# Trade Diversion: How U.S. Tariffs Reshape Trade across European Regions

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## Abstract

The protectionist shift in U.S. trade policy between 2018 and 2025 has renewed both policy and academic debates on the broader impacts of global trade shocks. While most existing studies have concentrated on the bilateral effects of tariffs, particularly in identifying trade-diverting outcomes, their sub-national dimension remains underexplored, especially within a highly integrated and harmonised context such as the European Union. This paper investigates whether the introduction of U.S. tariffs has triggered intra-EU trade diversion effects. Using a novel dataset covering 216 EU territorial units, we apply a Local Projections approach to estimate the dynamic response of intra-EU bilateral trade flows. The results indicate that, despite an initial wait-and-see approach by firms in response to trade policy uncertainty, export flows from EU regions gradually reorient towards the Single Market, reaching up to 2 per cent above pre-shock levels. This trade diversion effect is further amplified or reshaped by several structural factors, including pre-shock exposure to the U.S. market, the similarity of regional production structures and membership in the Euro area.

**JEL Codes:** F1, F42, R11

**Keywords:** Tariffs; Diversion; Single Market; Trade Protectionism

## 1. Introduction

In recent years, the global economy has been subjected to a series of unprecedented shocks that have profoundly disrupted consolidated growth models and redefined long-standing trade routes and policy frameworks (Gambhir et al., 2025). The United States has taken a significant protectionist turn: during his first administration, President Trump initiated a trade conflict with China through the imposition of targeted tariffs—measures largely maintained under the Biden administration (Robinson and Thierfelder, 2024). Marking a pivotal shift in trade policy, the U.S. government introduced universal tariffs on nearly all trading partners in April 2025, an event branded as "Liberation Day" (McKibbin et al., 2025).

Unlike previous tariff regimes, which were sectoral, regional, or product-specific, this blanket imposition is expected to fundamentally alter the structure of international trade (Baldwin, 2019; Lee, 2025). On one hand, U.S. tariffs have been raised to levels not seen since the Smoot-Hawley Tariff Act of the 1930s; on the other, this escalation has led to a dramatic increase in trade policy uncertainty. This intensification of protectionist measures has prompted renewed academic and policy interest in understanding both the direct and indirect consequences of global trade shocks (Miroudot and Nordström, 2020).

To date, research has primarily focused on the bilateral impacts of protectionist measures, particularly on the countries directly involved (Kutlina-Dimitrova and Lakatos, 2017; Cappariello et al., 2020). The U.S.-China trade dispute of 2018 resulted in a contraction of exports and GDP for both economies (Fajgelbaum and Khandelwal, 2022; Itakura, 2020). Preliminary evidence suggests that the most recent wave of tariffs will substantially hinder U.S. and global economic growth, with or without retaliatory measures from major trading partners (McKibbin et al., 2025). Regarding the European Union, estimates indicate that while the macroeconomic impact may be relatively limited, it remains economically and politically significant, particularly in terms of trade disruption and regional disparities in growth (Hinz et al., 2025; Saussay, 2024). These impacts are expected to be uneven across sectors (Galgóczi et al., 2025), member states (Boeters and Meijerink, 2024), and regions (Barata da Rocha et al., 2025).

What remains underexplored, however, is the extent to which global trade shocks affect trade flows among third-party countries. Evidence from the 2018 U.S.-China trade war suggests that significant trade diversion effects occurred not only between the principal actors but also among uninvolved economies (Chen et al., 2025; Cigna et al., 2022; Wang and Hannan, 2023). In particular, the regional (sub-national) dimension of these effects has been largely overlooked. This gap is especially pertinent in highly integrated economic spaces such as the European Union, where legislative, productive, and

commercial interdependencies among regions are profound (Fetzer and Schwarz, 2021). One often neglected consideration is that for the euro area, the internal market remains as critical as the external markets. Recent analysis by the European Central Bank suggests that even a modest 2% increase in intra-euro area trade could offset the export losses to the U.S. resulting from the new tariffs (ECB, 2025)[1].

Taking these considerations into account, the present study investigates whether a trade shock, anticipated to reduce EU exports to the U.S., may prompt a reconfiguration of trade flows within the EU internal market, leading to an intra-EU trade diversion effect. Adopting a regional lens, the paper applies the Local Projections methodology (Jordà, 2005; 2023) to data on NUTS-2 level regions within the European Union. The central hypothesis is that negative shocks affecting bilateral trade between major economies—such as the introduction of tariffs—may induce a reallocation of supply chains across regions. In such a scenario, some EU regions may increase their exports to other EU regions, depending on their pre-existing trade linkages, thereby generating heterogeneous. territorial effects.

The empirical strategy proceeds in three stages. First, we construct a plausibly exogenous measure of regional trade shock exposure, based on the evolution of U.S.-EU bilateral tariffs from 2009 to 2025 (sourced from the Federal Reserve Bank). Second, we estimate the dynamic regional response in imports from other EU regions using the Local Projections approach, testing for the presence of intra-EU trade diversion effects. Third, we explore the heterogeneity in the magnitude and persistence of trade spillovers, focusing on three key factors: i) the degree of pre-shock commercial integration with affected regions; ii) the level of sectoral substitutability of traded goods; and iii) regional participation in the euro area monetary union.

This paper contributes to a growing body of literature examining the local impacts of macroeconomic and trade shocks (Dijkstra et al., 2015; Partridge et al., 2017; Mitze, 2019; Bettarelli et al., 2024), introducing three key innovations. First, it focuses explicitly on the sub-national level (NUTS-2), highlighting the territorial dimension of responses to macroeconomic disruptions (Camagni and Capello, 2010; Martin, 2012; Chen et al., 2024). Second, it addresses a gap in the literature by empirically identifying spillovers from global trade shocks using a robust approach designed to minimize endogeneity concerns. Third, the paper employs a dynamic econometric strategy that accounts for fixed effects across regions and time, consistent with recent methodological advances in regional economic analysis by means of Local Projections (LP).

[1] https://www.ecb.europa.eu/press/key/date/2025/html/ecb.sp250930~c973459788.en.html

The findings have meaningful implications for both academic research and public policy. From a research perspective, this study enriches the understanding of how global trade tensions propagate through regional economies, and how macroeconomic structures can amplify or mitigate these effects. From a policy standpoint, the results can inform the design of European industrial and cohesion policies. Specifically, they highlight the possibility that certain regions, due to their industrial composition or network position, may be better positioned to benefit from international trade realignments. This uneven distribution of benefits underscores the importance of proactive regional policies to mitigate geographic concentration of economic gains and losses.

The remainder of the paper is structured as follows. Section 2 presents the conceptual framework based on the relevant literature on trade policy shock spillovers. Section 3 presents the empirical strategy and econometric model whereas Section 4 discusses the main results and robustness checks. Section 5 explores alternative specifications to test the influence of regional characteristics on trade diversion. Finally, Section 6 concludes with policy recommendations and avenues for future research.

## 2. Conceptual and Theoretical Framework

A growing body of literature has demonstrated that protectionist trade shocks between major economies can generate trade diversion effects in countries or regions not directly involved in the original shock, primarily through the reallocation of global demand and trade flows (Deng, 2021; Cigna et al., 2022; Fajgelbaum et al., 2023). From a theoretical standpoint, models incorporating firm-level heterogeneity suggest that, in response to a contraction in foreign demand, exporting firms tend to redirect their supply toward alternative markets (e.g., Melitz, 2003).

Recent empirical studies support this mechanism. Deng (2021), analysing trade flows during the 2019 U.S.-China trade war, finds that alongside a reduction in bilateral trade between the two countries, there was a significant trade diversion effect in favour of third economies, although this effect is less pronounced when the third-party partner is a developed country. Similarly, Cigna et al. (2022) report partial substitution of import sources, with short-term spillover effects on Chinese exports. Taking a different perspective, Lovely et al. (2021) highlight that bilateral trade conflicts can benefit third countries not directly involved. For instance, during the U.S.-China dispute, while U.S. imports from China declined, imports from Mexico rose significantly, by approximately 3%, with benefits spread across sectors. These gains for Mexican exporters have been confirmed by other studies, showing that as U.S. imports of Chinese goods subject to tariffs fell, Mexican exports to the U.S. sharply increased (Alfaro et al., 2023; Fajgelbaum et al., 2023).

The magnitude and direction of such trade realignments are often conditioned by the pre-existing structure of trade linkages. Prior research has shown that the transmission of economic shocks across trade networks tends to produce asymmetric effects (Costa et al., 2022; Kejžar et al., 2022). This is consistent with literature emphasizing that structural characteristics of economies shape their capacity to respond to external shocks (Camagni and Capello, 2010). Moreover, economically integrated regions, particularly those with low or zero tariffs and minimal trade frictions, are especially susceptible to strong diversion effects in the context of global trade tensions (Wang and Hannan, 2023).

