

7. Resilience of the Polish and German economies to external shocks in the context of Polish accession to the EU

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Abstract: Poland's 2004 accession is treated as a structural shock that may have strengthened resilience to later crises. The chapter compares Poland, a new Member State, with Germany, an established EU economy, using quarterly Eurostat data, Vector Autoregression models and Impulse Response Functions. GDP reactions to export shocks are assessed during accession, the global financial crisis, the sovereign-debt crisis and COVID-19. Poland displays stronger and more persistent responses relative to its economic size, while Germany shows earlier but smaller relative movements and greater exposure to large adverse shocks in its export mix. Market access, capital inflows, institutional convergence, EU funds and trade diversification appear to have improved Poland's adaptive capacity. The chapter portrays enlargement as a resilience-building mechanism rather than as a one-off integration event.

Keywords: EU accession, resilience, external shocks, Vector Autoregression (VAR) model, Impulse Response Functions (IRFs), GDP.

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Introduction

The enlargement of the European Union in 2004 marked a watershed for both new and old Member States. The accession of Poland, alongside nine other Central and Eastern European countries, expanded the Union's economic footprint, deepened regional integration, and reshaped trade, investment, and policy dynamics across the region. As highlighted in the accompanying analysis, the enlargement brought substantial macroeconomic gains for the EU as a whole, including higher trade volumes, job creation, and improved resilience to external shocks. Yet the magnitude and channels of these benefits were uneven across Member States, with the accession economies facing both heightened exposure to global fluctuations and enhanced opportunities for growth through integration. As the frequency and the severity of exogenous shocks and subsequent crises increased, the concept of economic resilience has gained significant attention in recent years (Keller, 2021; Majewska & Truskolaski 2024).

This chapter investigates the resilience of the economies that entered the EU in 2004, focusing in particular on Poland as a representative “new” member state and Germany as a benchmark “old” member state in the face of the overlapping crisis phenomena in the global economy. The central question is how EU accession affected their ability to withstand and recover from external shocks of overlapping crises – such as the global financial crisis, the sovereign debt crisis, and the COVID-19 downturn – based on the GDP response to external shocks in exports. By employing Vector Autoregression (VAR) models and Impulse Response Functions (IRFs), the study quantifies the extent to which EU accession altered the resilience properties of Poland and Germany in the face of external shocks, distinguishing responses of GDP to different crisis episodes within the whole analysed period.

The chapter is structured as follows. The literature review section (subsection Economic resilience and its determinants) surveys conceptualisations of economic resilience and its determinants, outlining static and dynamic perspectives and detailing how VAR-based tools capture short-run interdependencies and longer-run adjustment. The following subsection, devoted to the theoretical context, develops the concept of the EU accession shock as a multi-channel resilience mechanism, highlighting how openness, investment, and institutional convergence interact to raise export performance, attract capital, and improve productivity. The final subsection of the literature review examines how external shocks affect national economies and shape their resilience, using the global financial crisis, the euro area sovereign debt crisis, and the COVID-19 pandemic as key examples. The data and methodology section specifies the VAR framework and impulse response analysis, and the data sources used to compare Poland and Germany across the identified crisis episodes. The empirical findings section

presents the key results, emphasising the differential impact of shocks to exports on GDP and the durability of these effects. Finally, the conclusions synthesise the main insights and outline avenues for further research.

7.1. Literature review

7.1.1. Economic resilience and its determinants

Economic resilience, defined as an economy's ability to withstand or recover from shocks, is a cornerstone in economic literature. Briguglio et al. (2009) provide a comprehensive framework for understanding economic resilience, arguing that it is not merely a function of economic structure but also of policies and institutions that enable adaptation and recovery. They further posit that the resilience of small economies, in particular, is influenced by their openness, concentration, and the extent of their shock-absorbing potential.

Several factors can contribute to an economy's resilience. These include the diversity and complexity of the economy, the flexibility of its institutions and markets, the strength of its social networks and communities, and the effectiveness of its policy responses. Economies that are more diverse and complex tend to be more resilient because they are less dependent on any single sector or industry. If one sector is hit by a shock, other sectors can continue to function and support the overall economy. Flexible institutions and markets can help an economy to adapt to shocks. For example, flexible labour markets can help to mitigate unemployment during economic downturns by facilitating the movement of workers from declining sectors to growing ones. Strong social networks and communities can provide a form of social insurance that helps to buffer individuals and households against economic shocks. For example, during times of economic hardship, families and communities often provide support to their members in the form of shared resources, mutual aid, and emotional support. Effective policy responses can also play a crucial role in enhancing economic resilience. Martin et al. (2018) argue that this includes both proactive policies that aim to mitigate the risk and impact of shocks, and reactive policies that aim to facilitate recovery after shocks have occurred. They further suggest that resilience-building policies should be context-specific, taking into account the unique characteristics and vulnerabilities of each economy.

