Trade bloc enlargement when many countries join at once*

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August 23, 2025

Abstract

This paper examines the effects of trade bloc enlargement, focusing on simultaneous country entries. Using the European Union as a case study, we identify three driving forces behind changes in trade flows and welfare gains: (1) reduced bilateral trade costs between candidates and current members, (2) candidates adopting the bloc's trade policy towards outsiders, and (3) reduced trade costs among candidates. Our findings highlight the substantial impact of the third force, which for current candidates may account for at least a third of the welfare gains for candidates, sometimes exceeding the other two forces combined.

Keywords: Trade agreement, EU enlargement, international trade, new quantitative trade model

JEL codes: F13, F14

*We thank an anonymous referee and seminar participants at Banco de España. The views expressed in this paper are those of the authors and do therefore not necessarily reflect those of the Banco de España or the Eurosystem. Declarations of interest: none.

1 Introduction

In recent years, trade policy has re-emerged as a central topic in economic discussions. The issue has gained relevance not only because of the renewed imposition of tariff and non-tariff barriers and geopolitical tensions, but also because of the signature of new regional agreements, such as the recent agreement between the European Union (EU) and MERCOSUR, and ongoing discussions on the admission of new members to the EU. At the same time, economists have access to a wider range of tools for assessing the impacts of trade policy changes. Advances in data availability, and econometric and modeling techniques have significantly enhanced the precision and scope of trade policy analysis. The result of these developments has been an increase in the importance of simulations in trade policy research and analysis.

In this paper, we use the EU as a case study, to identify three driving forces behind changes in trade flows and welfare gains, and to show their relative importance in simulations. The EU is the largest and arguably the most deeply integrated single market area in the world. Much progress has been made since Belgium, France, Italy, Luxembourg, the Netherlands and the Federal Republic of Germany signed the Treaty of Rome on March 25, 1957, laying the foundations for economic integration among its members. This process included the elimination of tariffs and the drastic reduction of non-tariff barriers between member states and the adoption of a common commercial policy with the rest of the world.

The EU single market has added new members on seven separate occasions. This process, known in EU jargon as "enlargement," has often involved the simultaneous accession of several countries. For example, the fifth enlargement, which took place in 2004, was the largest to date, bringing ten new countries into the single market at once. Although there have been no new accessions in the last decade, the geopolitical tensions surrounding Russia's invasion of Ukraine have rekindled the interest of several candidates in joining the bloc (del Río et al., 2025).

In this paper, we focus on one characteristic of the enlargement process of trade blocs: the fact that often many countries join an existing bloc at once. In this situation, economic consequences arise from changes in direct bilateral trade costs *among joining candidates*.[1] Consider, for example, the garment industry in Serbia. Currently, Serbian footwear exports to the EU are subject to a 17% tariff and exports

[1] The concept of trade costs is usually taken to include both direct bilateral trade costs and multilateral resistance terms that are due to general equilibrium effects. For simplicity, in this paper we will refer to the direct bilateral trade costs as "bilateral trade costs", or just "trade costs", when it does not lead to confusion. We also use the terms "candidates" and "joining candidates" interchangeably.

to other Balkan countries, such as Albania, Bosnia-Herzegovina or North Macedonia face tariffs ranging from 15 to 20%. In the case of an EU enlargement to include all Balkan countries, the tariff rates for Serbian footwear exports will fall to zero not only if they are destined for countries currently in the EU, but also for Albania, Bosnia-Herzegovina, or North Macedonia, thus lowering bilateral trade costs among the candidates to join the EU.[2] The consequences are not only for tariffs, but also for non-tariff trade barriers.[3]

Let us consider the three different forces that are at work when more than one country joins a trade bloc at the same time. The first of these forces is the reduction in bilateral trade costs for all trade flows between candidates and current members of the bloc. This first driver is the most obvious and also the one that has been most studied in previous research. The second force is the change in bilateral trade costs between candidates and other countries that are not part of the bloc. This driver arises because, by joining a trade bloc, candidates often implicitly adopt the trade policy of that trade bloc with the rest of the world. In the case of the EU, for example, countries adopt the bloc's common external tariff and, more generally, the bloc's common commercial policy. This means, for example, that joining candidates will replace their existing set of bilateral agreements with third countries with the EU's trade agreements with third countries.[4] The third force is the one of primary interest in this study: when many countries join the bloc at the same time, direct bilateral trade costs between the joining candidates also change, as exemplified in our example on Serbian footwear exports.

In this paper, we use the current list of EU candidates to quantify these three driving forces in a hypothetical accession of all candidates to the EU. We follow the usual two-step procedure for evaluating trade policy from an ex-ante perspective. In the first step, we use information from the past to estimate how trade agreements of different degrees of integration typically affect direct bilateral trade flows. In a second step, we use these estimates to inform a general equilibrium quantitative trade model. We use this model to compute the expected change in trade flows and of welfare for countries involved and how each of the three driving forces is expected to contribute to these changes.

[2] Tariff data refer to the year 2018, and are based on the information made available by the World Bank World Integrated Trade Solution (WITS) database. "Footwear" corresponds to HS 6-digit code 640192.

[3] For example, there might be different labeling and certification requirements for Serbia when its goods are sold in the EU single market and in candidate countries, or differences in the application of pre-shipment inspections, etc.

[4] As with the example of Serbia, there is sometimes an overlap between the existing set of Serbian bilateral trade agreements with third countries and the set of EU trade agreements with third countries. However, the two sets may differ in terms of their scope and depth. For instance, the EU has a customs union with Turkey, while Serbia has a free trade agreement. In other cases, the EU may have agreements with third countries that Serbia does not have, such as a trade agreement with Japan, which Serbia does not have. Finally, in some other cases, Serbia may have agreements with third countries that the EU does not have, such as a trade agreement with the Eurasian Economic Union. In such cases, Serbia will need to phase out these agreements.

In the first step, we use a very flexible approach to estimate the change in bilateral trade costs associated with trade agreements that imply different degrees of integration. This distinction by degree of integration, or type or agreement, is inspired by the work of Baier et al. (2014), Baier et al. (2018), and Baier et al. (2019). We regress bilateral trade flows on indicators of the type of agreement to obtain the partial equilibrium effects of switching from one type of trade agreement to another according to the historical record. We do so using a gravity equation that is derived from an explicit general equilibrium trade model. This means that the partial equilibrium estimates can be mapped into structural parameters of this model. In the second step, we use the quantitative trade model to simulate the impact of each of the three drivers on trade volume and welfare for countries that are expected to join the EU in the future.

Our general equilibrium simulations indicate that the third force can be quantitatively very important. In the case of the joint accession of all EU candidate countries, a lowering of bilateral trade costs among these joining candidates explains at least a third of the ex-ante welfare gains. For some countries it even exceeds the other two forces combined. This is the case for Georgia, Kosovo, Montenegro, and Turkey. In contrast, the contribution of the second driver (the common trade policy towards outsiders) is positive but relatively small for most candidates, accounting for about 1% of the total increase in international trade and welfare for the median candidate.

The result that the third force is quantitatively large offers a valuable lesson for how evaluations of trade policy should be conducted. Ex-ante evaluations of trade policies are inherently more difficult to conduct than ex-post evaluations. Therefore, they necessarily concentrate only on some of the forces that drive trade, ideally those that are expected to be quantitatively large. The consensus so far has been that the reduction in bilateral trade costs between candidates and current members, i.e., the first driving force is the largest force to contend with. Consequently, virtually all ex-ante studies that quantify the impact of joining a trade bloc study only this first force.[5] Our results in this paper challenge the current consensus by showing that the reduction of bilateral trade costs between joining candidates when many of them join at the same time (the third force) is an important contributor to welfare gains of new EU members in our case study.

