless an economic union removes them. An economic union (or union, for brevity) is defined by the measure of industries covered: $t \in [0, 1-\tau)$; and the set of member countries: $\mathcal{U} \subseteq \mathcal{N}$. These two features jointly determine its effects on border costs:

$$\text{if } i \in [\tau, 1) \text{, then } b_{nm}^i = \begin{cases} 1 & \text{if } n = m \text{ or } i \in (\tau, \tau + t) \text{ and } n, m \in \mathcal{U} \\ \infty & \text{otherwise.} \end{cases} \tag{16}$$

That is, the union removes border costs between its members, i.e. $n \in \mathcal{U}$; for the measure of industries covered, i.e. $i \in (\tau, \tau + t)$. Inside the union, these industries enjoy a single common market. Outside the union, these industries are local. For later reference, we define the size of the union as $\lambda_U = \sum_{n \in \mathcal{U}} \lambda_n$, and its average industry productivities as $\pi_U^i = \sum_{n \in \mathcal{U}} \pi_n^i \lambda_n / \lambda_U$.

There are thus three types of industries: (i) those with global markets: $i \in [0, \tau]$; (ii) those with local markets: $i \in [\tau + t, 1]$ for $n \in \mathcal{U}$ plus $i \in [\tau, 1]$ for $n \notin \mathcal{U}$; and (iii) those with a union market: $i \in (\tau, \tau + t)$ for $n \in \mathcal{U}$. We shall use this simple model in what follows, and focus on the effects of t and $\mathcal{U}$.

Making theoretical progress requires the use of strategic assumptions, and our analysis here is no exception to this rule. The first strategic assumption we made was to assume a unit elasticity of substitution between products of different industries. The second strategic assumption is our use of extreme border costs, either negligible or prohibitive. These assumptions should be removed in quantitative applications, obviously. But they do not seem too restrictive for our purposes, and they greatly help produce simple and clear analytical results. Now we adopt a couple of additional strategic assumptions:

$$\frac{1}{i_2 - i_1} \int_{i_1}^{i_2} \pi_n^i di = \pi_n \text{ for any } i_1, i_2 \in [0, 1] \text{ such that } i_2 > i_1 \text{ and } n \in \mathcal{N} \tag{17}$$

and

$$\frac{1}{t} \int_{\tau}^{\tau + t} \left(\frac{\pi_n^i}{\pi_U^i} - \frac{\pi_n}{\pi_U} \right) \left(\pi_U^i - \pi_U \right) di = 0 \text{ for all } n \in \mathcal{U}, \tag{18}$$

where $\pi_U = \sum_{n \in \mathcal{U}} \pi_n \lambda_n / \lambda_U$. We have assigned indices to industries based on their sensitivity to border costs, from low to high. Assumption (17) essentially means that across industries within a country productivity and sensitivity to border costs are independent. It ensures that, within each country, the average productivity of global, local and union industries is the same. Assumption (18) is about the nature of unions and essentially means that a union member's productivity relative to other union members is independendent of the the union's productivity relative the rest of the world. That is, the productivity of a country relative to the union (π_n^i / π_U^i) is neither systematically higher nor systematically lower in industries for which the productivity of the union relative to the world (π_U^i) is high. Assumptions (17) and (18) do not limit the amount of heterogeneity across industries or countries, but they impose some symmetry on this heterogeneity. This type of symmetry does not seem too outrageous,

and it greatly simplifies the analysis. Thus, we assume it from now on.[6] We shall however explain later in a footnote the effects of relaxing these assumptions.

3.2 Industry incomes and prices with an economic union

We derive now industry incomes and prices, showing along the way the role of our strategic assumptions. The first observation is that spending is uniformly distributed across industries. This is a direct implication of assuming a unit elasticity of substitution between varieties of different industries. Thus, each industry receives an income equal to one (recall that world income has been normalized to one), and we only need to determine how this income is distributed within industries.

In global industries, border costs are negligible and the prices of all product varieties are equalized. Thus, in these industries workers' incomes are determined by their productivity:

$$Y_n^i = \pi_n^i \text{ if } i \in [0, \tau]. \tag{19}$$

Equation (19) says that the share of the industry income that goes to any worker is her share of world output in the industry.

In local industries, border costs are prohibitive and countries consume only the product varieties produced within the country. Since spending is uniformly distributed across varieties, workers in these industries receive the average income of their countries:

$$Y_n^i = \int_0^1 Y_n^j dj \text{ if either } i \in [\tau + t, 1] \text{ and } n \in \mathcal{U} \text{ or } i \in [\tau, 1] \text{ and } n \notin \mathcal{U}. \tag{20}$$

Equation (20) simply says that the average spending on industry i, i.e., Y_n^i, equals the average spending or income in the country, i.e., $\int_0^1 Y_n^j dj$.

[6] For a concrete example that satisfies both assumptions, suppose that the absolute productivity Π_n^i of each country-industry is the average of a number of draws proportional to its workforce, i.e., a number $k\lambda_n \in \mathbb{N}$ for a common scale parameter k. These draws are independent of each other, as well as across industries and countries. Each is drawn from a gamma distribution $\Gamma(\alpha\pi_n/k, k/\alpha)$ with a common scale parameter k/α and a country-specific mean π_n such that $\sum_{n\in\mathcal{N}} \lambda_n \pi_n = 1$. It follows that Π_n^i is i.i.d. across industries and countries with a gamma distribution $\Gamma(\alpha\lambda_n\pi_n, 1/(\alpha\lambda_n))$. Within each country, independence across industries implies Assumption (17). Within ech industry, denote absolute world productivity by $\Pi^\iota = \sum_{n\in\mathcal{N}} \lambda_n \pi_n^i$. Our objects of interest are the relative productivities $\pi_n^i = \Pi_n^i/\Pi^i$. The vector $\left(\lambda_1\pi_1^i, \lambda_2\pi_2^i, ..., \lambda_N\pi_N^i\right)$, which describes country endowments in relative efficiency units of labor as a share of the world total, has a Dirichlet distribution with concentration parameter α and base measure $(\lambda_1\pi_1, \lambda_2\pi_2, ..., \lambda_N\pi_N)$. The neutrality property of the Dirichlet distribution implies that Assumption (18) is satisfied for any set of union members $\mathcal{U} \subseteq \mathcal{N}$.

In union industries, the situation is a bit more complex. Border costs are prohibitive outside the union and, as a result, union members only consume product varieties produced within the union. Border costs are negligible inside the union, though, so that the prices of all union product varieties are equalized. Thus, we have that:

$$Y_n^i = \frac{\pi_n^i}{\pi_U^i} \sum_{m \in \mathcal{U}} \frac{\lambda_m}{\lambda_U} \int_0^1 Y_m^j dj \text{ if } i \in (\tau, \tau + t) \text{ and } n \in \mathcal{U}. \tag{21}$$

Equation (21) shows how this all plays out. Since the union as a whole is a "local" market, the average spending on industry i, i.e., $\sum_{n \in \mathcal{U}} Y_n^i \lambda_n / \lambda_U$, is the average spending or income in the union, i.e., $\sum_{m \in \mathcal{U}} \int_0^1 Y_m^j dj \lambda_m / \lambda_U$. Within the union, though, the market is "global" and prices are equalized. Thus, the share of industry income that goes to any worker within the union equals her share of the union's output in the industry, i.e., π_n^i / π_U^i.