Resilience can be viewed from two main perspectives: static and dynamic. Static resilience refers to the ability of an economy to withstand a shock without changing its structure or behaviour, while dynamic resilience refers to the ability of an economy to adapt and evolve in response to shocks, potentially

leading to a new equilibrium state that may be more efficient or desirable than the original state.

Static resilience can be associated with the Vector Autoregression (VAR) model. By capturing the interdependencies among multiple time series, the VAR model can help understand how a shock to one variable (e.g., an external shock to the economy) affects other variables in the system (like GDP or unemployment rate) at the same point in time. This can provide insights into the immediate or static response of an economy to shocks.

On the other hand, dynamic resilience, which refers to the ability of an economy to adapt and evolve in response to shocks, can be associated with Impulse Response Functions (IRFs). IRFs, derived from the VAR model, trace the response of variables in the system to shocks over time. This can provide insights into the dynamic response of an economy to shocks, including how quickly and effectively it recovers from them.

Therefore, the VAR model and IRFs can be valuable tools for analysing both the static and dynamic resilience of economies. They allow for a nuanced understanding of how economies respond to shocks both immediately and over time, which is crucial for designing effective policies to enhance economic resilience.

7.1.2. Theoretical context of EU accession as a structural shock – resilience function of integration

EU accession can be interpreted as a positive, multi-channel integration shock that lifts efficiency, long-run growth, and macroeconomic resilience. Standard and new trade models predict that removing tariff and non-tariff barriers within a large customs union reallocates resources toward activities with comparative and competitive advantage, deepens specialisation, and expands exports at both the extensive and intensive margins (Michałek & Hagemeyer, 2024). At the aggregate level, tighter external-demand linkages make output more responsive to global trade cycles, yet impulse-response evidence shows that export-driven shocks boost GDP in a positive and persistent way, consistent with an export-led resilience mechanism (e.g., SVAR/GVAR results in Sznajderska, 2021).

Integration also unlocks capital mobility. Accession strengthens policy credibility and compresses risk premia, crowding in foreign direct investment alongside EU funds that finance capacity expansion, technology transfer, and organisational upgrading. In theory, these inflows act on both the supply side (capital deepening, productivity) and the demand side (employment, income). Empirically, they often coincide with a post-accession structural break – a shift to a higher growth regime supported by sustained external financing and institutional adaptation (Ladonko

et al., 2022). In dynamic terms, investment and export effects arrive quickly, with output stabilising at a higher equilibrium as the new capital stock is absorbed.

A third mechanism is institutional convergence. Harmonisation of competition policy, state-aid rules, environmental and product standards, and governance practices reduces transaction costs, strengthens the credibility of economic policy, and lengthens private planning horizons (Ambroziak, 2021, 2022, 2023; Białek & Oleksiuk, 2024). In the language of endogenous-growth theory, these reforms operate as a sustained Total Factor Productivity (TFP) shock: they lock in efficiency gains, magnify the returns to openness, and reinforce the durability of export-led growth. The feedback loop between trade openness and institutional quality – “integration-induced productivity convergence” outlined in Michałek and Hagemeyer (2024) – explains why the accession shock is not merely transitory but yields permanent-type improvements in performance.

Taken together, accession functions as a resilience mechanism. A rule-based Single Market with free movement of goods, services, capital and – imperfectly but materially – labour reshapes expectations, coordinates investment and innovation, and strengthens shock absorption. In compact form, the integration shock raises exports, FDI, and productivity through mutually reinforcing channels of trade, finance, and institutions, placing the economy on a higher and more stable growth path that is better able to transmit, withstand, and recover from external disturbances.

Studies report that integration with the European Union is associated with economic integration with trade-offs. Aizenman and Saadaoui (2024), Buti and Szekely (2019), and Jacoby (2014) note that accession encourages growth, increased foreign direct investment, and trade integration. At the same time, these studies document how such economic openness can heighten exposure to external shocks and market volatility, particularly in non-eurozone contexts.