The existence of a third force affecting trade between joining candidates is not a phenomenon that is unique to EU enlargements. This force is always present when more than one country enters into an agreement that regulates any aspect of trade among its members. In fact, it can apply even when two

[5]For example, two well-known studies that use modern quantitative methods to quantify the economic consequences of the accession of the Balkan countries to the EU (Larch et al., 2023; Head and Mayer, 2022) do so.

parties sign an agreement that only indirectly changes the way trade within a trade bloc is affected by trade barriers. As an example, consider the EU-MERCOSUR agreement from the perspective of the MERCOSUR countries. This agreement may lead to the harmonization of sanitary controls, technical regulations, conformity assessment procedures, or any other type of non-tariff barrier to access to the EU market, for example by adopting EU regulations. In this case, MERCOSUR countries will have the same regulations as EU countries and among themselves. This harmonization will reduce trade barriers associated with different standards and minimize costly compliance procedures both between the EU and MERCOSUR countries and within MERCOSUR. Our findings are particularly pertinent in light of the current geopolitical landscape. As countries grapple with mounting trade tensions and protectionist policies with some partners, they are simultaneously seeking to negotiate new trade agreements or strengthen existing ones with others. This underscores the renewed relevance of a thorough ex-ante analysis of association agreements.

Our paper is related to the rich literature that has evaluated the trade and welfare gains of being part of the EU single market, either from an ex-ante or ex-post perspective. These studies suggest that the gains from belonging to the EU single market are large (Mayer et al., 2019; Wolfmayr et al., 2019; Head and Mayer, 2021; Anderson and Yotov, 2022; Felbermayr et al., 2022; Heid and Stähler, 2024; Fontagné and Yotov, 2024; Nagengast et al., 2024), and even larger than those from other types of trade agreements (Felbermayr et al., 2018), reflecting the very deep economic integration achieved by the EU. Our results are consistent with this prior research, as they suggest that a future EU enlargements would have substantial and positive effects on trade and welfare in the candidate economies and, to a lesser extent also on current EU members.

Our results bear implications for the part of this literature has looked at past expansions of the European Union from an ex-post perspective, such as the recent studies by Head and Mayer (2021) and Caliendo et al. (2021).[6] Although these studies quantify the total effect of the EU enlargement, and therefore include the three driving forces we discuss, they do not isolate the differential impact of each one of them. Given the quantitative importance of the third force for the ex-ante evaluation of future EU accessions, we argue that its measurement in ex-post analyses of past enlargements of the European Union would be an important benchmark for informing economic policy.

The remainder of the paper is organized as follows. Section 2 presents the general equilibrium trade

[6] In fact, these studies go beyond the role played just by trade policy, and study also the impact of the other freedoms that are part of the European Union.

model. Section 3 shows how to derive a gravity equation from this model and presents the empirical methodology and results of partial equilibrium estimates of the trade effects of different types of trade agreements to be used in simulations. Section 4 presents the results of the simulations using general equilibrium trade model and shows the importance of each of the three forces that drive trade and welfare. In Section 5 we consider the EU enlargement of 2004 to quantify the importance of the third force in a past experience. Section 6 concludes the paper.

2 A quantitative trade model with a positive supply elasticity

The model

We use a prototypical trade model with positive supply elasticity. This model is standard in the applied trade literature. For example, Allen et al. (2020) use this model as the main example of a trade model in what they call the universal gravity framework. More importantly, a very similar model is used by Head and Mayer (2022) to quantify the effects of EU enlargement to the Balkan candidate countries.

In the model there are N countries, and each country produces a single good. Real output of good i is denoted by Q_i. This good is generated by a Cobb-Douglas production function with constant returns to scale that combines internationally immobile labor (L_i) with intermediate inputs (M_i), as in the model of Eaton and Kortum (2002):

$$Q_i = (A_i L_i)^{\zeta} M_i^{1-\zeta},$$

where ζ is the share of labor in production and $0 < \zeta < 1$. The parameter $A_i > 0$ denotes country-specific labor productivity.

Intermediate goods are assumed to consist of the same bundle of goods as those entering final consumption. This is convenient because it implies that the price index for intermediate goods for each firm coincides with consumer price index. We denote this price index by P_i. Assuming perfect competition in all goods markets, the price of output in country i is given by

$$p_i = \overline{\kappa}_i w_i^{\zeta} P_i^{1-\zeta},$$

where $\overline{\kappa}_i > 0$ is a country-specific constant and w_i is the nominal wage rate. We define the value of total output in country i as $Y_i \equiv p_i Q_i$. Because of perfect competition and constant returns to scale in the production function, profits are zero and the value of output is distributed to workers, leading to the macroeconomic accounting identity

$$Y_i = p_i Q_i = w_i L_i.$$

Exporting goods from country i to country j incurs an iceberg trade cost, denoted by $\tau_{ij} \geq 1$. Due to arbitrage in the goods markets, the price paid in the destination country j for a good that is exported from the origin country i is

$$p_{ij} = \tau_{ij} p_i. \tag{1}$$

The amount of goods that reach the destination country j (net of the iceberg cost) is denoted by q_{ij}. The expenditure on this good valued at prices in the destination country can then be expressed as

$$X_{ij} = p_{ij} q_{ij}.$$

Each country is inhabited by a representative consumer who supplies labor inelastically. This consumer values varieties of goods according to a constant elasticity of substitution (CES) function that aggregates goods from all origins, as in the models of Armington (1969), Anderson (1979), and Anderson and van Wincoop (2003). We denote the elasticity of substitution by $\sigma > 1$. The consumer's optimization problem leads to the well-known result that expenditure on goods from different origins can be expressed as a gravity equation

$$X_{ij} = \frac{p_{ij}^{1-\sigma}}{\sum_{k=1}^{N} p_{kj}^{1-\sigma}} E_j = \frac{p_{ij}^{-\theta}}{\sum_{k=1}^{N} p_{kj}^{-\theta}} E_j = \frac{p_{ij}^{-\theta}}{P_j^{-\theta}} E_j, \tag{2}$$

where expenditure E_j is defined by $E_j \equiv \sum_i X_{ij}$ and $\theta \equiv \sigma - 1 > 0$ is known as the *trade elasticity*.[7]

Equilibrium requires that output markets clear, that is, that prices and quantities adjust so that real output Q_i in each country equals the aggregate demand from all countries, including the part that is lost to iceberg costs:

$$Q_i = \sum_{j=1}^{N} \tau_{ij} q_{ij}.$$

Trade deficits $D_i \equiv E_i - Y_i$ are exogenous and we assume that they remain constant.[8] Aggregate

[7]The last equality in (2) uses the definition of the price of the CES consumption bundle: $P_j \equiv (\sum_k p_{kj}^{-\theta})^{-1/\theta}$.

[8]As stated in Head and Mayer (2022), there is no fully satisfying way to model trade deficits in a static model. Our

consistency requires that trade deficits sum to zero. This model determines only relative prices and nominal quantities are indeterminate. We pin them down with the standard assumption that world income is constant in nominal terms:

$$\sum_i Y_i = \overline{Y},$$

where $\overline{Y}$ is a strictly positive scalar.

This model is an instance of the class of models that Allen et al. (2020) define as the universal gravity framework. Counterfactual simulations for these types of models can be conducted with only minimal information on bilateral trade flows, the trade elasticity θ, and the *supply elasticity* $\psi \equiv (1-\zeta)/\zeta$.