Up to now, we have not used Assumptions (17)-(18) yet. It is now the time to do so. To obtain country incomes, i.e., $\int_0^1 Y_n^i di$, we impose the condition that they must equal the sum of the incomes of all workers in the country, as described in Equations (19), (20) and (21). The main implication of Assumptions (17)-(18) is that the solution obtained by this procedure simplifies to:

$$\int_0^1 Y_n^i di = \pi_n, \tag{22}$$

for all $n \in \mathcal{N}$. That is, the share of world income of any country is its index of average productivity. This is a very convenient feature of the model. Relaxing Assumptions (17)-(18) shows that: (i) incomes of non-member countries are determined by their productivity in global industries; and (ii) incomes of member countries is determined by an average of their productivity in global industries and union industries.[7] This complicates the analysis without adding much in terms of intuition.

[7] If we do not impose Assumptions (17)-(18) the generic solution is:

$$\int_0^1 Y_n^i di = \begin{cases} \frac{1}{\tau} \int_0^\tau \pi_n^i di & \text{if } n \notin \mathcal{U} \\ \frac{1}{\tau + t} \left(\int_0^\tau \pi_n^i di + \int_\tau^{\tau+t} \frac{\pi_n^i}{\pi_U^i} di \frac{1}{\tau} \int_0^\tau \pi_U^i di \right) & \text{if } n \in \mathcal{U}. \end{cases}$$

Assumption (17) ensures that $(1/\tau) \int_0^\tau \pi_n^i di = \pi_n$ and thus $(1/\tau) \int_0^\tau \pi_U^i di = \pi_U$; Assumption (18) ensures that $(1/t) \int_\tau^{\tau+t} \left(\pi_n^i / \pi_U^i \right) di = \pi_n / \pi_U$. Hence the simplification.

We summarize now what we have learned about industry incomes:

$$Y_n^i = \begin{cases} \pi_n^i & \text{if } i \in [1, \tau) \\ \dfrac{\pi_n^i}{\pi_U^i} \pi_U & \text{if } i \in (\tau, \tau + t) \text{ and } n \in \mathcal{U} \\ \pi_n & \text{otherwise.} \end{cases} \tag{23}$$

Equation (23) shows how income is distributed within industries. In global industries, income shares equal industry productivities. In local industries, income shares equal country productivities. In union industries, income shares equal industry productivities relative to the union times union productivities. The design of the union, i.e., t and $\mathcal{U}$, determines the set of union industries and how income is distributed within this set of industries.

These results allow us to compute industry prices as follows:

$$P_n^i = \begin{cases} \left(\frac{1}{\phi\sigma}\right)^{\frac{1}{\sigma-1}} \dfrac{\sigma}{\sigma - 1} & \text{if } i \in [1, \tau) \\ \left(\dfrac{\lambda_U \pi_U^i}{\phi\sigma}\right)^{\frac{1}{\sigma-1}} \dfrac{\sigma}{\sigma - 1} \dfrac{\pi_U}{\pi_U^i} & \text{if } i \in (\tau, \tau + t) \text{ and } n \in \mathcal{U} \\ \left(\dfrac{\lambda_n \pi_n^i}{\phi\sigma}\right)^{-\frac{1}{\sigma-1}} \dfrac{\sigma}{\sigma - 1} \dfrac{\pi_n}{\pi_n^i} & \text{otherwise.} \end{cases} \tag{24}$$

To interpret Equation (24), recall that industry prices are low in the industries that offer many varieties at a low price per variety. Global industries offer many varieties, $1/(\phi\sigma)$, at an average price per variety equal to $\sigma/(\sigma - 1)$. Local industries offer little variety at a price per variety that reflects local scarcity: $\lambda_n \pi_n^i/(\phi\sigma)$ and $[\sigma/(\sigma - 1)]\, \pi_n/\pi_n^i$. Union industries offer less variety than global industries but more than local ones, at a price per variety that reflects union scarcity: $\lambda_U \pi_U^i/(\phi\sigma)$ and $[\sigma/(\sigma - 1)]\, \pi_U/\pi_U^i$. The intuitions are thus clear: consumers care about both variety and prices, and the design of the union affects both.

4 Political support for the union

We are now ready to derive predictions about the support of the union. To do this, we ask the inhabitants of our theoretical world whether a specific union raises their welfare relative to having no union at all. We then record their positive answers as support for the union, and the negative ones as opposition to the union. Thus, our exercise consists of counting winners and losers.

4.1 On the distribution of gains and losses from the union

Let $W_n^i(t,\mathcal{U})$ be the welfare of workers in i/n with a union that covers a measure t of industries and a set $\mathcal{U}$ of countries. Then, we define $\Delta W_n^i(t,\mathcal{U})$ as the change in welfare that the union generates relative to a scenario without the union:

$$\Delta W_n^i(t,\mathcal{U}) = W_n^i(t,\mathcal{U}) - W_n^i(0,\emptyset). \tag{25}$$

We say that workers in i/n support the union if $\Delta W_n^i(t,\mathcal{U}) > 0$ and oppose it if $\Delta W_n^i(t,\mathcal{U}) < 0$. If the union has no effect on welfare, we say that workers in i/n are indifferent about the union. In particular, we define the set of residents of country n that oppose the union as:

$$\mathcal{L}_n = \left\{ i \in [0,1] : \Delta W_n^i(t,\mathcal{U}) < 0 \right\}. \tag{26}$$

The goal is to measure this set and study how this measure depends on t and $\mathcal{U}$.

Let us consider first those residents of the union that do not work in affected industries, i.e. $i \notin (\tau, \tau+t)$. These residents work in industries that, after the union is created, still remain global or local. Since their industries are not affected, these workers experience the union from the perspective of consumers. From such a perspective, the union is a positive development since it improves the allocation of consumption:

$$\Delta W_n^i(t,\mathcal{U}) = \frac{1}{\sigma-1}\int_{\tau}^{\tau+t} \ln \frac{\lambda_U \pi_U^j}{\lambda_n \pi_n^j} dj + \int_{\tau}^{\tau+t} \ln \frac{\pi_n/\pi_n^j}{\pi_U/\pi_U^j} dj > 0. \tag{27}$$

Equation (27) shows the effects of the union on the cost of living. The first term of Equation (27), which is always positive, captures the gains from intra-industry trade. In union industries, consumers reduce their consumption of local varieties in favor of newly available product varieties from other union members. As usual, the gains from intra-industry trade are larger in smaller countries.