For Poland, integration into the EU increased its exposure to global demand fluctuations but simultaneously changed the sign and persistence of responses: shocks transmitted through exports now had a stronger positive multiplier, while negative shocks (e.g., crisis-related declines in global demand) were increasingly buffered by structural funds, fiscal coordination, and flexible exchange rates.

EU integration enhanced Poland's resilience to external crises. Both empirical reports (Ambroziak 2023; Białek & Oleksiuk 2024) and analytical models (Sznajderska 2021) demonstrate that post-accession Poland displayed a higher ability to absorb negative foreign shocks such as the 2008 global financial crisis, the Eurozone debt crisis, and the COVID-19 recession without long-term output loss. This resilience stems from several reinforcing mechanisms:

1. **Policy Anchoring and Credibility:** The institutional commitments of EU membership constrained fiscal and monetary populism, creating a credible policy environment that reduced risk premiums and currency volatility.

2. Diversified Trade and Financial Linkages: Integration broadened export markets and investment partners, decreasing exposure to single-country shocks.
3. Countercyclical Fiscal Transfers: Access to EU structural and cohesion funds acted as automatic stabilisers during downturns.
4. Adaptive Labour Markets: Migration flows to and from the EU provided a demographic shock absorber, aligning domestic labour supply with cyclical fluctuations.

Białek & Oleksiuk (2024) emphasise that Poland's macroeconomic volatility decreased markedly after 2004, with output gaps closing faster and recessions shallower compared to pre-accession years. Their analysis conceptualises EU membership as a "resilience dividend" – a permanent improvement in the country's ability to withstand shocks. In the language of impulse response analysis, this corresponds to a smaller negative deviation of GDP following crises and a faster return to equilibrium.

Balcerowicz's 2007 study noted that while EU accession initially implied rapid exposure to external markets and competition, it also strengthened the macroeconomic policy framework. Later research (Białek & Oleksiuk, 2024; Michałek & Hagemeyer, 2024) documented that the same institutional and financial mechanisms that amplified Poland's upward growth trajectory in the 2000s helped stabilise output during the successive global and European crises.

This resilience stems from three interacting theoretical channels:

1. The Automatic Fiscal Channel. The Stability and Growth Pact and access to EU structural and cohesion funds introduced countercyclical elements into Poland's fiscal policy. In downturns (2008–2009, 2020–2021), EU transfers rose relative to GDP, functioning as external automatic stabilisers. These transfers finance public investment and social programmes insulated from domestic budget tightening, thus mitigating the negative phase of the cycle.
2. The Financial Credibility Channel. Integration into the EU's financial and regulatory architecture reduced perceived sovereign risk. Poland's flexible exchange-rate regime, together with IMF's Flexible Credit Line, acted as a shock absorber during global financial turbulence. The institutional credibility effect meant that capital inflows resumed quickly after each crisis, avoiding the sudden-stop phenomena typical for non-integrated emerging markets.
3. The Trade Diversification Channel. Membership of the Single Market increased both the number of export destinations and the sophistication of exported goods. Thus, even when global demand declined, Poland's export portfolio shifted dynamically across EU submarkets. This diversification explains why, in the VAR model, the GDP response to export shocks remains consistently positive across the entire sample period, even when major crises are incorporated as exogenous dummies.

The theoretical literature therefore interprets Poland's accession as a structural upgrade in the transmission mechanisms of global shocks.

7.1.3. External shocks and national economic responses

External shocks, whether financial, fiscal, epidemiological or geopolitical, translate into macroeconomic reactions through four intertwined channels: trade, finance, expectations and policy. Trade shocks alter demand, import prices and inventories; financial shocks shift risk premia, collateral values and credit supply; expectations affect precautionary saving and the option value of waiting; policy transmits automatic stabilisers, discretionary fiscal measures, monetary reactions and regulatory forbearance. The balance between amplifiers (financial accelerator input-output propagation, inventory cycles) and buffers (bank capital, cash cushions, social insurance, international risk-sharing) determines the depth of the trough and the speed of recovery. Static resilience is the contemporaneous impact given existing buffers; dynamic resilience is the full adjustment path back to trend, measured by impulse-response functions that summarise peak effects, half-life and long-run convergence.

The following subsections examine three emblematic episodes (the 2007–2009 global financial crisis, the 2009–2012 euro area sovereign debt crisis, and the 2020 COVID-19 shock) to illustrate how variations in shock type, initial conditions, and policy mix map into distinct transmission patterns and resilience profiles.