Comparative statics

We adopt the "hat algebra" notation introduced by Dekle et al. (2008) and define $\hat{x} \equiv x'/x$, where x is the value of any variable in the initial equilibrium and x' is the value of the same variable in the counterfactual equilibrium. With this notation, the comparative statics for real output, income, and the real wage in response to changes in bilateral trade costs can be derived from the change experienced in equilibrium prices as a consequence of the change in trade costs.[9] They are determined by

$$\begin{aligned}\hat{Q}_i &= \frac{\hat{w}_i}{\hat{p}_i} = \left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{\psi},\\ \hat{Y}_i &= \hat{p}_i\hat{Q}_i = \frac{\hat{p}_i^{1+\psi}}{\hat{P}_i^{\psi}},\\ \frac{\hat{w}_i}{\hat{P}_i} &= \left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{1+\psi}\end{aligned}$$

We define the trade-deficit-to-income ratio as

$$\delta_i \equiv \frac{D_i}{Y_i}.$$

assumption implies fully exogenous, and therefore constant, trade deficits. Another possible assumption, often referred to as "multiplicative" assumption in the literature, is that trade deficits increase automatically with income (though not necessarily at the same rate). In the Appendix, we report results that use this assumption. The relative importance of the three forces, which are the focus of the paper, remains broadly unchanged. Changes in trade and welfare are slight.

[9] Detailed derivations of all results in this section can be found in Appendix A.

Comparative statics for welfare (W) are then given by

$$\hat{W}_i = \frac{1 + \delta_i \hat{\delta}_i}{1 + \delta_i} \frac{\hat{w}_i}{\hat{P}_i}.$$

The first term on the right-hand side vanishes with balanced trade, i.e. when $\delta = 0$. The expression for welfare given here generalizes the usual result for balanced trade, which says that the change in welfare is determined by the change in the real wage. The expression $(1 + \delta_i \hat{\delta}_i)/(1 + \delta_i)$ captures the effect that unbalanced trade has on the change in the ratio of the trade deficit to income and, ultimately, how trade deficits affect the change in consumer purchasing power. Since trade deficits are constant, only the denominator of δ changes, and the comparative statics for the deficit-to-income ratio $\hat{\delta}$ can be calculated directly from the change in income as follows:

$$\hat{\delta}_i = \frac{1}{\hat{Y}_i} = \frac{\hat{P}_i^{\psi}}{\hat{p}_i^{1+\psi}}.$$

Counterfactual equilibria for this model can be simulated by solving a nonlinear system of equations. We describe this system of equations in Appendix A.

3 Estimation of partial equilibrium effects

If we extend the economic model from the previous section to a panel setting, we obtain an expression for bilateral trade flows of the form

$$X_{ijt} = \tau_{ijt}^{-\theta} p_{it}^{-\theta} \frac{E_{jt}}{P_{jt}^{-\theta}} = \exp\left(-\theta \ln \tau_{ijt} - \theta \ln p_{it} - \ln E_{jt} + \theta \ln P_{jt}\right). \tag{3}$$

The first equality follows directly from combining the arbitrage condition (1) with consumer demand (2), and adding a t subscript to all variables to denote time. The second equality uses the fact that the logarithm and exponentiation are inverse functions.

In this expression, $\ln \tau_{ijt}$ is the only term that varies simultaneously by exporter, importer, and time. The other terms depend only on the identity of the exporter or importer. They can be collapsed into country-time dummy variables defined as

$$\eta_{it} \equiv -\theta \ln p_{it},$$
$$\phi_{jt} \equiv -\ln E_{jt} + \theta \ln P_{jt}.$$

These exporter-time and importer-time fixed effects are the standard way of controlling for "multilateral trade resistances," as defined by Anderson and van Wincoop (2003).

We model trade costs $\ln \tau_{ijt}$ flexibly by specifying the relationship

$$-\theta \ln \tau_{ijt} = \boldsymbol{\beta}' \boldsymbol{TA}_{ijt} + \gamma_t b_{ij} + \omega_{ij}. \tag{4}$$

The vector $\boldsymbol{TA}_{ijt}$ contains dummy variables associated with trade agreements that differ in their degree of integration. Following Baier et al. (2014) and Baier et al. (2018), we classify trade agreements into one-way preferential trade agreements (OWPTA), two-way preferential trade agreements (TWPTA), free trade agreements (FTA), customs unions (CU), and a dummy combining common markets and economic unions (CMECU). The latter includes the way the EU is classified. Importantly, these dummies capture both changes in tariffs (e.g. preferential tariff concessions) and non-tariff measures (e.g. harmonizing or recognizing equivalence for sanitary and phytosanitary standards, simplification of customs procedures, elimination of import quotas, etc.) associated with these trade agreements. Thus, the elements of the vector of coefficients $\boldsymbol{\beta}$ capture the semi-elasticity of bilateral trade flows to these different types of agreements.

We include a dummy variable b_{ij} that distinguishes international trade flows from domestic trade flows. Following the work of Bergstrand et al. (2015), we let the coefficient of this variable vary over time. The inclusion of $\gamma_t b_{ij}$ is intended to absorb general changes in the ease of trading across international borders—brought about by factors other than trade agreements, such as global trends in multilateral, non-discriminatory, tariff reductions. Studies following the suggestion of Bergstrand et al. (2015) typically interpret the coefficient γ_t as an indirect way of measuring trade globalization, because it captures how the ease of trading internationally evolves relative to trading domestically.

The final element in the specification for trade flows given in (4) is an exporter-importer fixed effect ω_{ij}. The inclusion of these terms follows the recommendation of Baier and Bergstrand (2007), who view them as a strategy to mitigate endogeneity concerns related to trade policy. In addition, they also control for all characteristics with exporter-importer (pair) variation (such as the standard gravity variables: distance, contiguity, common language, colonial relationship) that remain constant over time. Moreover, the inclusion of exporter-importer fixed effects is also a standard way of accounting for trade imbalances and asymmetric trade costs (Waugh, 2010).

Like many other studies estimating the impact of trade policy on trade, we do not explicitly include tariffs as an additional explanatory variable in our model. Incorporating tariffs is challenging due to the lack of consensus on the best indicator, which depends on the data's structure and granularity. Studies that use tariffs typically rely on three types of data: the average tariff applied across all trading partners, the most favored nation (MFN) tariff, or various measures of bilateral tariffs. Each of these has its own advantages and drawbacks relevant to our analysis.

The average applied tariff, while available for many countries, reflects changes in tariffs applied to all trading partners, regardless of trade agreements, complicating the interpretation of trade agreement coefficients. MFN tariffs, also widely available, represent the tariffs countries apply to imports from other WTO members outside of trade agreements, capturing changes dictated by the WTO rather than negotiated agreements. Bilateral tariff data, however, is not available for all countries and, as shown by Teti (2023), suffers from measurement errors due to misreporting.

Therefore, including a separate variable for tariffs in our regressions would complicate the general equilibrium counterfactual simulations, making it difficult to determine the drivers of tariff differences between current EU members, candidates, and third countries.

The main advantage of specifying bilateral trade costs as in (4) is its flexibility and simplicity. Its flexibility lies in its ability to model bilateral trade costs for any combination of country pairs (between current members, candidates and third countries) for agreements of different depths. Its simplicity stems from the fact that it requires only one database that classifies trade agreements according to their depth.

There are alternative approaches that have been successfully used to estimate bilateral trade costs while accounting for heterogeneity. For example, Anderson and Yotov (2022), Fontagné and Yotov (2024), and Nagengast et al. (2024) use country- or group-specific dummy variables to identify different trade flows within the EU, directly obtaining heterogeneous estimates of bilateral trade costs. Generally, these are alternatives that show great promise. However, given our focus on disentangling three different forces, this method becomes prohibitively complicated, especially for identifying our "second force"—the change in trade costs between joining candidates and countries outside the bloc. In this case, we would need separate dummies for trade flows between current EU members and each third country, as well as between candidate countries and each third country.