The second term in Equation (27), which is also always positive, measures the gains from inter-industry trade. The union market allows countries to run surpluses in export industries in which they have a comparative advantage: $\pi_n^j/\pi_n > \pi_U^j/\pi_U$; and to run deficits in import industries in which they do not have a comparative advantage: $\pi_U^j/\pi_U > \pi_n^j/\pi_n$. That is, exports of industries with high local productivity finance imports from industries with high foreign productivity. These gains from inter-industry trade are larger for countries with industry productivities that differ more from the union's average ones.

Let us now consider residents of the union that work in affected industries, i.e. $i \in (\tau, \tau + t)$. These residents also enjoy the benefits of the union as consumers. But they also experience the union as workers, and this might be positive or negative:

$$\Delta W_n^i(t, \mathcal{U}) = \ln\left(\frac{\pi_n^i}{\pi_U^i}\pi_U\right) - \ln \pi_n + \frac{1}{\sigma - 1}\int_\tau^{\tau+t} \ln \frac{\lambda_U \pi_U^j}{\lambda_n \pi_n^j} dj + \int_\tau^{\tau+t} \ln \frac{\pi_n/\pi_n^j}{\pi_U/\pi_U^j} dj. \tag{28}$$

Equation (28) shows the effects of the union on workers in affected industries. The last couple of terms are just the same as those for workers in non-affected industries. They are both positive and reflect the gains from trade as consumers analyzed in the previous paragraphs. The first couple of terms are the effects on industry incomes. Industry incomes grow in export industries, and shrink in import industries. The magnitude (in absolute value) of this redistribution grows with dispersion in industry productivities. Since Assumption (18) ensures that:

$$\int_\tau^{\tau+t} \left(\frac{\pi_n^i}{\pi_U^i}\pi_U - \pi_n\right) di = 0, \tag{29}$$

redistribution is zero-sum within a country. In export industries, the income gain must be added to the reduction in the cost of living. Thus, the union unambiguously raises their welfare. In import industries, the income loss must be balanced against the reduction in the cost of living. Since the balance of these two effects can go either way, the effects of the union are ambiguous.

Thus, an economic union produces two main effects: (i) it improves the allocation of consumption and reduces the cost of living; and (ii) it creates redistribution within each of its member countries. We can understand the total welfare effects of any union as a combination of these two partial effects.

It is worth saying a bit more about the redistribution caused by the union. In a sense, all of our strategic assumptions have been designed to "manage" the shape of this redistribution so as obtain a clear theoretical benchmark. For instance, there is no redistribution between affected and non-affected industries. The reason, of course, is the unit elasticity of substitution between products of different industries. If this elasticity were larger than one, there would also be redistribution from non-affected industries to affected ones. If this elasticity were less than one, this redistribution would go in the opposite direction.

There is no redistribution either from non-members of the union to members of the union or viceversa. Even if we kept the unit elasticity assumption, we would observe such redistribution if border costs were not extreme. Since the union lowers the cost of trading

among its members, it shifts demand towards union members and away from non-members. We do not observe this shift of demand away from non-members because there is no such demand with extreme border costs. If we made these costs less extreme, the creation of a union would lead to redistribution from non-members to members within the affected industries.

Finally, there is no redistribution across union members. Even if we retained our assumption of unit elasticity and extreme border costs, we would observe redistribution across countries within the union if we relaxed Assumptions (17)-(18). Relaxing Assumption (17) would make the union redistribute income towards countries with high productivity in the affected industries relative to the global ones, and away from the rest. Relaxing Assumption (18) would make the union redistribute towards countries whose comparative advantage is negatively correlated with the union's, and away from those for which this correlation is positive.

All these complications might be important in quantitative applications. However, they seem likely to be less central than the pattern of redistribution we focus upon here. In any case, even these additional redistributive patterns become clearer once we look at them from the perspective of our stylized benchmark.

4.2 What makes a union unpopular?

We can now write the set of losers in country n as follows:

$$\mathcal{L}_n = \left\{ i \in (\tau, \tau + t) : \ln \frac{\pi_n^i}{\pi_n} - \ln \frac{\pi_U^i}{\pi_U} < - \int_{\tau}^{\tau+t} \ln \left[\left(\frac{\lambda_U \pi_U^j}{\lambda_n \pi_n^j} \right)^{\frac{1}{\sigma-1}} \frac{\pi_n / \pi_n^j}{\pi_U / \pi_U^j} \right] dj \right\}. \tag{30}$$

Essentially, this set contains all workers in industries whose comparative disadvantage, and therefore net imports from the union and the associated income loss from union policies, exceeds a threshold. This threshold depends on how effective the union is at reducing the cost of living. This reduction is large in countries that are small and have industry productivities that are different from those of the union.

Let us develop some intuition with the help of an example. There are two types of countries, W and E. Half of workers live in W countries and the other half in E countries. Industries are characterized by a specialization parameter δ_i such that productivity in industry i is $\pi_n^i = 1 - \delta_i$ if $n \in \mathcal{W}$ countries and $\pi_n^i = 1 + \delta_i$ in E countries. Specialization is independent of i and uniformly distributed on $[-1, 1]$, so $\int_{i_1}^{i_2} \pi_n^i di = 1$ and

$\int_{i_1}^{i_2} \ln \pi_n^i di = \ln 2 - 1$ for any interval $[i_1, i_2] \subseteq [0,1]$ and any country n.

Consider first a union of depth t which contains only countries of type W. Then, it follows that all residents of the union support it: $\mathcal{L}_n = \emptyset$. Moreover, everyone supports the union more strongly the deeper it is ($\partial \Delta W_n^i / \partial t > 0$). If there are no exogenous technological costs of adopting union policies, the preferred union is the deepest one, with $t = 1 - \tau$. Needless to say, there may be exogenous administrative costs of enacting, enforcing and complying with trade-promoting union policies. However, with similar member countries the union is very stable and robust to the existence of such costs. There is a union depth that makes every resident of every member country support union membership.

Consider instead an enlarged union whose residents are evenly split between countries of type W and countries of type E. Now workers in an industry $i \in (\tau, \tau + t)$ in a W country face an income loss from integration whenever $\delta_i > 0$. By Equation (28), they oppose the union if

$$\ln(1 - \delta_i) < \frac{t}{\sigma - 1} \left[\ln \frac{\lambda_n}{\lambda_U} - (1 - \ln 2)\sigma \right]. \tag{31}$$

It follows that the share of country n's residents opposing the union is:

$$m(\mathcal{L}_n) = \frac{t}{2} \left[\left(\frac{2}{e} \right)^{\sigma} \frac{\lambda_n}{\lambda_U} \right]^{\frac{t}{\sigma - 1}}, \tag{32}$$

such that

$$\frac{\partial m}{\partial t} > 0 \Leftrightarrow t < \bar{t}_n \equiv \frac{\sigma - 1}{\sigma(1 - \ln 2) + \ln(\lambda_U / \lambda_n)}. \tag{33}$$

With a union of dissimilar countries, the effect of union depth is nonlinear. The set of affected industries grows linearly, and these are the industries with losers. However, among affected industries, fewer are net losers as union depth increases. In this example, this two effects combine in a non-monotonic way. Initially, as the union becomes deeper the first effect dominates and opposition to the union grows. However, provided that

$$\sigma[\tau + (1 - \tau)\ln 2] + \ln \frac{\lambda_n}{\lambda_U} < 1, \tag{34}$$

opposition to the union peaks at a union depth $\bar{t}_n < 1 - \tau$ and then declines as depth increases further.