Informed by this evidence, the central assumption of this study is that bilateral trade disruptions between large economies, such as the imposition of tariffs between the U.S. and third countries, can have broader redistributive effects beyond the direct bilateral relationship. Specifically, such disruptions may lead to significant internal adjustments within other trading blocs through mechanisms of supply and demand reallocation. For instance, a decline in EU exports to the U.S. may result in localised overcapacity, prompting firms to redirect goods toward alternative destinations. In the case of the European Union, characterised by strong commercial integration and low internal trade barriers, this could result in increased intra-EU trade.

Consequently, certain EU regions may increase their imports from affected regions within the Union, acting as partial substitutes for lost external demand. This intra-European reallocation of trade flows can be viewed as a form of intra-EU trade diversion, distinct from traditional, multilateral trade diversion, yet equally significant in understanding how global trade shocks propagate within integrated markets. Figure 1 illustrates the conceptual framework guiding this analysis.

**Please Insert Figure 1 about here**

## 3. Data description

### 3.1 Tariff shock exposure

To evaluate regional exposure to trade shocks originating from the United States, we adopt the methodology proposed by Barata da Rocha et al. (2025). As a first step, we quantify each region's economic exposure to the U.S. economy as follows:

$$Exposure_{r,t} = \sum_{i=1}^{n} \left( VA_{US_{c,i,t}} * SC_{r,i,t} \right),$$

where $\mathrm{VA}_{\mathrm{US}_{\mathrm{c,i,t}}}$ represents the share of value added embedded in manufacturing exports to the United States for each subsector $\mathrm{i} = 1, \ldots, 202$ relative to the total value added exported, both directly and indirectly, through third countries. $\mathrm{SC}_{\mathrm{r,i,t}}$ captures the structural composition of each region's production sector ($\mathrm{r} = 1, \ldots, 211$) measured as the ratio of firms operating in subsector $\mathrm{i} = 1, \ldots, 20$ to the total number of manufacturing firms in the region. Higher values indicate greater regional exposure to the U.S. economy. Next, we derive a measure of regional exposure to U.S. trade policy as follows:

$$Tariffs_{r,t} = Tariffs_t * Avg_Exposure_{r,t},$$

where $\mathrm{Tariffs}_{\mathrm{i,t}}$ denotes the average effective tariff rate imposed by the United States on goods imported from the European Union, based on data from the U.S. Federal Reserve (latest update: July 28, 2025), and $\mathrm{Avg_Exposure}_{\mathrm{r}}$ represents the average exposure of region ( r ) over the period 2009–2025. By fixing regional exposure at the period average, we aim to isolate the effect of changes in U.S. tariff rates from structural changes in regional trade linkages.

Figure 3 presents the average effective tariff rates applied by the United States on imports from EU Member States between 2009 and 2024, as calculated by the Federal Reserve Bank. As shown, for most of the observed period, average tariff rates remained relatively low, ranging from 1.1% in 2009 to 1.5% in 2019. However, a sharp increase to 15% occurred following the breakdown of U.S.-EU trade negotiations and the introduction of broad-based tariffs on July 28, 2025.

Figure 3 illustrates the average exposure of EU regions to the U.S. economy. Ireland, Germany, and Italy emerge as the most exposed economies within the Union. As of 2024, these three countries ranked as the top EU exporters to the U.S., with Germany exporting €161 billion, Ireland €72 billion,

[2] Based on the NACE Rev. 2 classification, we consider 20 manufacturing sector's subsectors corresponding to the following categories: Manufacture of (i) food; beverages and tobacco products, (ii) textiles, wearing apparel, leather and related products, (iii) wood and of products of wood and cork, except furniture; articles of straw and plaiting materials, (iv) paper and paper products, (v) Printing and reproduction of recorded media, (vi) coke and refined petroleum products, (vii) chemicals and chemical products, (viii) basic pharmaceutical products and pharmaceutical preparations (ix) rubber and plastic products, (x) other non-metallic mineral products, (xi) basic metals, (xii) fabricated metal products, except machinery and equipment, (xiii) computer, electronic and optical products, (xiv) electrical equipment, (xv) machinery and equipment n.e.c., (xvi) motor vehicles, trailers and semi-trailers, (xvii) other transport equipment, (xviii) furniture, (xix) other manufacturing, (xx) repair and installation of machinery and equipment. However, the pharmaceutical sector was excluded from the analysis, as it was not subject to the round of tariffs imposed by the United States as of July 2025.

and Italy €65 billion. Among them, Germany and Italy, both manufacturing powerhouses, exhibit a relatively diversified trade portfolio (Conteduca et al., 2025). In contrast, Ireland stands out as the most vulnerable economy in terms of U.S. exposure. Approximately 25% of Ireland's total exports are directed to the United States (Daly and Lawless, 2021), a figure that rises to 53.7% when considering only extra-EU trade. Key sectors driving Irish value-added exports include chemicals, transport equipment and repairs, and food and beverages, all of which contribute significantly to national employment (Barata da Rocha et al., 2025).

**Please Insert Figure 2 and 3 about here**

### 3.2 Regional bilateral trade flows in the manufacturing sector

The key dependent variable in our analysis is bilateral trade flows among European regions. To capture these dynamics, we constructed a dynamic panel dataset in which each EU region appears twice, once as a reporting region and once as a partner, allowing for the analysis of both import and export flows between each regional pair. To quantify region-industry trade flows at the NUTS-2 level, we used data derived from the input-output matrices developed by Thissen et al. (2019). Our analysis focuses on trade originating from the manufacturing sector of each reporting region toward all sectors of the partner regions. This focus is motivated by the sector's well-documented sensitivity to external shocks (Benati, 2013) and its vulnerability to global risk and uncertainty (Ma and Samaniego, 2019; De Michelis and Somale, 2023).

The original trade flow data from the input-output matrices cover the period 2000–2010. To extend this timespan, we incorporate Eurostat data on national-level bilateral trade flows among EU Member States (MS). Specifically, we apply the annual growth rates of exports between the MS of the reporting region and the MS of the partner region to extrapolate regional manufacturing trade flows beyond 2010. Furthermore, to account for the trade effects of tariffs introduced between April and July 2025, we extend our projections by integrating estimates from the European Commission's Spring 2025 Economic Forecasts on the expected contribution of trade between 2025 and 2027.

Following this methodology, we construct a comprehensive database of regional trade flows covering the period 2009–2027, encompassing 211 territorial units within the EU. These include 206 NUTS-2 regions and five countries treated as single units (Bulgaria, Ireland, Lithuania, Romania, and Slovenia). The final dataset comprises 845,889 observations.

Figure 4 illustrates the average per capita manufacturing exports of EU regions to other EU regions. The highest per capita export values are recorded in the Union's most industrialised areas, particularly the Western and Southern regions of Germany (notably North Rhine-Westphalia, Bavaria, and Baden-Württemberg) and the industrial north of Italy. High export levels are also observed in Belgium, a small, open economy that is highly dependent on external trade and serves as a major hub for goods movement across the EU. Conversely, the lowest export values are found in regions of Bulgaria, Romania, and Greece.

**Please Insert Figure 4 about here**

## 4. Empirical Strategy

To identify the effect of an external trade shock on intra-EU trade dynamics, we estimate a set of dynamic regressions using the Local Projections approach by Jordà (2005, 2023), which allows to assess the Impulse Response Function (IRF) of European regions over different time horizons. The following equation has been estimated for a balanced panel database considering 211 EU territorial units (i.e., 206 NUTS-2 EU regions, plus. five countries considered as a single unit – Bulgaria, Ireland, Lithuania, Romania and Slovenia[3]) in the period 2009-2027. In the dataset, each observation unit is considered twice, both as a reporter (i.e., the region of origin of the trade flow) and as a partner (i.e., the regions where the flow is directed), thus leading to a total of 845,889 observations in the database.

$$Trade_{r,t+h} = \alpha_{r,h} + \delta_{t,h} + \beta_h Tariff_{r,i,t} + \gamma_h X_{r,t} + \varepsilon_{r,t+h}, \quad (1)$$

where $\mathrm{Trade}_{\mathrm{r,t+h}}$ represents the cumulative difference of (log) manufacturing trade among EU regions (between a reporting region r and each trade partner p) measured at different horizons (h=5) following the trade shock (Dube et al., 2025). It is calculated as the long difference of the trade outcome relative to the pre-shock year (t-1) as: $\Delta_{\mathrm{h}}\mathrm{y}_{\mathrm{it}} = \mathrm{y}_{\mathrm{t+h}} - \mathrm{y}_{\mathrm{t-1}}$. This variable is constructed using intra-EU regional bilateral manufacturing trade data derived from the input-output tables provided by Thissen et al. (2019).