More importantly, the precise estimation of the causal effect of different types of trade agreements on trade in a partial equilibrium setting—i.e. the exact change in bilateral trade costs dictated by moving from one type of trade agreement (or no agreement) to another—or of any other alternative indicator used to capture potentially heterogeneous changes in trade costs, is beyond the scope of this paper, as its primary objective is to discuss how the three forces influence the design of counterfactual scenarios. In other words, our contribution to the literature is not to provide new partial equilibrium estimates of the variables used in the simulation in a way that improves on previous work, but to ensure that these scenarios are correctly formulated and that the figures obtained from the general equilibrium calculations are therefore more accurate.

Using the definitions of exporter-year and importer-year fixed effects and the relationship assumed for trade costs (4) in the gravity equation (3) implied by the theory yields the following estimating equation:

$$X_{ijt} = \exp\left(\boldsymbol{\beta}'\boldsymbol{TA}_{ijt} + \gamma_t b_{ij} + \eta_{it} + \phi_{jt} + \omega_{ij}\right) + \varepsilon_{ijt}, \tag{5}$$

where we interpret ε_{ijt} as a combination of measurement error and other omitted variables that may cause trade flows.[10] We note that the inclusion of exporter-time and importer-time fixed effects controls for all features that vary at the country-time level (such as GDP, GDP per capita, population, etc.), which are therefore not part of the error term.

The object of interest is the vector $\boldsymbol{\beta}$, which contains the semi-elasticities of trade with respect to trade agreements of varying depth. The identifying assumption is that trade agreements do not systematically vary with measurement error or other bilateral time-varying causes of trade flows that are part of the error term. We note that the inclusion of country-time fixed effects removes the general equilibrium effects of trade agreements, implying that the semi-elasticities in $\boldsymbol{\beta}$ have the interpretation of partial equilibrium objects.

The dependent variable X_{ijt} refers to gross bilateral trade flows between the exporter i and importer j in year t, also including the case where $i = j$ (i.e., domestic trade flows). We estimate equation (5) using a pseudo Poisson maximum likelihood estimator (PPML) and cluster standard errors by country pair.

[10] See also Anderson and van Wincoop (2003), Baier and Bergstrand (2007), and Yotov et al. (2016) for similar derivations.

Data on trade flows are taken from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) gravity database (Head et al., 2010; Head and Mayer, 2014), which collects and reports bilateral merchandise trade flows from the International Monetary Fund (IMF) Direction of Trade Statistics (DOTS) database. Trade flows are gross, reported in nominal terms, and expressed in the same currency (thousands of US dollars). Following the standard practice in the estimation of gravity equations, we use nominal trade data for estimations, as the set of country-time fixed effects already accounts for inflation differentials (Baldwin and Taglioni, 2007). We construct domestic trade flows as the difference between nominal Gross Domestic Product (GDP) and nominal total exports (the latter constructed as the sum of bilateral exports; both GDP and trade data are from the same CEPII gravity database).[11]

We classify country pairs into different types of trade agreements based on the EIA database by Baier and Bergstrand.[12] In this database economic integration agreements are classified using an index that varies from 0 to 6. The number 0 indicates that no EIA exists. The index increases according to the depth of the agreements, going through one-way preferential trade agreements (OWPTA), two-way preferential trade agreements (TWPTA), free trade agreements (FTA), customs unions (CU), common markets (CM), all the way to an economic union (ECU). In our estimations we combine the last two categories into one (because that is how the EU is defined).

In Figure 1, we plot the partial equilibrium effects of different types of trade agreements on trade flows according to the baseline specification (5). The point estimates for each type of agreement show a clear progression. The partial equilibrium effects increase as agreements become deeper. The most shallow type of agreement, a one way preferential trade agreement is predicted to increase trade by $\exp(0.06) - 1 = 6.2\%$. At the other extreme, a common market or economic union is associated with an increase in trade flows of $\exp(0.62) - 1 = 85.9\%$. These results are in line with prior studies (e.g., Baier et al., 2014, 2019; Timini and Viani, 2022) that have studied the effect of trade agreements of varying depth.

[11] Using gross production instead of GDP would be a more theory-consistent way of constructing domestic trade flows, but this would considerably restrict the period of analysis and therefore the variation in the data. In this respect, Campos et al. (2021) show that GDP-based and gross production-based methods for measuring domestic trade show consistent estimates of the impact of trade agreements.

[12] The database is available at `https://sites.nd.edu/jeffrey-bergstrand/database-on-economic-integration-agreements/`. We use the July 2021 version of this database.

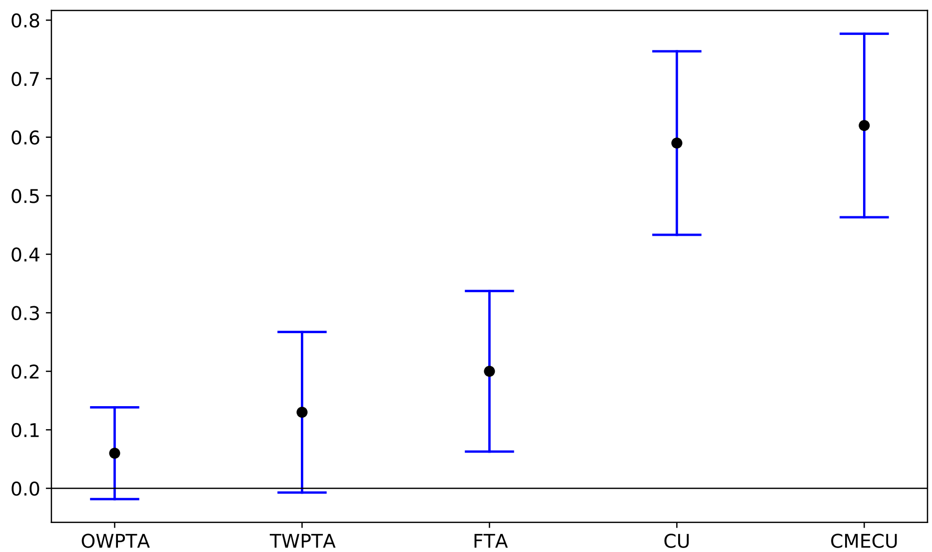

Figure 1: Trade effects of different types of trade agreements

Notes: The figure shows the point estimate and the 95% confidence interval for the variables of interest. Standard errors are clustered by country pair. Results are for a regression that includes both international and domestic trade flows. It controls for exporter-year, importer-year, direction pair fixed effects, as well as border-year dummies. The number of observations is 850,750.

4 Simulation of an EU enlargement to all candidates

We now use the general equilibrium model described in Section 2 to simulate the gains from trade implied by an enlargement of the EU. We consider the simultaneous accession of all candidates. While this may be a realistic prediction of future events, in this paper it serves to illustrate the importance of considering the third driving force when modeling the joint accession of several countries at the same time. We simulate the total gains from trade and also the impact of the three driving forces separately and report the change in international trade and welfare that can be attributed to each component according to the model.

The simulation exercise has very limited data requirements: a complete and square bilateral trade matrix for a certain baseline year, a change in trade costs, and two elasticities. We use the database put together by Head and Mayer (2022) in their paper assessing the effects of deepening trade relationships between the EU and the Western Balkans. The trade flows in this database refer to the year 2018. The database includes 130 countries and territories.[13] Given the well known properties of general equilibrium trade models (Head and Mayer, 2014), we can interpret the estimates obtained in Equation 5 from a structural perspective, as components of the vector of bilateral trade costs. Therefore, we exploit the estimated parameters to compute the change in trade costs between any two scenarios, taking as a reference the existing type of trade agreement at the time of accession to the EU, and the EU. For example, in the case of a pair of countries with an existing FTA, the change in trade costs is calculated as follows:

$$\tau_{ijt}^{-\theta} = \exp\left(\hat{\beta}_{\text{CMECU}} - \hat{\beta}_{\text{FTA}}\right). \tag{6}$$

The value for the trade elasticity θ used in the simulations is 5.03, taken from the chapter by Head and Mayer (2014). According to our model, the supply elasticity depends on the importance of intermediate inputs in production. We followed the approach described by Campos et al. (2023), calculating the supply elasticity as the midpoint of the values implied by the 10th and 90th percentiles of the intermediate input share distribution across the KLEMS country sample, as reported by Huo et al. (2025). This gives us a supply elasticity of 1.24.