The intuition provided by this example is that a union becomes unstable and fragile when its member countries have sufficiently different patterns of comparative advantage, and thus sufficiently large imbalances in intra-union trade. While such a union creates

greater efficiency gains than a union among homogeneous countries, those gains accrue to consumers and to winners in each country's export industries. Instead, losers emerge whose welfare is reduced by the union. A marginal reduction in union depth is likely to be one strategy to reduce their number. However, another and more efficient strategy may be a "big push" towards much closer integration. As Equation (34) highlights, this second possibility exists when a fully integrated common market is valuable enough, i.e., when gains from intra-industry trade are high (σ is low) and trade without union policies is limited (τ is low).

Both Equation (34) and Equation (32) show that opposition to a heterogeneous union is greater in larger member countries. The reason, intuitively, is that residents of larger economies stand to gain less as consumers from the common union market. Therefore, they are more sensitive to the losses they may suffer as producers in import-competing industries. Finally, note that Equation (32) measures the share of industries in country n that oppose the union. We have assumed for ease of exposition that workers are uniformly distributed across industries, but it is straightforward to relax this assumption. Then, popular opposition to the union will be greater in countries with a larger share of the workforce in low-productivity, comparative-disadvantage sectors. These two forces—lower consumer gains in larger economies, and more numerous losers in countries with greater employment in import-competing industries—are the two fundamental predictions of our theory that we take to European evidence in the next section.

5 Empirical evidence: European integration and its discontents

In this section, we briefly review the process of European integration through the lens of our theoretical model, and we show evidence consistent with the predictions derived in the previous sections.

European integration started when 6 countries—Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany—signed the Treaty of Paris in 1952 and the Treaty of Rome in 1957, creating the European Economic Community. Member countries removed custom duties and agreed on a common agricultural policy. The first enlargement happened in 1973, when Denmark, Ireland and the United Kingdom joined the union. During the 1970s, the union implemented regional policies to help the development of poorer areas and adopted laws to protect the environment. Over time, the European Parliament increased its influence and, from 1979, all citizens started to elect its members directly. In 1981, Greece joined the union. Spain and Portugal followed in 1986. In the same year, the Single European Act

extended Community powers especially in the area foreign policy. In 1993, the Maastricht Treaty established the European Union and the Single Market with its "four pillars:" the free movement of goods, services, capital and persons. In 1995, the EU gained three more new members: Austria, Finland and Sweden.

In 1999, the euro as a currency was launched. Ten new countries—Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia—joined the EU in 2004, followed by Bulgaria and Romania in 2007. In response to the eurozone debt crisis, the so-called "banking union" was established, transferring responsibilities for banking policy from the national level to the EU. In 2013, Croatia became the 28th member. Besides these major events, the EU was built on a complex maze of treaties and agreements, steadily widening and deepening the economic integration between its members.

Ever since its initial foundation, the EU has also been accompanied by controversy. Clear examples of disagreement are various cases of failed expansions. For instance, the UK's membership was vetoed by France in 1961; Spain's application was rejected by the European Council in 1962; Norway's citizens voted against joining the union in 1967 and 1992. Yet, until recently, the union has always grown in size and scope. In 2016, for the first time, a member state—the UK—voted to leave the union. Anti-EU sentiment has also been on the rise in other countries. What is driving this growing dissatisfaction with European integration?

5.1 Discontent for the EU: the data

The Eurobarometer, a series of public opinion surveys conducted regularly on behalf of the European Commission, contains data that can be used to study how attitudes towards the EU vary across countries and have evolved over time. These surveys address a variety of issues relating to the European Union and have been conducted both in EU countries and prospective member states. In this section, we focus on one question: "In general, does the EU conjure up for you a very positive, fairly positive, neutral, fairly negative or very negative image?" Compared to the data used to draw Figure 1, on the perceived economic benefits from the EU, answers to this question are available for all 28 current EU countries for the more recent period from 2000 to 2018. For both questions, the share of respondents with a positive view exhibits slightly less variation, while the margin between negative and undecided answers appears to be more active. This is already evident from Figure 1. For this reason and to be closer to the predictions derived in Section 4, we choose as our main variable of interest the share of respondents with a "fairly negative or very negative image"

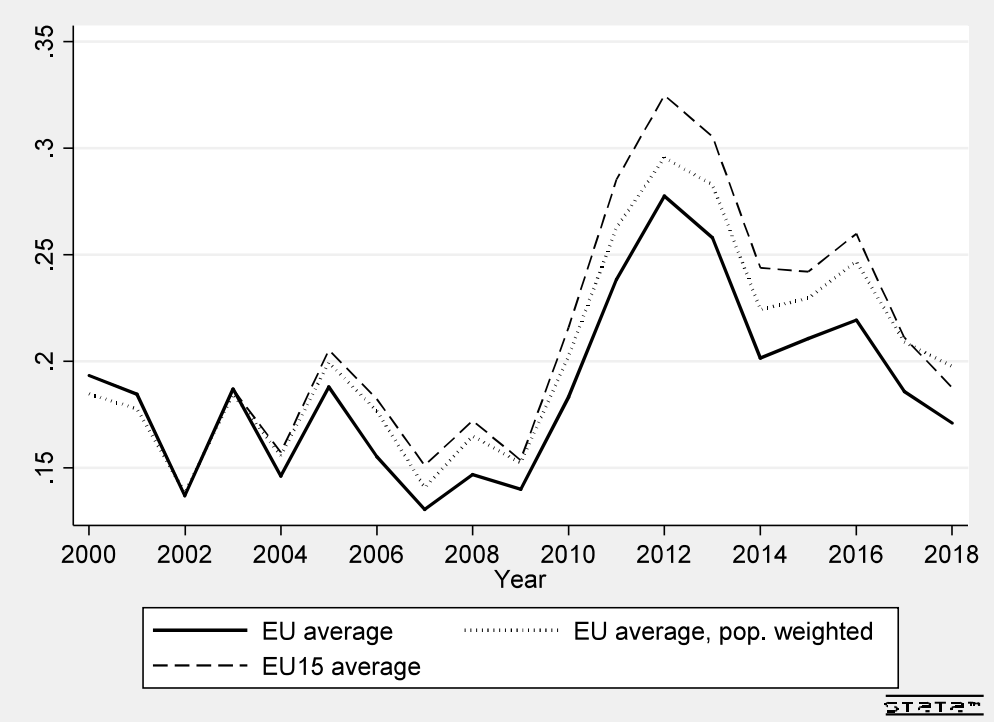

Figure 2: Negative image of the EU, averages. Source: Eurobarometer.

of the EU.[8]

Figure 2 plots the evolution over time of this measure of discontent. The solid line corresponds to the EU simple average, the dashed line is the simple average for the sample of 15 member countries in 2000, and the dotted line is the EU average weighted by population. A number of facts stands out. First, the figure shows a growing dissatisfaction that started around 2007 and continued until 2012. Clearly, one culprit is the eurozone debt crisis. However, the deterioration of the image of the EU seems to predate the crisis. Second, the dashed line is above the solid line, implying that new members tend to have a more positive view of the EU. Moreover the difference seems to have grown, at least until 2016. This means that dissatisfaction has grown especially in countries that were part of the EU before the accession of new members and suggests that "enlargement fatigue" may have played a role. Third, the dotted line (population weighted average) is closer to the dashed line (EU15 average), confirming that new members tend to be smaller in size. Finally, all lines display strong co-movements, suggesting that some of the driving forces may be common to many countries.