Global financial crisis

The financial crisis of 2007–2008 had a significant impact on Europe's economies, with the effects of the crisis unfolding over several quarters. While the crisis originated in the United States due to the subprime mortgage market's collapse, its consequences quickly spread to Europe and other parts of the world. In Europe, the sequence ran from stress at some banks in mid-2007, through the post-Lehman funding freeze in Q3 2008, to recessions in 2009. Transmission operated via a sudden stop in wholesale funding, jumps in risk premia, bank deleveraging, and a collapse of trade finance and investment. Policy responses combined liquidity backstops and guarantees with fiscal stimulus; recovery relied on bank repair and regulatory overhaul that gradually restored credit and confidence.

Sovereign debt crisis

The sovereign debt crisis, also often referred to as the European debt crisis, was a financial calamity that struck several European nations in the aftermath of the 2008 global financial crisis, and it spanned roughly from 2009 to 2012. The

core mechanism was a sovereign–bank feedback loop: rising sovereign yields weakened banks holding domestic bonds, which amplified funding stress. Policy combined fiscal adjustment and competitiveness-oriented realignment with European-level firewalls (EFSF/ESM) and the ECB's backstop via Outright Monetary Transactions, re-anchoring expectations.

COVID-19 crisis

The outbreak of the SARS-CoV-2 pandemic in China at the end of 2019 and its rapid spread across the globalised world in early 2020 had a severe global economic impact. As a macro shock, COVID-19 combined simultaneous supply restrictions (mobility and workplace constraints) with a demand contraction driven by uncertainty and precautionary behaviour. Effective responses layered three pillars: large temporary fiscal transfers and state guarantees; highly accommodative monetary policy and regulatory forbearance; and labour-market schemes to preserve matches. The literature stresses that resilience policies must be context-specific, blending proactive risk reduction with reactive support (e.g., Martin et al., 2018).

These crises have produced heterogeneous economic effects, affecting economic growth, policies, and institutional governance, fiscal variables, banking sectors, and government debt, with some countries experiencing more dramatic consequences than others. The variations are driven by country-specific factors like economic structure and local fiscal policies, making a uniform EU-wide response challenging.

7.2. Methods and data sources

7.2.1. Data sources and description

The empirical analysis in this study relies on a rich dataset retrieved from the Eurostat Dissemination Database, an official data portal of the European Union. This dataset offers a comprehensive range of social and economic statistical data that covers all EU Member States. We focus on a pair of countries: Poland as the “new” EU member and Germany as the “old” one. We used quarterly data for the period 2000–2023 from Eurostat databases.

We incorporate the following variables into our analysis:

1. Gross Domestic Product (GDP) – in EUR mln as a comprehensive measure of overall economic activity within countries.
2. Exports of goods and services – in EUR mln as a measure of economic activity and its vulnerability to external shocks.
3. Crises Dummy – a dummy variable incorporated to account for any major economic or financial crises during the observed period.

Figure 7.1 and Figure 7.2 below present the comparison of changes over quarters within the years 2000–2023 in GDP and exports (in millions of euros, current prices) in Poland and Germany, respectively.

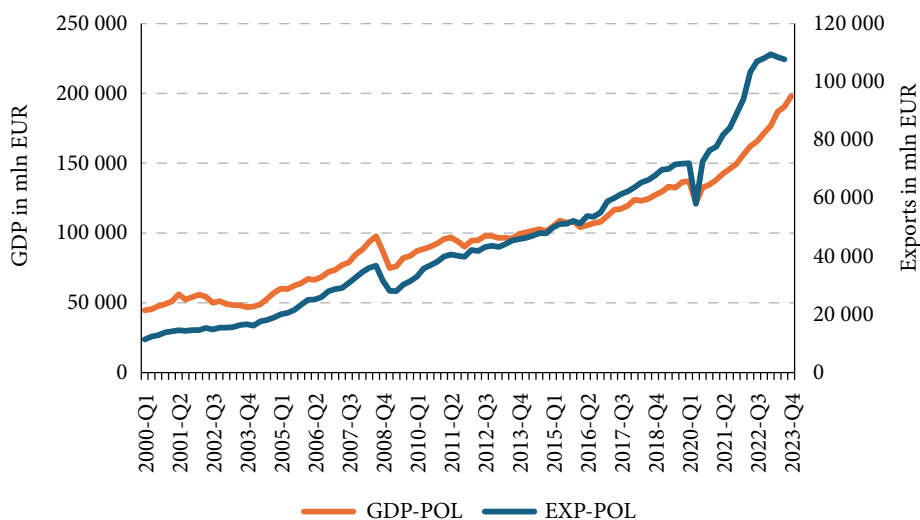


Figure 7.1. GDP and exports values in EUR mln over time for Poland

Source: based on Eurostat Database.