[3] Croatia is excluded from the analysis, as it is not included in the Thissen et al. (2019) dataset.

$\text{Tariff}_{r,i,t}$ denotes the average U.S. tariff rate, computed by the Federal Reserve Bank, adjusted by a region-specific measure of sectoral exposure to the U.S. economy. This allows for the identification of heterogeneous regional impacts based on industrial composition. [4]

$X_{r,t}$ is a vector of control variables, which includes three lags of both the dependent variable and the main shock variable ($\text{Tariff}_{r,i,t}$). [5] It also incorporates a set of region-level covariates such as GDP per capita (log), the share of industrial value added in total value added, the share of extra-EU exports to countries other than the U.S., labour productivity, and population, as well as country-level controls such as real effective exchange rates. Exchange rate data are obtained from the Bank for International Settlements, export data from Thissen et al. (2019), and all regional indicators from the ARDECO database, including projections to 2027.

The model includes fixed effects by region, $\alpha_{r,h}$, and by year, $\delta_{t,h}$, to account for unobserved heterogeneity across space and time. The error term is denoted by $\varepsilon_{r,t+h}$. Equation (1) is estimated for horizons (h = 0, 1, 2, 3, 4, 5 ) using Ordinary Least Squares (OLS) with standard errors clustered at the regional level, following Bertarelli et al. (2024).

## 5. Results

The results of the estimation of Equation (1) are presented in Table 1, Figure 5 illustrates the cumulative evolution of intra-EU regional trade flows following a spike in U.S. tariffs. The percentage values on the vertical axis correspond to the estimated coefficients for the variable $\text{Tariff}_{r,i,t}$ across different time horizons. The empirical evidence indicates that an increase in U.S. tariffs on European imports stimulates intra-EU trade, suggesting a reallocation of trade flows within the EU internal market. This trade diversion effect is persistent over time: five years after the initial shock, intra-EU trade exhibits a cumulative increase of approximately +2%, with the peak response observed four years post-shock. At the (h = 4) horizon, the peak effect reaches +3.9% relative to the pre-shock baseline (t-1).

**Please Insert Table 1 about here**

[4] We set the average tariff imposed on the EU at 15% for the years 2026 and 2027, assuming that the general tariff agreement reached between the U.S. Administration and the European Commission on July 28, 2025, will remain in effect over the subsequent years.

[5] The optimal lag structure was determined using the Akaike Information Criterion (AIC).

What clearly emerges from our estimates is that that EU regions' responses to the external trade shock unfold in three distinct phases. Notably, the reaction is considerably delayed, reflecting findings from the European Investment Bank, which emphasizes that immediate responses to trade uncertainty and policy shocks are limited. Firms typically require time to adjust their production and sales strategies in the face of such disruptions (EIB, 2025).

Phase One: during the first phase, comprising the year of the shock and the following year, intra-EU trade growth remains marginal, ranging between +0.02% and +0.03%. At this stage, firms largely maintain existing trade relationships and begin cautiously exploring alternative partners. As a result, trade flows remain rigid in the short term, with economic agents typically adopting a "wait-and-see" approach. Several factors may explain this delayed response: i) Behavioural factors – Firms tend to respond cautiously to trade policy shocks, especially when such shocks are perceived as temporary or potentially reversible (Handley, 2014; Handley and Limão, 2017); ii) Sunk costs and relational frictions – Establishing new a trade relationship involves significant costs: identifying new clients, adapting products to different markets, and reorganising logistics networks (Della Posta, 2022). Even among "friendly" or geographically close trading partners, this process requires time and investment, making reorientation gradual; and iii) Product and logistical adjustment lags – Sector- and product-specific characteristics often hinder immediate substitution. Such frictions slow both the transmission and response to trade shocks (Barrot and Sauvagnat, 2016).

Phase Two: from the second year onwards, a more structural reallocation of trade flows becomes evident. Exports affected by U.S. tariffs are increasingly redirected toward intra-EU markets. By year four, intra-EU trade reaches a peak increase of +3.9% compared to the pre-shock baseline. This shift is largely driven by the need to compensate for lost external demand, and several mechanisms appear to facilitate this reorientation. The EU internal market allows trade diversion to occur with relative ease, due to the absence of internal tariffs, extensive regulatory harmonisation, and common production and consumption standards (Hodge et al., 2024). The uniformity of regulations reduces technical barriers, ensures level competition, and fosters the development of integrated value chains and fluid goods mobility across Member States (Vancauteren and Weiserbs, 2011). Network effects further reinforce intra-EU trade. As regional supply chains become more active, new collaboration opportunities emerge, suppliers and customers expand their connections, and trade flows intensify. This creates a virtuous cycle that strengthens the single market and deepens regional interdependence (Saliya, 2025).

Phase Three: In the final phase, observable around year five, the intra-EU trade growth stabilises or even slightly recedes. This suggests that while the EU internal market can act as a buffer to absorb

shocks, it also faces natural limits (EIB, 2025). Not all inputs and products affected by U.S. tariffs can be seamlessly redirected within the EU, and in many cases, domestic demand saturates or fails to fully absorb the displaced trade volumes. Furthermore, as Contractor (2022) notes, the EU has limited substitutes for the U.S. market, upon which many of its exporters remain heavily dependent. In a broader context of rising global protectionism, international competitors may also attempt to redirect their exports to the EU, thereby increasing pressure on European producers, though these spillover effects are likely to be partial and uneven (Barata da Rocha et al., 2025).

**Please Insert Figure 5 about here**

### 5.1 Robustness Checks

To assess the robustness of our results, we conducted a series of sensitivity checks. First, we examined the potential influence of the lag structure on our estimates. We re-estimated Equation (1) by varying the number of lags included for both regional bilateral trade flows and tariff shocks. As shown in Figure 6, the results remain consistent with those of the baseline specification.

**Please Insert Figure 6 about here**

Next, to account for the influence of potential outliers in the distribution of tariff shocks, we re-estimated Equation (1) after trimming the top and bottom 1st and 5th percentiles of the trade policy shock variable. As shown in Figure 7, the results remain qualitatively similar to the baseline estimates.

**Please Insert Figure 7 about here**

We then assessed whether within-country trade dynamics influenced the overall findings. To do so, we excluded intra-country trade flows (i.e., trade between regions within the same Member State) and re-estimated the model. As shown in Figure 8, the results remain broadly consistent with the baseline, suggesting that intra-national trade is not driving the observed effects. Furthermore, we tested the robustness of the results by focusing on countries with a larger number of administrative regions. Specifically, we excluded countries with limited subnational disaggregation and re-estimated the model using only the three (and alternatively, five) largest EU economies. This exercise,

illustrated in Figure 9, helps determine whether regional heterogeneity plays a significant role. The results remain stable, indicating no substantial variation due to different territorial structures.

**Please Insert Figure 8 about here**

**Please Insert Figure 9 about here**

We also addressed the forecasting assumptions underlying the baseline analysis. The original projections for trade dynamics during 2025–2027 rely on the European Commission's Spring 2025 Forecasts. To test robustness, we re-estimated Equation (1) using alternative projections from the IMF's 2025 World Economic Outlook. As shown in Figure 10, the results continue to be consistent with the baseline estimates.

**Please Insert Figure 10 about here**

Finally, we investigated whether the results were influenced by major historical shocks and institutional responses by excluding periods affected by the Great Recession, the Sovereign Debt Crisis, and the COVID-19 pandemic. The re-estimated model, presented in Figure 11, shows no statistically significant deviation from the baseline, further reinforcing the robustness of our findings.

**Please Insert Figure 11 about here**

## 6. Trade diversion intensity by regional characteristics

Recent literature highlights that the transmission of external shocks at the sub-national level is strongly influenced by regions' structural characteristics, resulting in a high degree of heterogeneity in regional responses (Camagni and Capello, 2010; Fratesi and Perucca, 2018). To investigate this heterogeneity, we re-estimate our baseline model by examining three regional features that may influence trade reallocation dynamics: i) exposure to the U.S. economy; ii) interregional similarity in production structures, and iii) Economic and Monetary Union (EMU) membership.