[8]Yet, there is a strong negative correlation between the share of respondents with negative and positive views (-0.83) and both questions yield the same qualitative patterns.

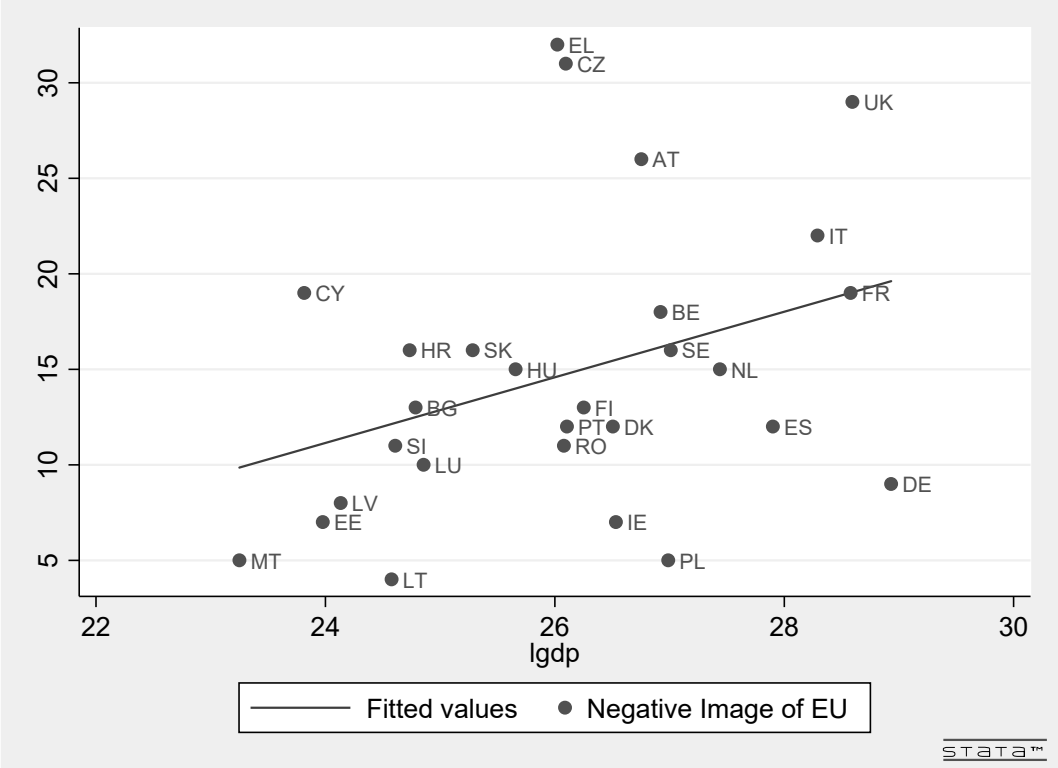

Figure 3: Negative image of the EU by economic size. Data for 2017. Source: Eurobarometer and Eurostat.

As a next step, we do a simple variance decomposition exercise. We ask what fraction of the variance in attitudes towards the EU is accounted for by time-specific common factors and country-specific factors. We do this by comparing the R-squared obtained by regressing the share of respondents with a negative image of the EU on year and country fixed effects. This exercise shows that the largest source of variation is cross sectional: country fixed effects alone explain 49% of the data, while year dummies accounts for 17%. We now discuss the main factors that, according to our model, may explain the observed time and cross-sectional variation.

Starting from the latter, our model suggests that an important determinant of preferences for the union is economic size: larger and richer countries benefit relatively less from adopting union policies. To have a first sense of whether this prediction is consistent with the data, Figure 3 shows a scatter plot of respondents with a negative image of the EU (vertical axis) against the logarithm of aggregate GDP (horizontal axis) in 2017.[9] The picture shows a

[9]We use nominal GDP to focus on economic size net of price effects. However, results are qualitatively similar when using real GDP.

clear positive association between size and a negative image of the EU, highlighted in the graph by the linear regression line. The figure is also useful to visualize the cross-sectional variation in the data. It is immediate to see that countries differ substantially in their attitude towards the union. The most pro-EU members states (less than 10% of respondents with a negative view) include small countries such as Malta, Lithuania and Ireland, but also Germany, despite its size. Countries with a strong anti-EU attitude (more than 20% of respondents with a negative view) include several large economies, such as the UK and Italy, but also Greece.

Regarding the time variation, our theory suggests that EU enlargement may be an important factor. While a bigger union is better at promoting trade, it may lead to more disagreement if new members make the union more diverse. This is indeed what happened. As figure 4 shows, enlargements have made the EU more heterogeneous in economic terms. It shows the average aggregate GDP of union members relative to the average GDP of the six founding members. The figure confirms that, almost invariably, each enlargement included countries with an economic size on average smaller than the initial members. Moreover, the sharpest drop in average country size happens after the 2004 enlargement. The EU has also become more diverse in terms of factor endowments: since 2004, new member states were not just smaller, but also on average poorer and with lower levels of education.

Our theory then suggests that enlargement fatigue could be driven, at least in part, by a dissatisfaction of the larger economies with the extent of economic integration with much smaller and poorer economies. Increased trade with countries with different factor endowments may have had redistributive effects that heightened disagreement over the union within countries. This argument is consistent with the simple observations that the UK has always been one of the largest economies in the EU and that UK workers employed in sectors more exposed to import competition from Eastern Europe voted predominantly to leave the union.

5.2 Size, import competition and attitudes towards the EU

We now study the relationship between economic size, import competition and discontent towards the EU more systematically. To this end, we have collected a number of additional variables sourced from Eurostat. To measure aggregate economic size, we consider separately the logarithm of population and of GDP per capita. Breaking down the two components of size is useful as they exhibit significantly different variation over time and across countries.

Next, we are interested in measuring workers' exposure to import competition from other

Figure 4: Average GDP of EU member states relative to the six founding countries. Source: Eurostat.