Using a single supply elasticity for all countries is a common assumption when using general equilibrium

[13] In this database some countries and territories have been grouped together to avoid having negative domestic trade values. Some examples include the grouping of Hong Kong with China, Latvia and Estonia with Lithuania, Belgium and Luxembourg with France, and Netherlands with Germany. For more details on the database, see Head and Mayer (2022).

trade models of the "universal gravity" class. In general, higher values of the supply elasticity imply larger welfare gains, while smaller values imply lower welfare gains. We computed the share of intermediates for current EU members and candidates and found that they are very close, at around 0.54 and 0.52, respectively. The data therefore point to similar supply elasticities, on average, across EU members and candidate countries.[14] We solve for the counterfactual equilibrium by using Algorithm 2 in the article by Campos et al. (2024a).[15]

In Table 1 we report summary statistics of the trade and welfare gains for current EU members and candidates according to the simulation. It shows that the effects of EU enlargement are likely to be very different for current EU members and candidates. Among current EU members, the countries were trade is predicted to increase the most are Croatia, followed by Romania, Bulgaria, and Greece. All these EU members are geographically close to and trade more with the candidates in the present. At the other end of the continent, Ireland is the country with the lowest increase in trade according to the simulations. Among the candidates, Albania is the country with the highest increase in trade and Turkey the country with the lowest. This last result is partly explained by the fact that Turkey and the EU already belong to a customs union.

Table 1: Trade and welfare gains from joining the EU for current EU members and candidates

	Variable	Mean	Median	Minimum	Maximum
Current EU members	International trade (%)	0.58	0.29	0.02	2.59
	Welfare (%)	0.31	0.16	-0.01	1.02
Candidates	International trade (%)	27.52	28.10	6.10	39.85
	Welfare (%)	10.79	9.69	1.28	25.17

Notes: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24. The changes in trade costs incorporate all three driving forces.

In Figures 2 and 3 we show predicted growth rates of trade and welfare for all candidate countries. Countries are ordered by magnitude of the effect. The figures also show the decomposition into each of the three forces. We computed these decompositions by simulating each of the forces separately. So, to simulate the first force, which involves increased integration between current EU members and candidates, we modified only trade costs only for trade flows between current EU members and candidates. For the candidate countries this component measures the gains from "access to current EU members". To

[14]We collected data on value added, intermediates, and output "UN data" database (`https://data.un.org/`). Data were available for an overlapping cross-section of countries including 25 EU members and 8 candidates during the period 2005-2008 (Kosovo data refers to 2004).

[15]We do this using the `ge_gravity2` command (Campos et al., 2024b). This command allows users to compute counterfactual trade flows in a large class of general equilibrium trade models in Stata.

simulate the impact of the second force, we modify only trade costs involving joining candidates and non-members and to simulate the third force we modify only trade costs for trade between joining candidates.

Because we are using a static general equilibrium trade model to simulate the long-term effects of joining a trade bloc, we do not address the differences between joining at the same time and joining at different times. Our contribution is intended to illustrate how to incorporate the different forces within such simulations. Importantly, as explained in the paper, the third force is present when more than one country joins at the same time.[16]

The different components vary considerably across candidates, depending on the importance of their current trade relations and the depth of their current trade policies. We find that the first and third force make up almost the entirety of the variation in trade and welfare of all candidate economies. The contribution of the second force, the common commercial policy with non-members, is small, accounting for roughly 1% of the total increase in international trade and welfare for the median candidate. The most notable exception, is Turkey. For this country, the second force accounts for almost 10% of the total predicted increase in international trade and welfare. This can be explained by the fact that the first force is relatively small, as the upgrade from the current customs union to full membership in the EU is expected to generate relatively less trade flows than for other countries. For Georgia and Moldova the contribution of the common commercial policy is negative, since EU accession would mean the termination of trade agreements (and therefore a sizeable increase in bilateral trade costs) with important trade partners, such as Azerbaijan, China, Kazakhstan, Russia, and Uzbekistan for Georgia, and Azerbaijan, Belarus, Kazakhstan, and Russia for Moldova.

In general equilibrium trade models, trade and welfare effects hinge on three main factors: (1) changes in bilateral trade costs due to policy shifts, (2) the share of trade impacted by these bilateral trade cost changes, and (3) trade and supply elasticities. The number of countries involved is less relevant than the extent of trade affected. For example, two countries with high trade volumes and barriers may generate stronger effects than a larger group with minimal trade ties. To show that the importance of the third force—namely, the reduction in bilateral trade costs among joining candidates—is not unique

[16] If there is only one country joining, the third force is absorbed by the first force. To illustrate this point, imagine candidate A and candidate B joining a trade bloc together. The third force is generated by the decrease in trade barriers between the two candidates. If, on the other hand, they join separately, with country A going first, the reduction in trade barriers between A and B when B accesses the bloc, will be between an existing member (previous candidate A) and a candidate.

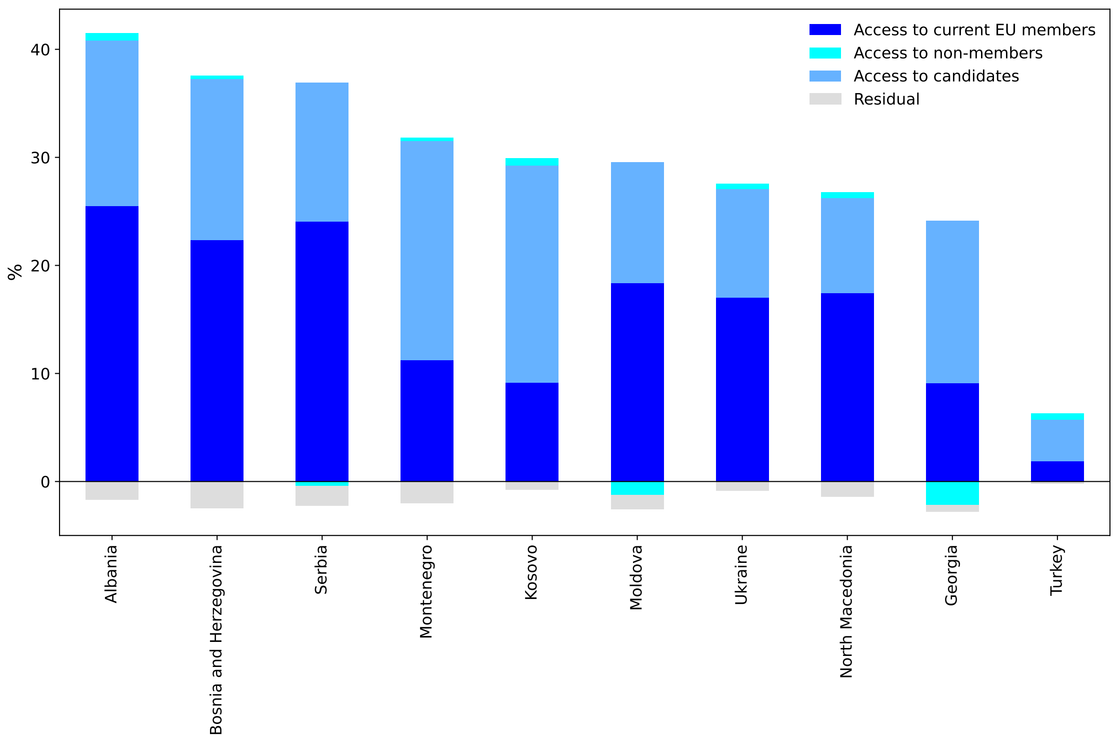

Figure 2: Trade gains from joining the EU for candidates

Note: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24. Total effects are decomposed into the three driving forces. The component labeled "access to current EU members" is obtained from a simulation that changes trade costs only for trade flows between candidates and current EU members (the first force). The component labeled "access to non-members" is obtained from a simulation that changes trade costs only between candidates and non-members (the second force). The component "access to candidates" is obtained from a simulation that changes trade costs only for trade between candidates (the third force). The decomposition has a residual because introducing all three forces at the same time produces interactions.