### 6.1. Trade exposure

As noted in the literature, trade linkages play a critical role in amplifying the transmission of shocks, whether economic, policy-driven, or international in nature, at the local level (Blagrave et al., 2018; Bettarelli et al., 2024). The underlying mechanism stems from agents' expectations: when two economies are tightly interconnected, adverse developments in one tend to raise concerns and uncertainty in the other (Balli et al., 2022). These concerns, and thus the corresponding behavioural responses, are more pronounced when domestic agents have significant economic interests in the partner economy. Based on these theoretical assumptions, we formulate the following hypothesis:

*H1.1 The greater the pre-shock trade exposure of region j to the affected country i, the stronger the resulting import reallocation effect.*

To test whether trade diversion effects depend on the degree of regional exposure to the U.S. economy, we estimate Equation (1) separately for two subsamples of regions: 1) that with export shares to the U.S. above the EU average, and 2) those below the EU average. Figure 12 presents the impulse response functions (IRFs) for intra-EU trade: panel (a) refers to regions with high U.S. exposure, while panel (b) shows results for low-exposure regions.

The two groups exhibit distinct response patterns. Regions more exposed to the U.S. demonstrate a stronger cumulative trade diversion effect, reaching approximately +5% by the fifth year post-shock. However, the adjustment process in these regions is more gradual, with the effect becoming statistically significant only after four years (h = 5). These regions tend to be more embedded in U.S.-oriented trade routes and global value chains (GVCs). Following a trade shock, the adjustment is typically costlier and more complex, due to the need to reconfigure larger trade flows, renegotiate contracts, and adapt to alternative technical standards (Della Posta, 2022). This rigidity leads to a slower, but ultimately more persistent, increase in intra-EU trade.

Moreover, firms in highly exposed regions face higher sunk costs (Phillips et al., 2022) and have stronger interests in the U.S. market (Balli et al., 2022). As a result, they are more likely to adopt a "wait-and-see" strategy, postponing adjustment until the persistence of the trade shock is confirmed. Once short-term volatility has subsided, these firms engage in medium- to long-term reallocation strategies, ultimately generating a stronger diversion effect compared to less exposed regions.

On the contrary, low-exposure regions react more rapidly, with adjustments occurring earlier in the post-shock period. Since these areas require only marginal reconfigurations in trade volumes and can leverage alternative commercial networks, they respond more flexibly. Their reallocation strategies operate more on the extensive margin, involving minor adaptations to existing trade structures rather than costly overhauls.

**Please Insert Figure 12 about here**

### 6.2 Products similarity

According to the theory of differentiated trade and heterogeneous firm models, goods traded on international markets are not homogeneous. In markets where competition occurs between similar and easily substitutable products, importers can more readily redirect demand toward alternative suppliers (Krugman, 1980; Melitz, 2003). Product-specific characteristics therefore influence substitutability, which in turn affects the potential for trade diversion within the economy (Barrot and Sauvagnat, 2016). Consequently, we test whether trade diversion in response to external shocks depends on the substitutability of goods in the sectors affected. We consider the following hypothesis:

*H1.2 The greater the share of highly substitutable goods affected by the shock, the greater the reallocation of excess demand across European regions.*

To examine this, we re-estimate Equation (1) by classifying regional pairs (i.e., reporting and partner regions) based on the similarity of their production structures, measured using a Cosine Similarity Index. Figure 13 presents the impulse response functions (IRFs) of intra-EU trade: Panel (a) shows results for region pairs with similarity above the EU average, whereas Panel (b) shows those with similarity below the average.

The results suggest that trade reallocation between regions with similar production structures is both steady and persistent over time. From year 3 (h = 3) to year 5 (h = 5) following the shock, trade flows between these regions increase by approximately +2%, indicating that similarity in productive capacity facilitates smoother and more sustained trade diversion. Also, regions with similar production structures are more likely to act as alternative suppliers or reciprocal markets in the event of external shocks. In a context marked by rising uncertainty and geopolitical tensions, shortening supply chains and identifying substitutable inputs becomes an increasingly viable strategy for firms (Di Stefano et al., 2022).

Product substitutability plays a crucial role in shaping the response to trade shocks, as it allows firms to either accommodate slightly different inputs from a wider range of suppliers or standardise the use of intermediate goods (D'Ambrosio and Lavoratori, 2025). Empirical evidence shows that trade diversion typically occurs in homogeneous product categories, that is, goods that can be easily substituted in the short term (Haveman and Hummels, 1998; Cigna et al., 2022). Conlon and Mortimer (2021) find that sectors with highly substitutable products are significantly more likely to experience trade diversion in response to shifts in price or availability.

This dynamic is particularly relevant for large economies with complex industrial structures, which are more vulnerable to the long-term effects of exogenous shocks and therefore more inclined to pursue durable trade reallocation strategies (Liu et al., 2024). In such contexts, once substitutable and more secure supply routes are identified, they are often retained as part of a long-term adjustment, especially within the manufacturing sector.

By contrast, regions with less similar production structures exhibit a strong but short-lived trade diversion effect. While these regions may benefit from a short-term boost in trade immediately following the shock, the effect tends to dissipate over the medium to long term. This is because structural differentiation limits the potential for sustained commercial ties, making such trade relationships more transitory once the initial disruption is absorbed or global value chains are rebalanced.

**Please Insert Figure 13 about here**

### 6.3 Economic and Monetary Union membership

Membership in a monetary union plays a decisive role in shaping trade dynamics, primarily by reducing transaction costs and eliminating exchange rate volatility risks (Gunnella et al., 2021). The literature widely recognises the positive impact of a shared currency on bilateral trade (Rose, 2000; Frankel and Rose, 2002). We test the latter test formalizing the following hypothesis:

*H1.3 The intensity of trade spillovers varies by monetary regime, with stronger effects observed among countries that belong to a monetary union*

To empirically test this hypothesis, we re-estimate Equation (1) by focusing exclusively on pairs of regions where both the reporting and partner regions have adopted the euro as their national currency (Figure 14)[6]. The results indicate that trade diversion within the Economic and Monetary Union (EMU) is both stronger and more persistent. Specifically, eurozone economies respond more quickly to the tariff shock, likely due to their greater capacity for immediate adjustment and lower adjustment costs.

[6] As of 2025, the following countries have adopted the euro as their national currency: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. The countries that have not adopted the euro include: Czech Republic, Denmark, Hungary, Poland, Romania, and Sweden. Although Bulgaria received approval from the European Central Bank in 2025, it is scheduled to adopt the euro in January 2026. Therefore, for the purposes of this analysis, Bulgaria is included in the second group of non-euro area countries.
.

Five years after the trade policy shock, the cumulative effect on intra-EU trade among euro area members reaches +4%, significantly higher than the +2% effect observed across the full EU sample. This amplified response is primarily attributable to the elimination of exchange rate uncertainty and the reduction of transaction costs (Baldwin and Di Nino, 2006). The removal of such barriers enables firms to expand their networks beyond national borders, thereby enhancing the resilience of trade systems and accelerating the adaptation process (Mealli, 2021).

Furthermore, monetary convergence fosters price transparency and facilitates cross-border price comparisons, which in turn improve allocative efficiency and stimulate intra-EU trade (Feghehmajidi et al., 2019). More broadly, these institutional conditions not only support more robust and persistent trade flows within the euro area, but also differentiate the trade adjustment path from that of countries outside the monetary union (De Grauwe, 2018; Rose, 2000). Finally, the benefits of a common currency extend beyond technical and economic frictions; they also promote deeper socio-economic integration among participating economies (Frankel and Rose, 2002).

**Please Insert Figure 14 about here**

## 7. Conclusions

This paper has examined whether and to what extent the recent shift in U.S. trade policy, marked by the imposition of broad-based tariffs, has reshaped trade patterns across European regions. Using a novel dataset of bilateral trade flows among 216 EU territorial units and a Local Projections framework, we have provided new evidence that global protectionist shocks generate significant intra-European trade diversion effects. Specifically, we find that U.S. tariffs on EU exports, while initially inducing caution among firms, eventually lead to a reorientation of regional exports toward the Single Market. Five years after the shock, intra-EU manufacturing trade flows are expected to stand approximately 2–4 percent above their pre-shock levels, with the strongest effects observed in euro area regions and in regions with similar industrial structures.

These findings add a regional dimension to the existing literature on trade diversion and global shock propagation (e.g. Deng, 2021; Cigna et al., 2022; Fajgelbaum et al., 2023), extending previous national-level analyses (Kutlina-Dimitrova and Lakatos, 2017; Cappariello et al., 2020) by uncovering substantial heterogeneity in regional responses within an integrated economic area. The use of an original, regionally disaggregated dataset constitutes one of the paper's main contributions, enabling us to detect intra-EU reallocation mechanisms that aggregate national data would conceal.