EU members. Our model suggests that workers employed in sectors with a comparative disadvantage relative to other countries in the EU should have a more negative view of the union. To test this prediction, we have collected data on employment and the value of production at a detailed sectoral level (NACE classification, level 2) from the Structural Business Statistics (SBS) database, describing the structure and performance of businesses across the EU. Then, for each country-year, we computed the fraction of employment in industries with a share of domestic production lower than the income share of the country in the EU.[10] According to equation (30) in our theoretical model, this variable identifies the share of workers who would lose income due to import competition from the EU. It measures aversion to the union net of size effects, which are instead captured separately by GDP, and other price effects.

Exposure to import competition, which is available from 2000 to 2016, varies both because of difference in the structure of employment and production in all countries, but also because

[10] We compute this measure for industry only and disregard construction, distributive trades and services mostly because of the high number of missing values in the latter sectors. Moreover, traded goods are heavily concentrated in industry.

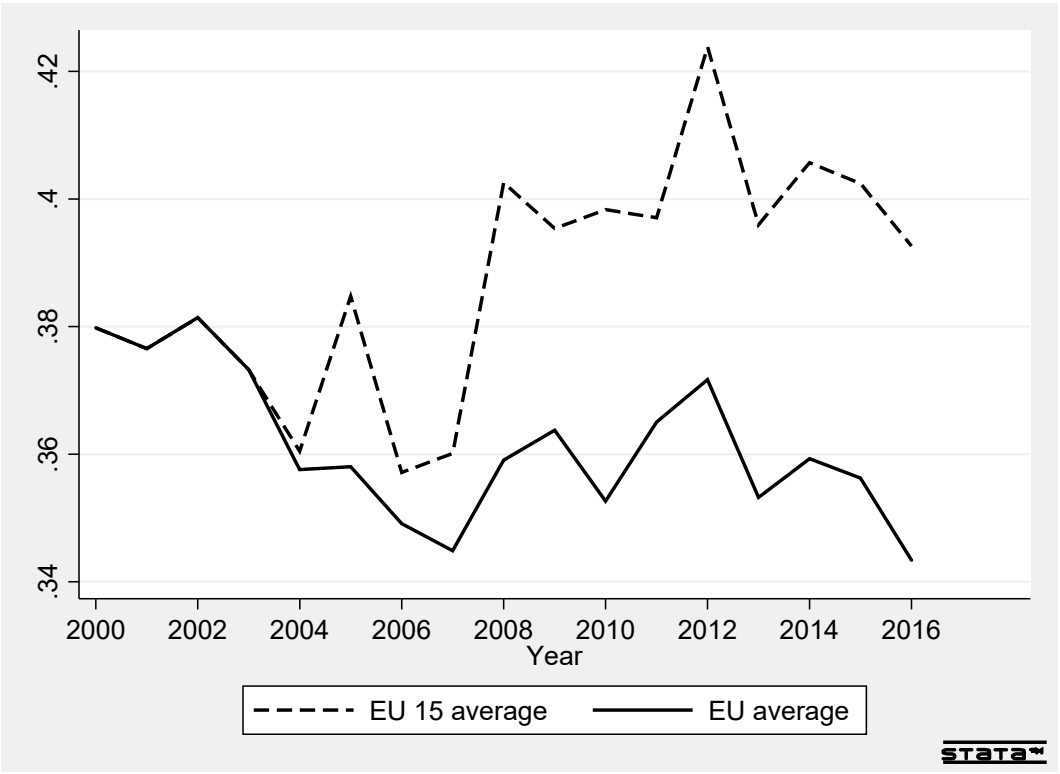

Figure 5: Employment share exposed to import competition from the EU. Source: Eurostat SBS.

the composition of the EU changes over time. For this variable, Figure 5 plots the evolution of the EU simple average (solid line) and the simple average for the sample of 15 member countries in 2000 (dashed line). The rise in the dashed line and its divergence from the solid line after 2004 clearly indicate that the enlargement has made workers in the initial EU 15 countries more exposed to import competition from new members, whose workforce is more concentrated in export oriented sectors. Moreover, comparing Figure 5 to 2 it is easy to see that exposure to import competition in the EU 15 countries and a negative attitude towards the EU display a similar evolution, both peaking in 2012.

Figure 6 shows instead a scatter plot of respondents with a negative image of the EU (vertical axis) against the share of workers exposed to import competition from the EU (horizontal axis) in 2016. The picture shows a clear positive association between the fraction of workers in comparative disadvantage industries and a negative image of the EU, highlighted by the linear regression line.

Besides these variables, which have clear counterparts in our model, we also consider a number of additional controls. Since our theory suggests that exporters are keener on

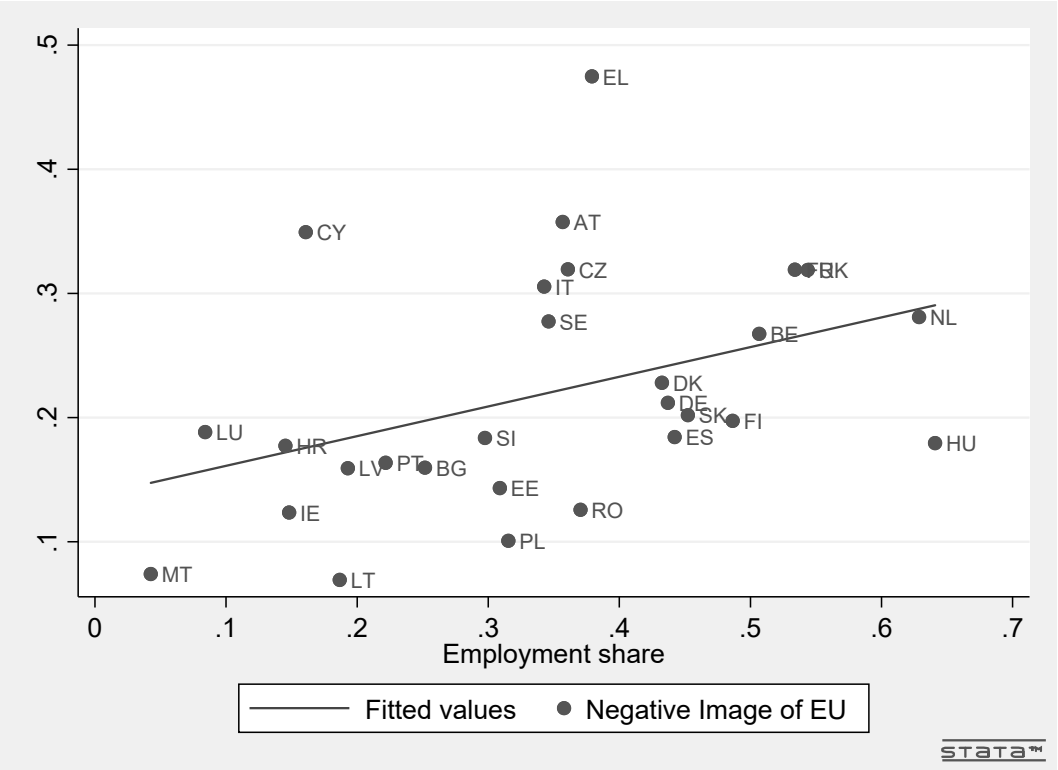

Figure 6: Negative image of the EU and employment share exposed to import competition in 2016. Source: Eurostat (SBS) and Eurobarometer.