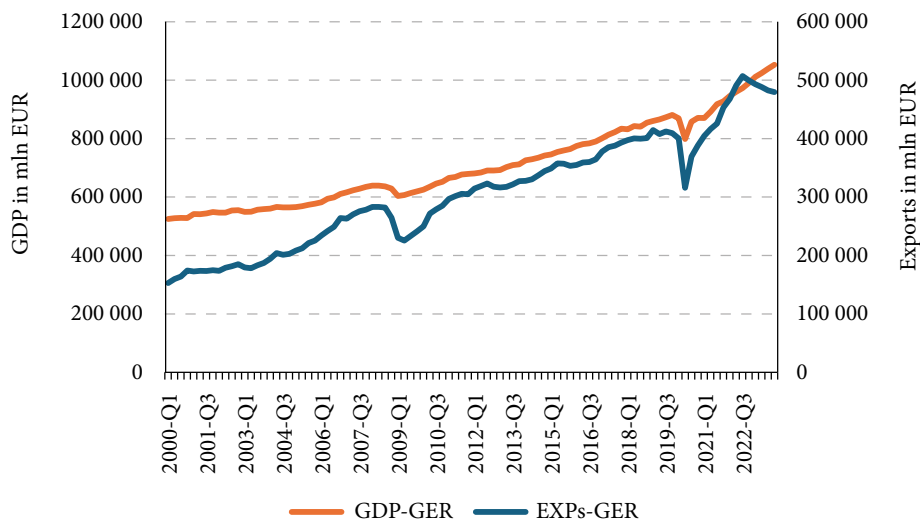


Figure 7.2. GDP and exports values in EUR mln over time for Germany

Source: based on Eurostat Database.

7.2.2. Method and model specification

We employ the Vector Autoregression (VAR) method to compute the Impulse Response Functions (IRFs) for explaining the effects of positive (EU accession) and negative (crises) shocks on the endogenous variables – GDP, and exports of goods and services. The VAR model is a multivariate time series econometric model that captures the linear interdependencies among multiple time series variables (Lütkepohl, 2005).

We compute the IRFs to analyse the dynamic responses of GDP to one standard deviation shocks in exports in the presence of the external dummy variables representing EU accession in 2004, the 2008 financial crisis, sovereign debt crisis, and Covid-19 pandemic for the period 2000–2023. The IRFs provide insights into the magnitude, direction, and persistence of the impact of these shocks on the GDP changes in Poland and Germany as examples of “new” and “old” EU Member States.

VAR models are widely used in macroeconomics to analyse the dynamic interactions between economic variables, policy analysis, and forecasting (Sims, 1980; Stock & Watson, 2001). The VAR model is appropriate for this study due to its ability to capture the complex relationships among GDP, exports of goods and services, and external shocks (Enders, 2015).

The VAR model can be represented by the following equation:

$$\Delta Y_t = A_1 \Delta Y_{t-1} + A_2 \Delta Y_{t-2} + \dots + A_p \Delta Y_{t-p} + B_1 X_{1t} + B_2 X_{2t} + B_3 X_{3t} + \varepsilon_t$$

where

ΔY_t is a vector of endogenous variables (seasonally differenced real GDP, and exports of goods and services),

A_i ($i = 1, 2, \dots, p$) are matrices of coefficients to be estimated,

X_{1t} , X_{2t} , and X_{3t} are the dummy variables representing the accession to the EU, 2007–2008 financial crisis, 2009–2012 sovereign debt crisis, and the 2020 COVID-19 pandemic, respectively,

B_i ($i = 1, 2, 3$) are coefficient vectors associated with the external shocks, and ε_t is a vector of error terms.

The VAR model is estimated using the ordinary least squares (OLS) method. The optimal lag length for the VAR model is determined using information criteria such as Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) (Lütkepohl, 2005). Diagnostic tests, including serial correlation tests (Breusch–Godfrey test), heteroskedasticity tests (White test), and tests for

normality of residuals (Jarque–Bera test), are conducted to ensure the model's validity and robustness (Enders, 2015). After estimating the VAR model, we compute the Impulse Response Functions (IRFs) to analyse the dynamic responses of the endogenous variables (seasonally differenced real GDP, and exports of goods and services to one standard deviation shocks in the external dummy variables representing the accession to the EU, 2007–2008 financial crisis, sovereign debt crisis, and COVID-19 pandemic.