This approach allows a more granular understanding of how territorial structures mediate macroeconomic shocks, in line with the growing regional economics literature on place-based responses to globalization (Camagni and Capello, 2010; Chen et al., 2024).

From a policy perspective, the results carry several implications. First, they show that the European Single Market can act as an effective buffer against external shocks by absorbing displaced exports and fostering internal demand substitution. This highlights the importance of safeguarding and deepening the integrity of the internal market, particularly in periods of heightened global trade uncertainty. Second, the asymmetric regional responses observed suggest that the benefits of trade diversion are unevenly distributed, with highly industrialized or euro area regions gaining more. This calls for reinforced cohesion and industrial policies that support lagging regions in adapting to global trade realignments, through investment in logistics, digitalization, and supply chain integration. Third, the findings have implications for firms' strategic planning. In a context of growing protectionism, European producers appear to reconfigure supply chains toward geographically and institutionally closer partners. Policies that facilitate this adjustment, such as reducing non-tariff barriers, strengthening cross-border infrastructure, and promoting regional industrial complementarities, can enhance the resilience of European value chains.

At the same time, our results suggest that the Single Market's shock-absorbing capacity has natural limits. Not all displaced exports can be redirected within the EU, and domestic demand saturation may constrain longer-term trade reallocation. This implies that a purely inward adjustment cannot fully offset global trade disruptions. Complementary external policies, such as diversifying export markets and reinforcing strategic trade partnerships, remain essential for maintaining Europe's global competitiveness.

The analysis also has limitations that open avenues for further research. Most notably, the present study focuses exclusively on intra-EU trade effects, without examining the potential impact of U.S. tariffs on European regions' trade with the rest of the world. This exclusion reflects the paper's deliberate focus on intra-regional dynamics but represents an interesting direction for future work. Extending the analysis to extra-EU flows would enable a more comprehensive assessment of Europe's role in the on-going global reconfiguration of trade networks. Future research could also explore firm-level adjustment mechanisms, sectoral asymmetries, and the interplay between trade diversion and labour market outcomes. Overall, the findings suggest that in the face of renewed global protectionism, regional integration remains a crucial source of resilience. Strengthening the Single Market and supporting territorial convergence can help the European Union transform external shocks into opportunities for deeper internal cohesion and strategic autonomy.

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# TABLES

**Table 1: Estimates from Equation (1): Intra-EU Bilateral Trade Diversion**

| **Dependent Variable** | **Long-difference of Regional Bilateral Manufacturing Trade Flows** | | | | | |
|---|---|---|---|---|---|---|
| | **h=0** | **h=1** | **h=2** | **h=3** | **h=4** | **h=5** |
| ***Tariff*** | 0.0276*** | 0.0347*** | 2.1397*** | 3.3022*** | 3.8882*** | 2.0042* |
| | (0.0072) | (0.0103) | (0.4597) | (0.8999) | (1.0830) | (1.0177) |
| ***Tariff (t-1)*** | -0.0567*** | 0.3353 | -0.3293 | -0.2329 | -2.9597* | -4.1570*** |
| | (0.0126) | (0.5785) | (0.6056) | (0.6216) | (1.6214) | (0.9275) |
| ***Tariff (t-2)*** | -1.1694** | -0.2688 | 0.4907 | -0.9657 | -0.9622 | 1.8944*** |
| | (0.4778) | (0.9014) | (0.4987) | (1.0971) | (1.2869) | (0.6489) |
| ***Tariff (t-3)*** | 1.3986*** | 0.5494 | -0.9887* | -0.3411 | 2.1915*** | 2.1314*** |
| | (0.3896) | (0.7322) | (0.5314) | (0.6988) | (0.7788) | (0.6850) |
| ***Manuf. Trade (t-1)*** | -0.3759*** | -0.3744*** | -0.3622*** | -0.3223*** | -0.3067*** | -0.3096*** |
| | (0.0239) | (0.0307) | (0.0323) | (0.0252) | (0.0273) | (0.0227) |
| ***Manuf. Trade (t-2)*** | -0.0683*** | -0.0608*** | -0.0302*** | -0.0238*** | -0.0254*** | -0.0297*** |
| | (0.0060) | (0.0094) | (0.0039) | (0.0051) | (0.0048) | (0.0076) |
| ***Manuf. Trade (t-3)*** | -0.0075*** | -0.0018 | -0.0058*** | -0.0104*** | -0.0033* | -0.0101** |
| | (0.0019) | (0.0025) | (0.0016) | (0.0027) | (0.0018) | (0.0043) |
| ***GDP*** | -0.0454 | 0.0532* | 0.0493* | -0.0652*** | -0.1060*** | 0.0093 |
| | (0.0325) | (0.0275) | (0.0251) | (0.0206) | (0.0222) | (0.0243) |
| ***GDP (t-1)*** | 0.1213** | 0.0375 | -0.0513** | 0.0288 | 0.1738*** | -0.0113 |
| | (0.0567) | (0.0383) | (0.0218) | (0.0262) | (0.0287) | (0.0534) |
| ***GDP (t-2)*** | -0.0768** | -0.1507*** | -0.0766** | 0.0205 | -0.1603*** | -0.0767*** |
| | (0.0352) | (0.0417) | (0.0331) | (0.0416) | (0.0297) | (0.0279) |
| ***GDP (t-3)*** | -0.0068 | 0.0465** | 0.0405** | -0.0363 | 0.0715*** | 0.0552** |
| | (0.0169) | (0.0211) | (0.0192) | (0.0286) | (0.0264) | (0.0221) |
| ***Real Exchange rate*** | -0.0689*** | 0.0487** | -0.0105 | -0.0001 | 0.1091*** | 0.0377** |
| | (0.0123) | (0.0210) | (0.0190) | (0.0182) | (0.0149) | (0.0168) |
| ***Real Exchange rate (t-1)*** | 0.1490*** | -0.0372* | 0.0277 | 0.0719*** | -0.1268*** | 0.0158 |
| | (0.0210) | (0.0223) | (0.0176) | (0.0189) | (0.0260) | (0.0284) |
| ***Real Exchange rate (t-2)*** | -0.1768*** | -0.0551*** | -0.0295* | -0.1362*** | -0.0010 | -0.1204*** |
| | (0.0231) | (0.0204) | (0.0162) | (0.0253) | (0.0236) | (0.0313) |
| ***Real Exchange rate (t-3)*** | 0.0624*** | -0.0015 | -0.0828*** | -0.0826*** | -0.1064*** | 0.0154 |
| | (0.0094) | (0.0129) | (0.0144) | (0.0149) | (0.0180) | (0.0191) |
| ***Extra-EU export*** | 0.0121*** | 0.0195*** | -0.0233*** | -0.0223*** | -0.0125** | -0.0320** |
| | (0.0031) | (0.0065) | (0.0059) | (0.0060) | (0.0054) | (0.0135) |
| ***Extra-EU export (t-1)*** | -0.0067 | -0.0482*** | -0.0111** | 0.0029 | -0.0317*** | -0.0106*** |
| | (0.0049) | (0.0081) | (0.0055) | (0.0060) | (0.0091) | (0.0040) |
| ***Extra-EU export (t-2)*** | -0.0213*** | 0.0147*** | 0.0209*** | -0.0037 | 0.0347*** | 0.0170*** |
| | (0.0080) | (0.0056) | (0.0071) | (0.0055) | (0.0090) | (0.0050) |
| ***Extra-EU export (t-3)*** | 0.0057 | -0.0049 | -0.0189*** | 0.0019 | -0.0218*** | -0.0349*** |
| | (0.0088) | (0.0082) | (0.0052) | (0.0048) | (0.0049) | (0.0091) |
| ***Manufacturing employment*** | -0.1069 | -0.1202 | 0.0116 | -0.0367 | 0.1694* | -0.0664 |
| | (0.0920) | (0.1150) | (0.0902) | (0.0953) | (0.0952) | (0.0964) |
| ***Manufacturing employment (t-1)*** | 0.0053 | 0.1270 | 0.0537 | 0.2600** | 0.0126 | -0.0954 |
| | (0.1271) | (0.1337) | (0.0985) | (0.1041) | (0.1082) | (0.1107) |
| ***Manufacturing employment (t-2)*** | 0.1709 | 0.0516 | 0.2009* | 0.0693 | 0.0587 | -0.0131 |
| | (0.1122) | (0.1291) | (0.1135) | (0.0978) | (0.1185) | (0.1210) |
| ***Manufacturing employment (t-3)*** | -0.1859** | -0.1311 | -0.2270** | -0.1347 | -0.1298 | 0.0685 |
| | (0.0753) | (0.1088) | (0.1042) | (0.0876) | (0.0976) | (0.1176) |
| *Time Effect* | YES | YES | YES | YES | YES | YES |
| *Regional Effects* | YES | YES | YES | YES | YES | YES |
| *Constant* | YES | YES | YES | YES | YES | YES |
| *N* | 664,650 | 620,340 | 576,030 | 531,720 | 487,410 | 443,100 |
| Log Likelihood | 903,380.5 | 772,538.6 | 748,245.7 | 719,164.9 | 654,626.7 | 604,691.1 |

Note: The dependent variable is the log of regional bilateral manufacturing trade flows. Robust standard errors are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level.