economic integration than importers, we also consider net export to the EU, normalized by the volume of trade with the EU. The existing literature suggests that negative attitudes towards the EU are typically associated with economic hardship, low levels of education and inequality. There is also a popular view that immigration may have triggered a anti-EU sentiment. Hence, we control for the unemployment rate of the active population (in percentage points), as a measure of economic crises; for the share of working-age population (25-64) with tertiary education; for the Gini coefficient of the net income distribution, as a measure of inequality; and for the stock of immigrants as a share of population. Most of these variables are available for all 28 countries over the period 2000–2018.[11]

We start by studying correlates of changes in the negative attitude towards the EU, with the *caveat* that, for many variables of interests, the most meaningful variation is cross sectional. Table 1 reports panel regressions with country fixed effects and standard errors clustered at the year level. Column (1) shows that the coefficients for both components

[11]However, exposure to import competition is available until 2016 only. The stock of immigrants has several missing observations, especially in the first years of the sample. For this reason, we do not include it in our main specifications.

Table 1: Negative image of the EU: Country FE

Dependent variable: Negative Image of EU						
	(1)	(2)	(3)	(4)	(5)	(6)
Log population	0.370**		0.559***	0.301**	0.376*	0.237
	(0.136)		(0.127)	(0.121)	(0.200)	(0.199)
Log GDP pc	0.018		0.035	-0.034	0.012	-0.164**
	(0.020)		(0.027)	(0.028)	(0.043)	(0.065)
EU imp. comp. (% of emp.)		0.163***	0.160***	0.087***	0.164***	0.118**
		(0.041)	(0.041)	(0.027)	(0.051)	(0.053)
EU net exports				0.331***	0.093	0.123
				(0.087)	(0.144)	(0.102)
Unemployment %				0.008**	0.010**	0.005**
				(0.003)	(0.004)	(0.002)
Tertiary education				0.402***	0.335	-0.144
				(0.131)	(0.326)	(0.255)
Gini				-0.198	0.350	0.686**
				(0.170)	(0.300)	(0.305)
Immigrants (%)					-0.538	-0.283
					(0.367)	(0.330)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No	Yes
Clusters	Year	Year	Year	Year	Year	No
Observations	479	414	414	374	231	227
R-squared	0.517	0.523	0.572	0.739	0.779	0.887

Notes: All regressions include the intercept. Robust standard errors are in brackets. *, ** and *** denote significance at 10%, 5% and 1% respectively.

of economic size are positive, but only population is statistically significant (at the 5% level). This is not too surprising, given that changes in GDP per capita over time are likely to capture cyclical factors such as the severity of the crisis, which may affect people's attitudes. Column (2) shows, as expected, that changes in import competition from the EU are strongly correlated with a negative image of the union. The coefficient is significant the 1% level. Column (3) confirms the previous findings when all there variables are included simultaneously. In column (4) we include all the other control variables, except immigration, which is has several missing values. The coefficients for population and import competition remain highly significant. Regarding the new controls, perhaps surprisingly, the coefficient for net export to the EU and tertiary education turn out to be positive and significant. However, as we shall see, these findings are not robust, which may reflect the fact that

changes over time of these variables are hard to interpret.[12] An increase in the unemployment rate is associated with a more negative view of the EU, while the Gini coefficient has no statistically significant correlation. In column (5) we also include the share of immigrants. Despite the loss of observations, the coefficients for population and import competition remain significant. Finally, in column (6) we include year fixed effect, thereby removing any common factor. Despite the demanding specification, the positive coefficient for exposure to import competition remains highly significant. Interestingly, we also find that differential increases in inequality, as captured by the Gini coefficient, are now associated with a more negative attitude towards the EU. The same applies to the variables capturing economic hardship.

Next, we focus on the cross sectional variation in the data. Table 2 replicates columns (1)-(5), but with year fixed effects instead of country dummies, and clustering standard errors at the country level. The coefficients for both components of economic size are still positive, but now only GDP per capita is statistically significant (at least at the 5% level). Hence, it is rich countries that tend to have a more negative view of the EU. The coefficient for import competition is also positive and significant (except in one case). Interestingly, in the cross section, net exports to the EU are strongly correlated with a less negative image of the union. These results confirm that countries with a higher employment in import-competing sectors and higher imports relative to exports to the EU tend to dislike the union more. There is also some evidence that tertiary education is correlated with a more favorable view of the EU. These results are broadly consistent with our model.

The relatively weak correlation between education and preferences for the EU seems in contrast with existing evidence within countries. For instance, for the UK, Becker, Fetzer and Novy (2017), Pastor and Veronesi (2019) and others find that voting Leave is associated with low educational attainment. A special survey by the European Commission (2016) also shows that education markedly affected the attitude of Europeans towards EU enlargement: 51% of those who left full-time education at the age of 20 or later favored EU enlargement, compared to 35% of those who left at age 15.

Yet, a discrepancy between results within and across countries is consistent with our model, which highlights different sources of disagreement over union policies across and within countries. From this perspective, it is useful to look at how attitudes towards the EU vary with the level of education by country. Data from the Eurobarometer stratified

[12] For instance, changes in net exports to the EU are likley to capture cyclical movements in the current account balance rather than structural trade patterns.

Table 2: Negative image of the EU: Year FE

Dependent variable: Negative Image of EU					
	(1)	(2)	(3)	(4)	(5)
Log population	0.011		0.004	0.008	-0.001
	(0.009)		(0.009)	(0.009)	(0.011)
Log GDP pc	0.042**		0.046***	0.060***	0.071**
	(0.016)		(0.015)	(0.019)	(0.028)
EU imp. comp. (% of emp.)		0.129*	0.094	0.164**	0.340***
		(0.070)	(0.067)	(0.074)	(0.089)
EU net exports				-0.176***	-0.239***
				(0.046)	(0.052)
Unemployment %				0.005	0.006**
				(0.003)	(0.003)
Tertiary education				-0.108	-0.345**
				(0.139)	(0.157)
Gini				-0.528*	-0.219
				(0.309)	(0.336)
Immigrants (%)					0.139
					(0.172)
Country Fixed Effects	No	No	No	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clusters	Country	Country	Country	Country	Country
Observations	479	414	414	374	227
R-squared	0.274	0.229	0.316	0.468	0.585

Notes: All regressions include the intercept. Robust standard errors are in brackets. *, ** and *** denote significance at 10%, 5% and 1% respectively.

by education groups confirms that the share of respondents with a "very positive or fairly positive" image of the EU in 2017 is on average much higher (48%) among individual who left education at the age of 20 or later than those who left at age 16-19 (36%) or below (29%). But do these differences between more and less educated people vary systematically with the level of income of a country? In other words, are highly educated workers more pro-EU in richer countries? The answer to this question is provided by Figure 7 which shows the share of positive views among respondents who left education at age 20+ relative to those who left school at age 16-19, against the log of GDP per capita in 2017. The scatter plot confirms that in all countries but Hungary positive views are more frequent among better educated people. Strikingly, however, this difference increases with income. In particular,