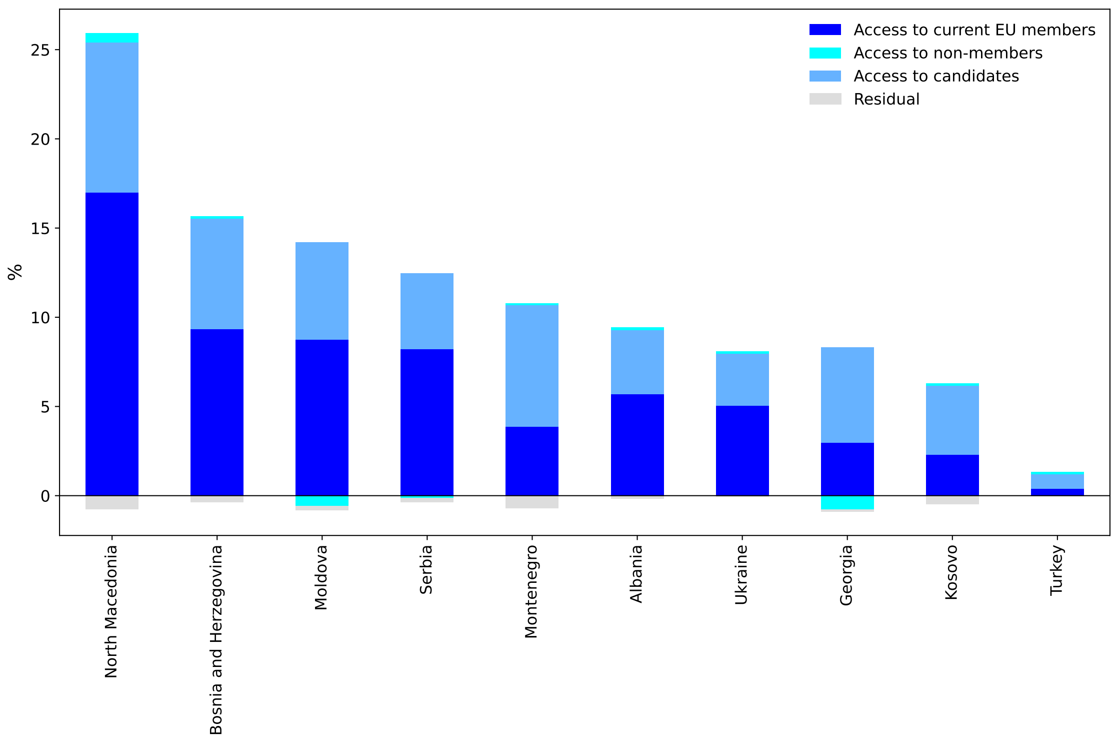

Figure 3: Welfare gains from joining the EU for candidates

Notes: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24. Total effects are decomposed into the three driving forces. The component labeled "access to current EU members" is obtained from a simulation that changes trade costs only for trade flows between candidates and current EU members (the first force). The component labeled "access to non-members" is obtained from a simulation that changes trade costs only between candidates and non-members (the second force). The component "access to candidates" is obtained from a simulation that changes trade costs only for trade between candidates (the third force). The decomposition has a residual because introducing all three forces at the same time produces interactions.

to the prospective enlargement studied in this paper, we analyze all past EU enlargements involving multiple countries (this excludes only the accessions of Greece in 1981 and Croatia in 2013). As shown in Figure B.1, this third force often drives 20–90% of total trade gains, depending on pre-enlargement trade relationships and the magnitude of bilateral trade cost reductions.

5 Ex-ante calculations versus actual outcomes: lessons from the 2004 EU expansion

In the preceding analysis, we conducted an ex-ante evaluation of the European Union's expansion, highlighting a significant yet often overlooked force that influences trade flows and welfare gains among newly admitted members. However, a question arises: can ex-ante calculations predict the eventual outcomes of such expansions? To address this point, we undertake a comparative analysis of the ex-ante predictions made for the EU's enlargement in 2004 against the actual post-expansion developments. By examining this specific case, we aim to assess the accuracy of our initial forecasts and the robustness of the identified driving forces in shaping the trade dynamics and welfare implications of simultaneous accession to the trade bloc.

An important issue for this analysis is the accuracy of the data measuring the depth of prior agreements between joining candidates and current members—i.e. those that existed before the accession date—as they determine the size of the reduction in trade costs between them that is included in the model. Apart from the large number of countries involved, we focus on the 2004 enlargement because we were able to manually cross-check the reliability of such data from different online sources. The classification of existing trade agreements further back in time, when the previous enlargement took place, may be less precise.[17]

In our analysis, we focus on the ten countries that joined the European Union during the 2004 enlargement, using bilateral trade data from the year preceding their accession, specifically 2003. To evaluate the accuracy of our predictions, we compare the results from the simulations with actual trade data from 2013, a decade after the expansion. We use data from ten years after the enlargement to allow all long-term adjustments run their course. When doing this comparison, we focus on the structure of

[17] The 2007 enlargement suffers from similar problems—the depth of existing agreements varies between databases—exacerbated by possible anticipation effects, as both Bulgaria and Romania were already longstanding candidates in 2004.

trade flows rather than levels because there are many confounding factors that might have shaped the evolution of total trade, including the continuing globalization trend and its slowing after the Great Financial Crisis in 2007–2008.

Specifically, we look a the share of trade of the 10 new members of the EU that has other new members either as origin or destination, and compare the actual data with simulated data. We show the results from this exercise in Figure 4. We perform two simulations: one in which we allow all three forces to act and one in which we simulate only the impact of the first force. A good fit is indicated by results that are close to the 45 degree line. As is apparent from the figure, when all forces are allowed to act, the fit is reasonable, with observations approximately lining up with the 45 degree line. However, when only the first force, giving access to current EU members, is simulated, the model considerably under-predicts the share of trade among new members, with observations systematically above the 45 degree line.

These results, which underscore the importance of considering various forces that reduce trade costs in ex-ante analysis—particularly between joining candidates and current members and among joining candidates—align with recent ex-post analyses using advanced econometric techniques. For example, Fontagné and Yotov (2024) and Nagengast et al. (2024) examine the trade effects of EU accession, differentiating between "new" members (countries that joined during or after the 2004 enlargement) and "old" members (those already in the EU). They find significant and economically substantial trade effects both between "old" and "new" members and among "new" members themselves.