# FIGURES

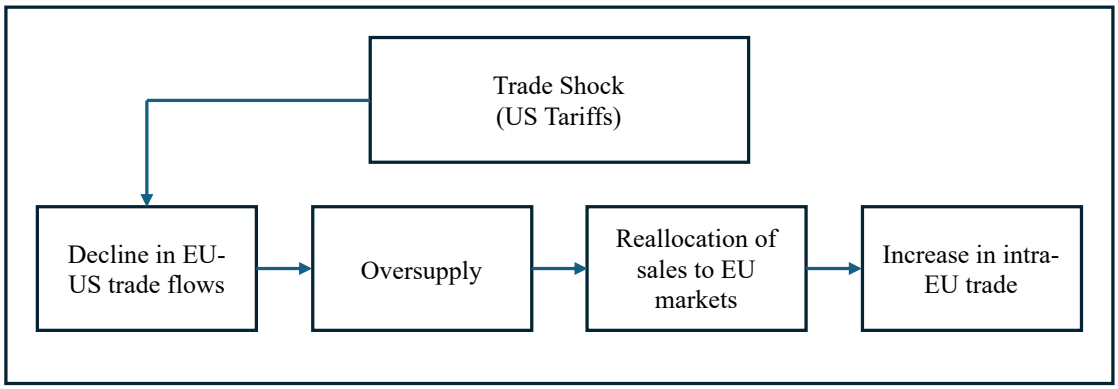



Figure 1: Conceptual framework illustrating the intra-EU trade diversion

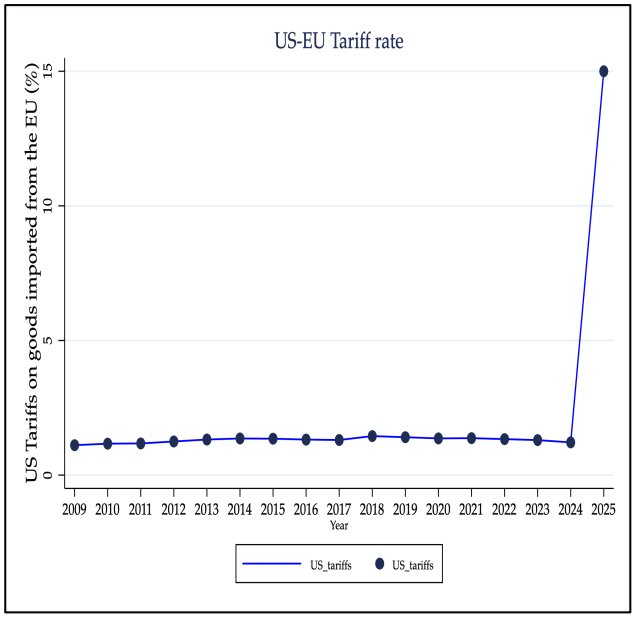



Figure 2: ATER of U.S. on EU goods

Source: Authors' elaboration on FED data

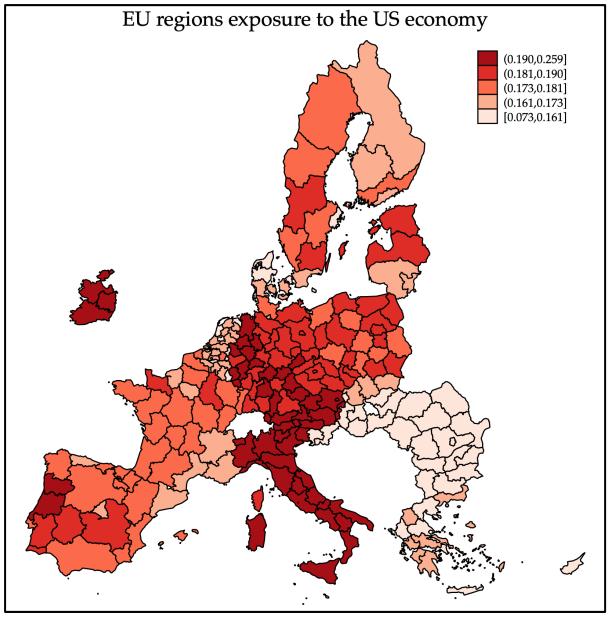



Figure 3: Regions' exposure to the U.S. economy

Source: Authors' elaboration on Eurostat data

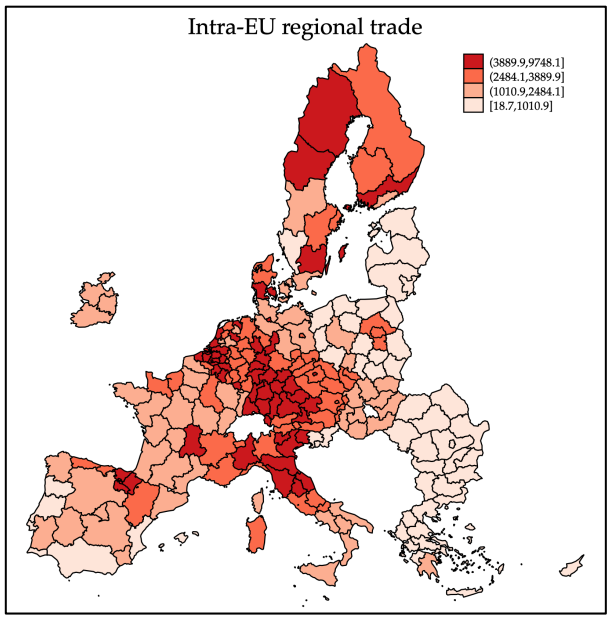



Figure 4: Exports between EU NUTS-2 regions within the internal market

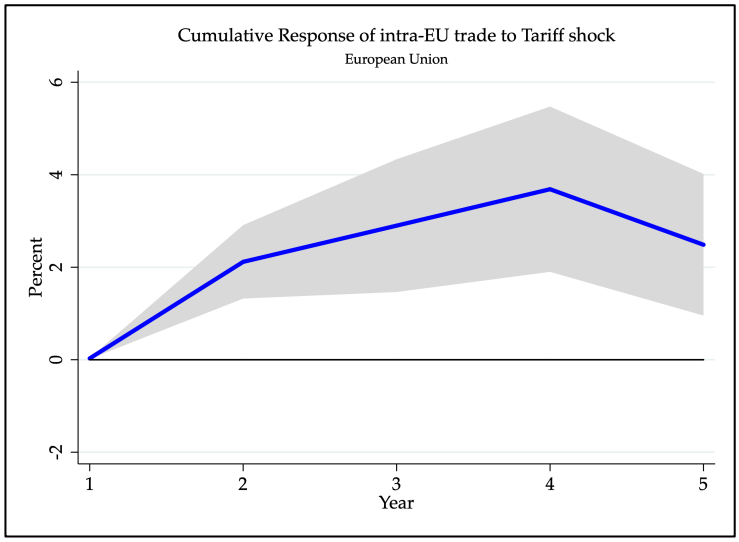



Figure 5: IRF of Intra-EU Regional Trade Flows. Note: the figure displays the estimated coefficients of the Tariff variable from Equation (1), along with the 90% confidence intervals.

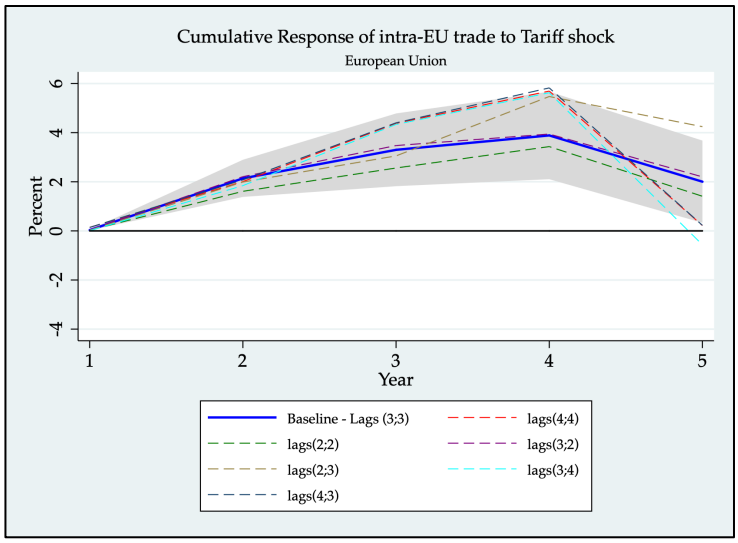



Figure 6. Robustness checks – Alternative Lag structure. Note: the figure depicts the coefficients of the *Tariff* variable of Eq. (1) and the 90% confidence bands.