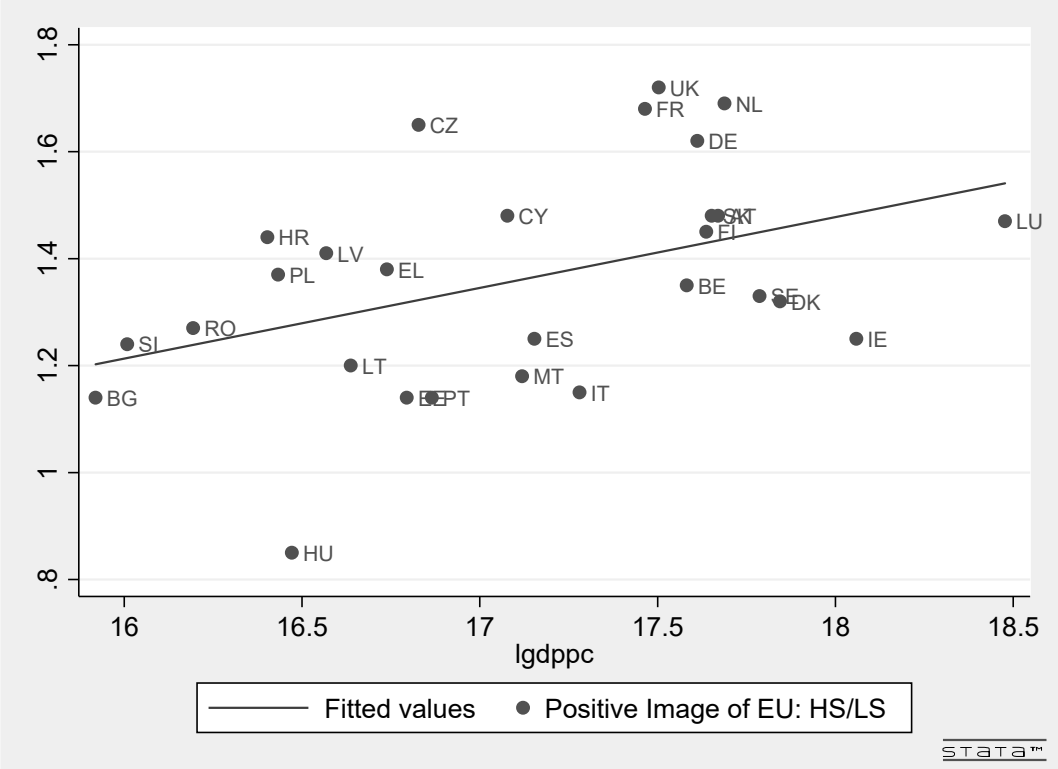

Figure 7: Economic size and support for the EU by education. Positive image of the EU in 2017 among high-skill respondents (who left education at age 20+) relative to low-skill respondents (who left education at age 16-19). Source: Eurobarometer and Eurostat.

the coefficient of a linear regression is 0.13, with a standard error of 0.05.[13]

What can we learn from these results? The evidence suggests that attitudes towards the EU mirror the distribution of the gains from intra-EU trade. It broadly supports the predictions of our theory. Smaller and poorer countries, with a larger share of employment in export-oriented sectors, reap greater benefits from accessing the larger union market. Within countries, educated workers are more likely to benefit from trade as they tend to be specialized in industries where products are more differentiated and gains from varieties higher (e.g., Epifani and Gancia 2008). At the same time, as in models of inter-industry trade, gains are larger for workers in export industries, such as the high-skilled in rich countries, then for those in import-competing industries.[14]

[13] A similar scatterplot using data on respondents with a negative view of the EU yields very similar results: respondents with lower education are more anti-EU in richer countries.

[14] A recent literature uses structural models to quantify the economic gains from the EU. The results are consistent with our view. For instance, Caliendo et al. (2017) and Mayer, Vicard and Zignago (2019) find that new member states were the largest winners from EU enlargement.

In line with this view, there is a growing empirical literature suggesting that exposure to import competition has increased the support for parties and politicians with protectionist, populist, and nationalist agendas (Colantone and Stanig 2018a, b). While import competition is often perceived as a major threat of globalization, export opportunities can instead help explain the support for international unions. The German case is of particular interest here. Dauth, Findeisen and Suedekum (2014) find that the rise in trade with Eastern Europe caused job losses in German regions specialized in import-competing industries, but that these losses were more than compensates by employment gains in export-oriented industries. Dippel, Gold and Heblich (2015) also find that German regions that gained better export opportunities reduced their vote share for extreme right-wing parties, at the same time as it increased in regions that faced sharper import competition.

These results then offers some insight on the persistent support for European integration in Germany. While Germany is the largest economy in Europe, it is also an export powerhouse, with a trade surplus in a majority of industries. Our framework then suggests that German workers are uncommonly keen on the Single Market because they are more likely to be employed in sectors with positive net exports to the EU.

6 Concluding remarks

We conclude by summarizing our main findings and discussing briefly some of their policy implications. We have shown how the support for international unions can become weaker as member countries become more dissimilar in economic size and factor endowments. The expansion of the WTO, from 23 to 164 countries, the enlargement of the EU, especially after 2004, the rise of China and the emergence of global supply chains all fostered trade between an increasingly diverse set of countries. While all these phenomena raise the potential gains from trade, our model shows that they may also undermine the political support for the process of economic integration.

If an international union comprises countries that are sufficiently similar, it can grow without facing any opposition. An intra-union pattern of comparative advantage due to difference in endowments, instead, increases the value of the union but also creates winners and losers. This redistribution may undermine the support for the union even when the country as a whole would benefit from union membership. Moreover, differences in economic size implies that, in the presence of any cost of integration, larger economies would prefer a shallow union, while smaller ones prefer deeper integration.

What policies could then be adopted to restore the support for more economic integration, and hence to reap additional gains from trade? If disagreement over the value of the union is between winners and losers within countries, domestic redistribution may suffice to solve it. If instead the disagreement is between countries that differ in size and income, solving it requires some form of international redistribution. This may be more difficult to achieve, given that such policies tend to be politically costly and hard to implement. Alternatively, support for the union may be restored by making the union more attractive, for instance by deepening integration in areas that are less contentious.

We conclude by emphasizing that in this paper we have limited our analysis to exogenous unions. In particular, we have taken the size and scope of the union as given. However, our model shows how changes in one margin affect preferences for the other. For instance, as we have already argued, the accession of smaller and poorer countries, which want deeper integration, may trigger a deepening of the union which may go against the desire of larger and richer countries. Studying more formally the interaction between the size and scope of economic unions may help to shed new light on recent phenomena and seems a fruitful avenue for future research.

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