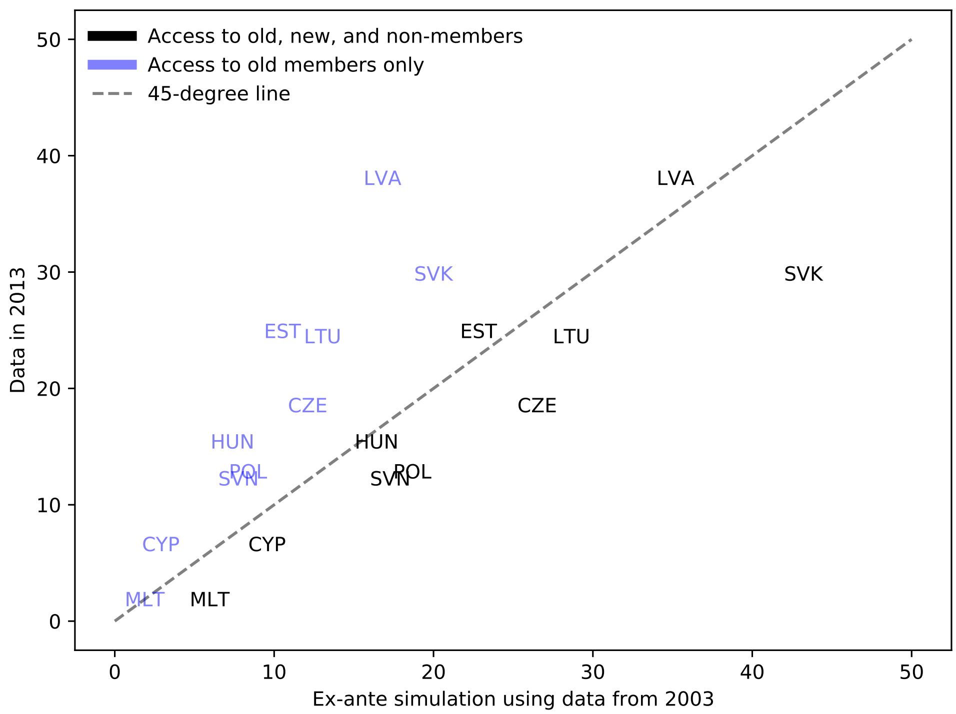

Figure 4: Share of trade with new members in the 2004 EU expansion

Notes: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24.

6 Conclusions

This paper sheds light on the complex dynamics that arise when more than one country joins a trade bloc at the same time, using the enlargement process of the European Union as a case study. Our analysis identifies and decomposes the changes in trade flows and welfare gains into three key driving forces. The first force, which has garnered significant attention in previous literature, pertains to the reduction of trade costs between candidates and current members. The second force highlights the changes in trade costs between candidates and other countries outside the bloc, while the third force, which is often overlooked, focuses on the reduction of bilateral trade costs among candidates themselves.

We use a quantitative general equilibrium trade model to calculate the trade and welfare effects expected from EU accession. Our simulations show that the deepening of trade relations between candidates and current members is large, but also that the deepening of trade relations between candidates accounts for an important share of the trade and welfare gains of candidates. The contribution of the common commercial policy, in comparison, is small for most candidates.

The existence of these forces is not a phenomenon that is unique to the EU, highlighting the relevance of our findings in the current geopolitical context. As countries contend with increasing trade tensions and protectionist measures with certain partners, they are also working to forge new agreements or enhance existing ones with others. This trend emphasizes the growing importance of a comprehensive ex-ante analysis of new association agreements and trade policy in general.

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A Detailed derivations of theoretical results

A.1 Output, the real wage, and income

The relationship between output and the real wage and terms of trade can be derived from the equality between the output price and the marginal cost:

$$p_i = \overline{\kappa}_i w_i^{\zeta} P_i^{1-\zeta},$$

Rearranging,

$$\frac{w_i}{p_i} = \overline{\kappa}_i^{-\zeta} \left(\frac{p_i}{P_i}\right)^{\frac{1-\zeta}{\zeta}} = \overline{\kappa}_i^{-\zeta} \left(\frac{p_i}{P_i}\right)^{\psi}.$$

Because profits are zero, the value of output is entirely paid out as prices, so that $Q_i = w_i/p_i$. This implies that

$$\hat{Q}_i = \frac{\hat{w}_i}{\hat{p}_i} = \left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{\psi}.$$

Comparative statics for the real wage (in terms of the consumption bundle) can then be obtained as

$$\frac{\hat{w}_i}{\hat{P}_i} = \frac{\hat{p}_i}{\hat{P}_i}\frac{\hat{w}_i}{\hat{p}_i} = \frac{\hat{p}_i}{\hat{P}_i}\left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{\psi} = \left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{1+\psi}.$$

Comparative statics for income are determined by

$$\hat{Y}_i = \hat{p}_i \hat{Q}_i = \hat{p}_i \left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{\psi} \frac{\hat{p}_i^{1+\psi}}{\hat{P}_i^{\psi}}.$$

A.2 Welfare

The appendix of Campos et al. (2024a) shows that welfare with unbalanced trade is given by

$$W_i = \Xi \xi_i \frac{w_i}{P_i}.$$

Comparative statics for welfare are then determined by

$$\hat{W}_i = \hat{\Xi} \hat{\xi}_i \frac{\hat{w}_i}{\hat{P}_i}.$$

Before, we have shown that

$$\hat{\xi}_i = \frac{1}{\hat{\Xi}} \frac{1 + \hat{\delta}_i \delta_i}{1 + \delta_i}.$$

Substituting this result in the expression for the comparative statics of welfare,

$$\hat{W}_i = \hat{\Xi} \left(\frac{1}{\hat{\Xi}} \frac{1 + \hat{\delta}_i \delta_i}{1 + \delta_i}\right) \frac{\hat{w}_i}{\hat{P}_i} = \frac{1 + \hat{\delta}_i \delta_i}{1 + \delta_i} \frac{\hat{w}_i}{\hat{P}_i}.$$

Finally, using the result obtained above for the real wage

$$\hat{W}_i = \frac{1 + \delta_i \hat{\delta}_i}{1 + \delta_i} \left(\frac{\hat{p}_i}{\hat{P}_i}\right)^{1+\psi}$$

A.3 System of equations for price changes

In their description of the class of universal gravity models Allen et al. (2020) express expenditure as a multiple of income in the following way:

$$E_i = \Xi \xi_i p_i Q_i,$$

where $\xi_i > 0$ for all i and

$$\Xi = \frac{\sum_i p_i Q_i}{\sum_i \xi_i p_i Q_i}.$$

In these models, comparative statics for prices can be computed by solving the following system of $2N+1$ non-linear equations:

$$\begin{aligned}
\hat{p}_i^{1+\theta+\psi} \hat{P}_i^{-\psi} &= \hat{\Xi} \sum_j \left[\frac{X_{ij}}{Y_i}\right] (\hat{\tau}_{ij})^{-\theta} (\hat{P}_j)^{\theta} \hat{p}_j \hat{\xi}_j \left(\frac{\hat{p}_j}{\hat{P}_j}\right)^{\psi}, \quad i = 1, \dots, N \\
\hat{P}_i^{-\theta} &= \sum_j \left[\frac{X_{ji}}{E_i}\right] \hat{\tau}_{ji}^{-\theta} \hat{p}_j^{-\theta}, \quad i = 1, \dots, N, \\
\hat{\Xi} &= \frac{1}{\sum_{i=1}^N \hat{\xi}_i \frac{\hat{p}_i^{1+\psi}}{\hat{P}_i^{\psi}} (E_i/\overline{Y})}.
\end{aligned}$$

A derivation for this result can be found in the online appendix of Allen et al. (2020) and (in more detail) in the appendix of Campos et al. (2024a).

With constant trade deficits the change in the parameters ξ_i is endogenous, as it depends on price changes and also on the ratio of trade deficits to income ($\delta_i \equiv D_i/Y_i = D_i/p_i Q_i$) in the baseline economy. To derive the formula for the change in ξ_i we start from the equation

$$\Xi \xi_i p_i Q_i = E_i = D_i + p_i Q_i.$$

The equality on the left is the definition given above for the universal gravity framework and the equality on the right follows from the usual definition of trade deficits $D_i \equiv E_i - Y_i = E_i - p_i Q_i$.