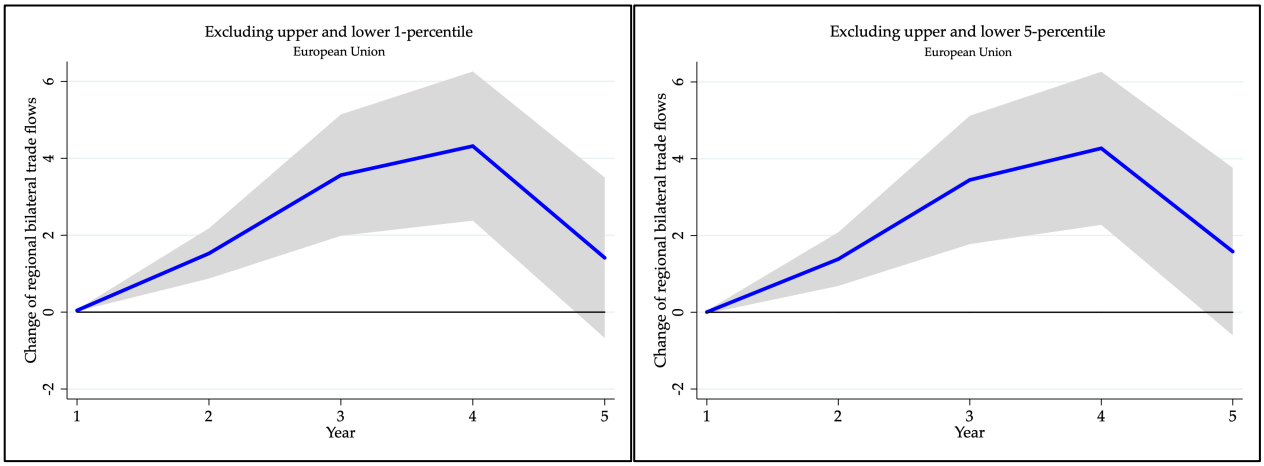



Figure 7. Robustness checks – Excluding outliers of trade shock. Note: the figure depicts the coefficients of the *Tariff* variable of Eq. (1) and the 90% confidence bands. The left (right) graph is obtained by estimating Eq. (1) excluding the upper and lower 1 (5) percentiles.

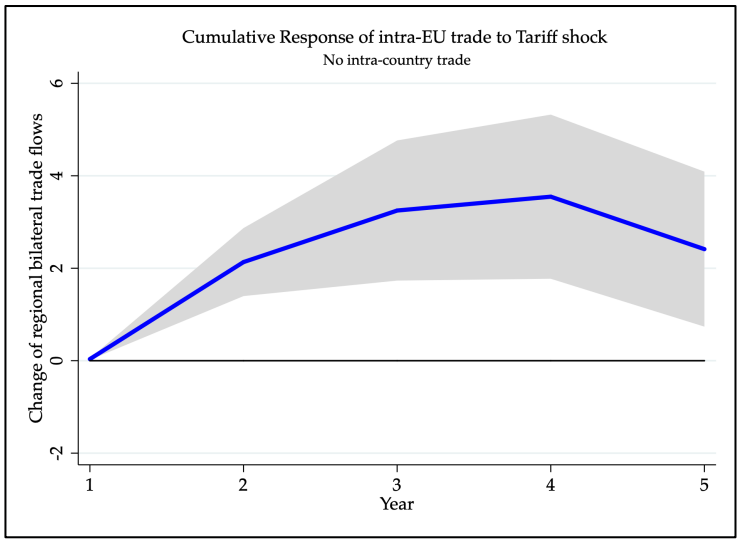



Figure 8. Robustness checks – Excluding intra-country trade. Note: the figure depicts the coefficients of the *Tariff* variable of Eq. (1) and the 90% confidence bands.

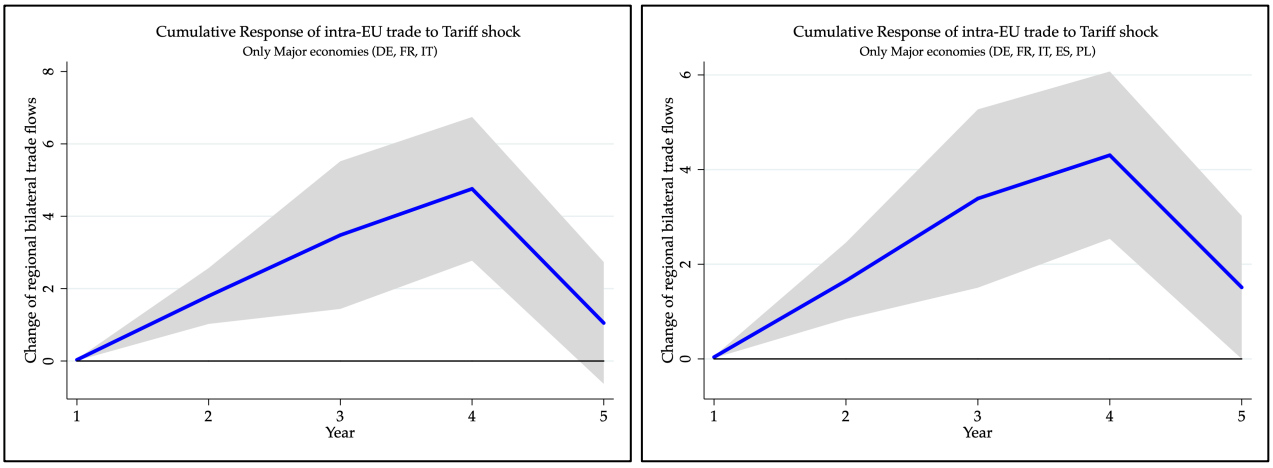



Figure 9. Robustness checks – Excluding small countries. Note: the figure depicts the coefficients of the *Tariff* variable of Eq. (1) and the 90% confidence bands. The left (right) graph is obtained by estimating Eq. (1) including only Germany, France, Italy (Germany, France, Italy, Spain, and Poland).

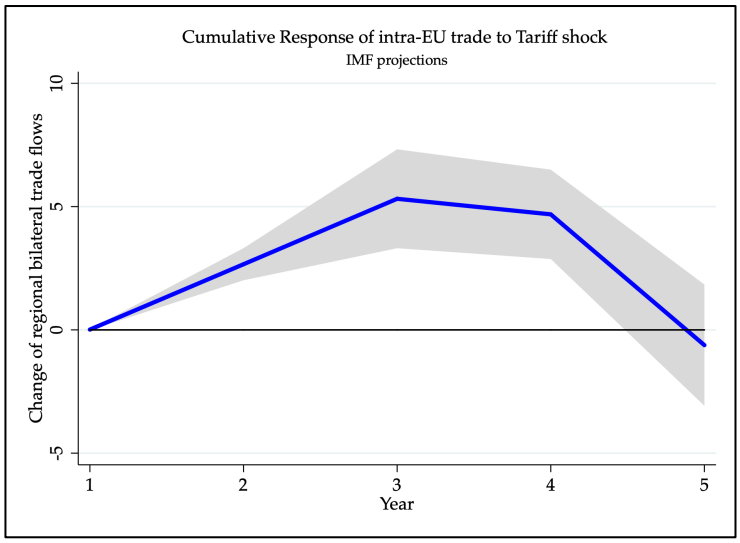



Figure 10. Robustness checks – Using IMF World Economic Outlook projection. Note: the figure depicts the coefficients of the *Tariff* variable of Eq. (1) and the 90% confidence bands.

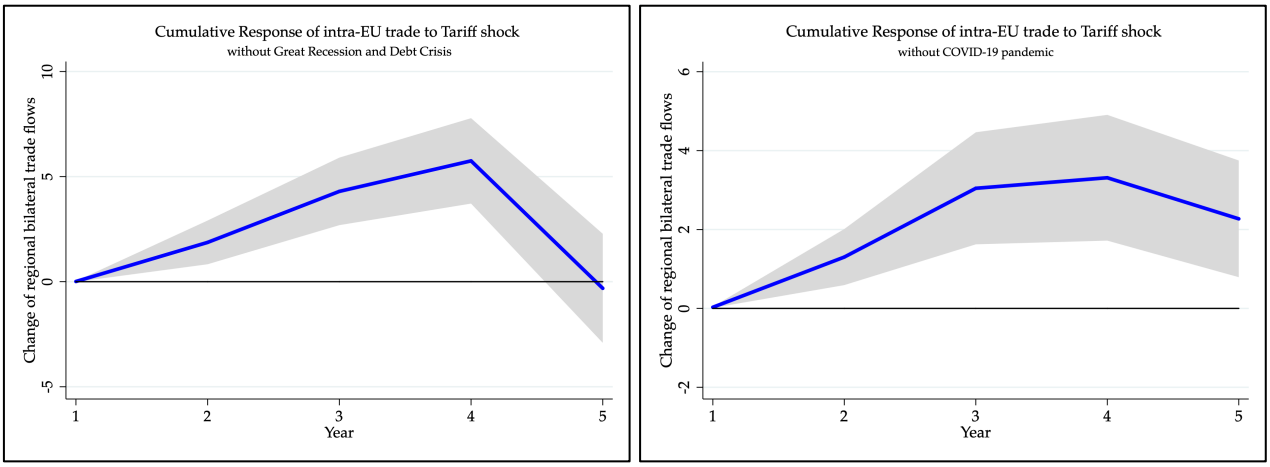



Figure 11. Robustness checks – Excluding Great Recession and Covid-19 pandemic. Note: the figure depicts the coefficients of the *Tariff* variable of Eq. (1) and the 90% confidence bands.

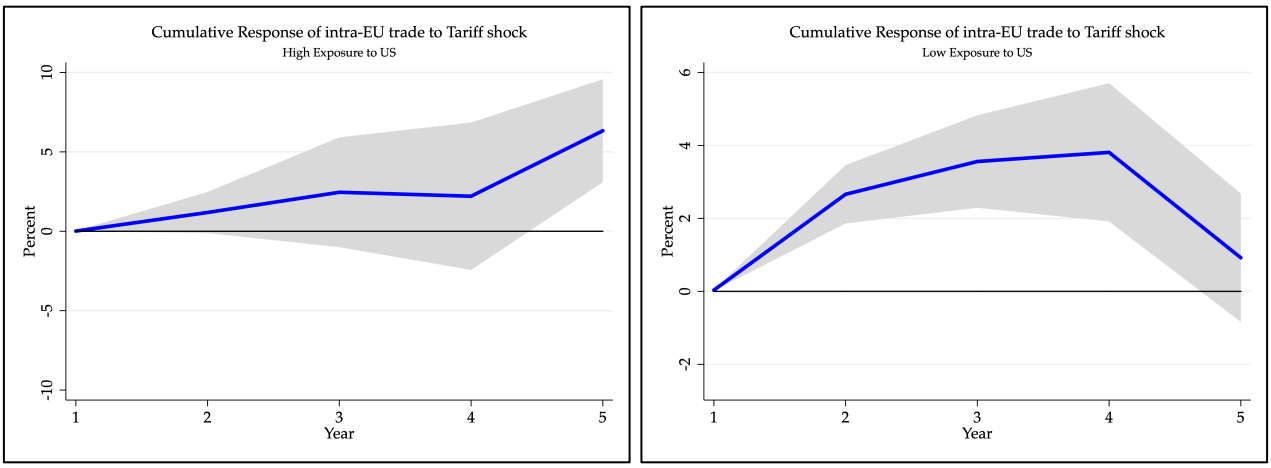



Figure 12: IRF of Manufacturing Bilateral Trade among Regions with High (Panel a, Left) and Low (Panel b, Right) Exposure to the U.S. Note: Exposure is measured as the share of a reporting region's (r) total exports directed to the U.S. The figure displays the estimated coefficients of the Tariff variable from Equation (1), along with the associated 90% confidence intervals.

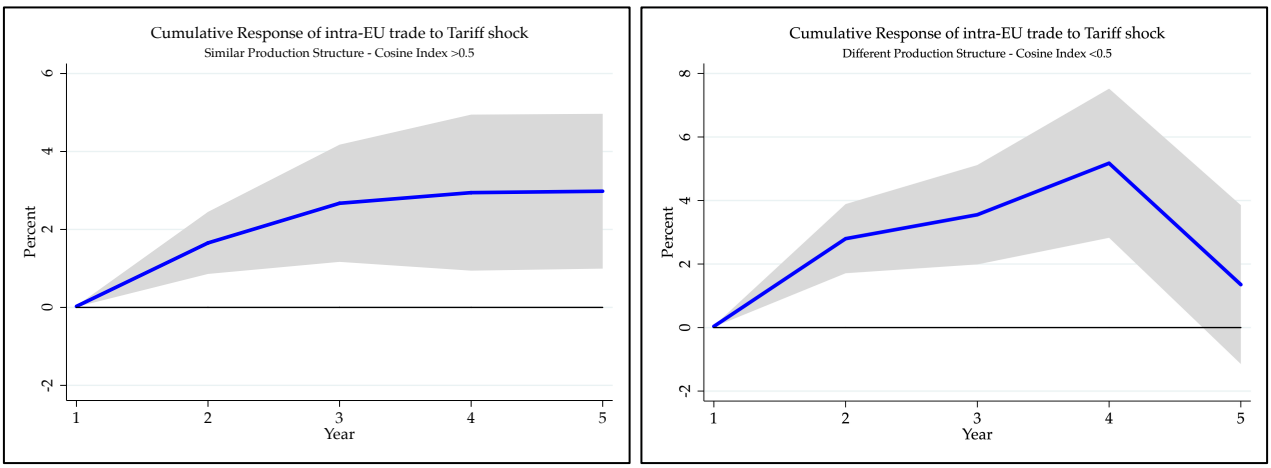



Figure 13: IRF of Manufacturing Bilateral Trade Among Pairs of Regions with High (Panel a, Left) and Low (Panel b, Right) Production Similarity Note: Similarity is measured using a Cosine Similarity Index based on the relative importance of each of the 20 manufacturing sub-sectors in the regional production structure. The figure shows the estimated coefficients of the Tariff variable from Equation (1), along with the corresponding 90% confidence intervals.

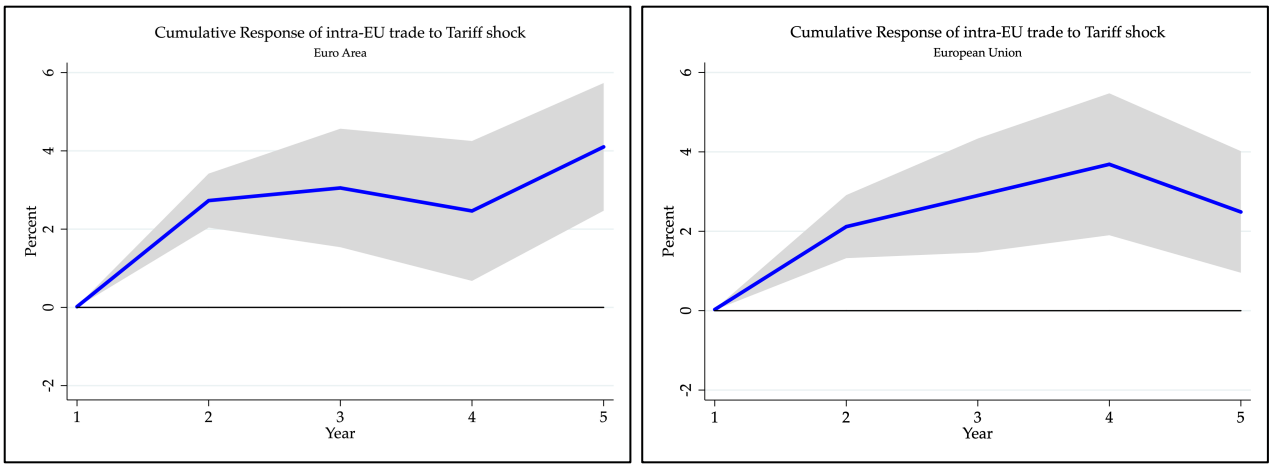



Figure 14: IRF of manufacturing bilateral trade among pairs of regions in euro area countries (left panel) compared to the entire EU (right panel). Note: The figure shows the estimated coefficients of the Tariff variable from Equation (1), along with the corresponding 90% confidence intervals.