Solving this equation for ξ_i results in

$$\xi_i = \frac{1}{\Xi}\left(1 + \frac{D_i}{p_i Q_i}\right) = \frac{1}{\Xi}(1+\delta_i).$$

The change in the endogenous variable $\hat{\xi}_i$ is then determined by

$$\hat{\xi}_i = \frac{1}{\hat{\Xi}} \frac{1+\delta_i'}{1+\delta_i} = \frac{1}{\hat{\Xi}} \frac{1+\hat{\delta}_i \delta_i}{1+\delta_i} = \frac{1}{\hat{\Xi}}\left(1 + \frac{\delta_i}{1+\delta_i}(\hat{\delta}_i - 1)\right).$$

Using the condition that deficits remain constant, i.e., $D_i' = D_i$, we also have that

$$\hat{\delta}_i = \frac{D_i/(p_i' Q_i')}{D_i/(p_i Q_i)} = \frac{1}{\hat{p}_i \hat{Q}_i} = \frac{1}{\hat{Y}_i} = \frac{\hat{P}_i^{\psi}}{\hat{p}_i^{1+\psi}}.$$

Therefore, the endogenous change of $\hat{\xi}_i$ required to maintain trade deficits constant is

$$\hat{\xi}_i = \frac{1}{\hat{\Xi}}\left(1 + \frac{\delta_i}{1+\delta_i}\left(\frac{\hat{P}_i^{\psi}}{\hat{p}_i^{1+\psi}} - 1\right)\right).$$

The system of equations to solve for equilibrium price changes can then be expressed as follows

$$\begin{aligned}
\hat{p}_i^{1+\theta+\psi}\hat{P}_i^{-\psi} &= \hat{\Xi}\sum_j \left[\frac{X_{ij}}{Y_i}\right](\hat{\tau}_{ij})^{-\theta}(\hat{P}_j)^{\theta}\hat{p}_j\hat{\xi}_j\left(\frac{\hat{p}_j}{\hat{P}_j}\right)^{\psi}, \quad i=1,\dots,N \\
\hat{P}_i^{-\theta} &= \sum_j \left[\frac{X_{ji}}{E_i}\right]\hat{\tau}_{ji}^{-\theta}\hat{p}_j^{-\theta}, \quad i=1,\dots,N, \\
\hat{\xi}_i &= \frac{1}{\hat{\Xi}}\left(1+\frac{\delta_i}{1+\delta_i}\left(\frac{\hat{P}_i^{\psi}}{\hat{p}_i^{1+\psi}}-1\right)\right), \quad i=1,\dots,N, \\
\hat{\Xi} &= \frac{1}{\sum_{i=1}^N \hat{\xi}_i \frac{\hat{p_i}^{1+\psi}}{\hat{P}_i^{\psi}}(E_i/\overline{Y})}.
\end{aligned}$$

This system of equations can be solved using Algorithm 2 in the article by Campos et al. (2024a).

B Additional results

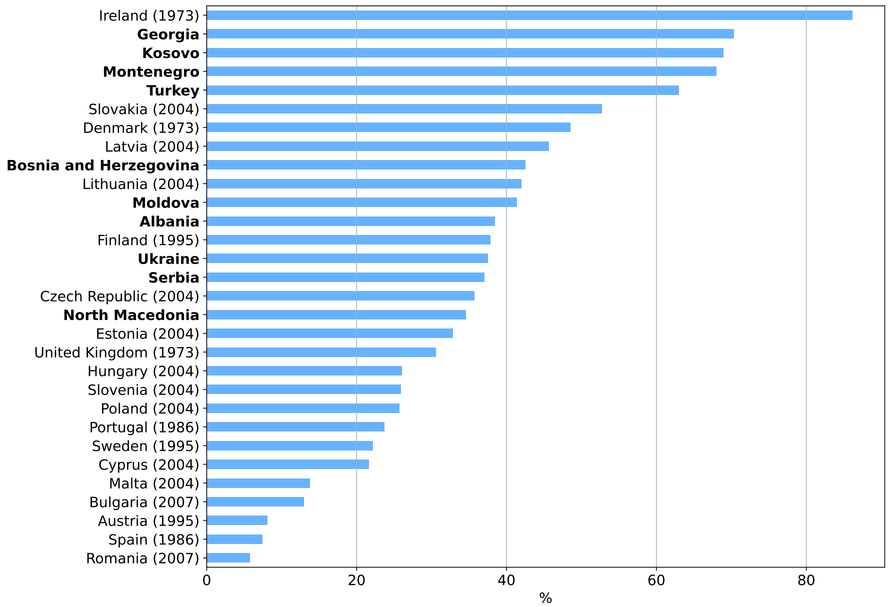

Figure B.1: Share of trade gains explained by access to new members in past enlargements

Notes: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24. The figure does not include the enlargements that incorporated Greece and Croatia, because these countries did not join the EU at the same time as other countries.

Country	Trade gains		Welfare gains	
	Baseline	Multiplicative	Baseline	Multiplicative
Albania	39.8	40.9	9.3	10.8
Bosnia and Herzegovina	35.1	37.3	15.3	18.7
North Macedonia	25.4	26.6	25.2	27.4
Montenegro	29.8	33.0	10.1	13.5
Serbia	34.7	35.6	12.1	13.4
Kosovo	29.2	27.9	5.8	4.6
Georgia	21.4	23.5	7.4	10.1
Moldova	27.0	29.4	13.4	17.2
Ukraine	26.7	26.8	8.0	8.2
Turkey	6.1	6.2	1.3	1.4

Table B.1: Gains (in percent) from joining the EU for different assumptions on trade deficits

Note: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24. All simulations are performed for the baseline case and for the case in which trade deficits are assumed to be "multiplicative."

Country	Access to EU members		Access to non-members		Access to candidates	
	Baseline	Mult.	Baseline	Mult.	Baseline	Mult.
Trade						
Albania	64.0	64.0	38.4	38.0	1.7	1.7
Bosnia and Herzegovina	63.6	63.3	42.5	42.1	0.9	0.9
North Macedonia	68.8	68.8	34.6	34.3	2.1	2.1
Montenegro	37.7	36.4	68.0	67.2	0.9	0.9
Serbia	69.3	69.0	37.0	37.0	-1.2	-1.2
Kosovo	31.3	27.9	68.9	69.1	2.3	2.3
Georgia	42.7	42.9	70.3	69.1	-10.2	-9.8
Moldova	68.0	68.1	41.4	40.5	-4.7	-4.6
Ukraine	63.8	63.7	37.5	37.6	1.8	1.8
Turkey	30.9	30.9	63.0	62.9	9.4	9.3
Welfare						
Albania	61.4	62.5	38.5	36.4	1.8	1.6
Bosnia and Herzegovina	61.1	61.4	40.5	40.0	0.8	0.8
North Macedonia	67.5	67.8	33.5	33.1	2.0	2.0
Montenegro	38.3	34.9	67.5	65.8	1.0	0.8
Serbia	67.9	67.4	35.0	35.3	-1.1	-1.1
Kosovo	39.3	27.3	66.6	68.4	2.2	2.2
Georgia	40.1	41.7	72.0	68.0	-10.4	-9.3
Moldova	65.3	66.6	40.6	38.8	-4.4	-4.3
Ukraine	62.7	62.5	36.2	36.4	1.6	1.7
Turkey	30.7	30.7	62.6	62.7	9.3	9.2

Table B.2: Decomposition of gains from joining the EU (in percent of total gains)

Note: The simulations use the quantitative trade model described in Section 2 for a trade elasticity of 5.03 and a supply elasticity of 1.24. Total effects are decomposed into the three driving forces. The component labeled “access to EU members” is obtained from a simulation that changes trade costs only for trade flows between candidates and current EU members (the first force). The component labeled “access to non-members” is obtained from a simulation that changes trade costs only between candidates and non-members (the second force). The component “access to candidates” is obtained from a simulation that changes trade costs only for trade between candidates (the third force). The decomposition has a residual because introducing all three forces at the same time produces interactions. All simulations are performed for the baseline case and for the case in which trade deficits are assumed to be “multiplicative.”