7.3. Results

7.3.1. Poland

We built a VAR model taking GDP (EUR mln) as an endogenous variable and calculated IRF showing the response of GDP to an export shock, as a measure of the economy's resilience to shocks. The response is measured in terms of standard deviations, with the shock to exports and the corresponding response of GDP during each crisis. The data reveals considerable variation across different crises and countries, illustrating the interplay between external shocks and national economic responses.

Table 7.1 reports the size of export shocks and the associated GDP responses for Poland, both in standard-deviation units, across four episodes.

Table 7.1. Impact of accession and various crises on exports and GDP response, Poland

Country	Accession, crises	Shock to exports (in standard deviations)	Response of GDP (in standard deviations)
Poland	accession to the EU	0.013	0.029
	financial crisis	−0.065	−0.135
	sovereign debt crisis	none	none
	COVID-19	−0.175	−0.193

Source: based on Eurostat Database.

Based on the data collected, the GDP response to shocks in exports varies during different crises. The accession to the EU registers a small positive export impulse ($+0.013\sigma$) with a positive GDP reaction ($+0.029\sigma$). The implied output-to-export transmission is approximately 2.23 ($0.029/0.013$), consistent with a benign demand expansion and productivity gains. The global financial

crisis shows a negative export shock (-0.065σ) and a larger negative GDP response (-0.135σ), giving a transmission of 2.08; output fell roughly twice as much (in σ terms) as exports, in line with financial-accelerator effects. For the sovereign debt crisis, the table records no distinct shock for Poland, suggesting that this episode did not generate a statistically separable export disturbance in the Polish data. The COVID-19 shock is the largest in magnitude on exports (-0.175σ) and translates into -0.193σ on GDP; the transmission ratio drops to about 1.10, indicating that supply restrictions, precautionary behaviour and policy buffers damped the pass-through from trade to output compared with the financial crisis.

Figure 7.3 below presents IRF of GDP to a shock in exports for Poland.

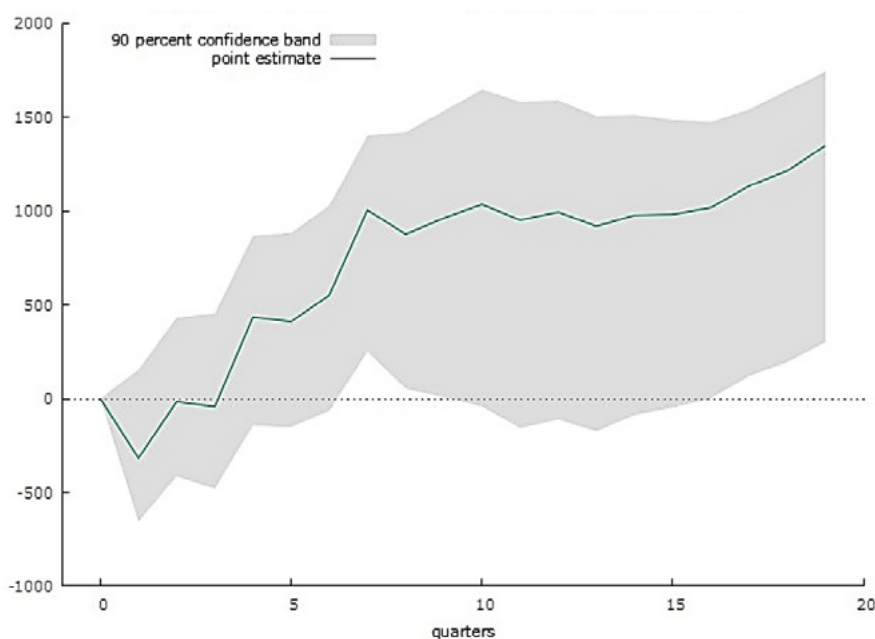


Figure 7.3. Response of GDP in EUR mln to shocks in exports for Poland

Source: based on Eurostat Database.

The Polish GDP response to an export shock begins slightly below zero, turns positive within the first few quarters, rises steeply to a peak of about EUR 1,000 million around quarters 3–7, and then settles near EUR 1,250 mln by quarter 20. The 90% confidence band is wide and overlaps zero at several horizons, so claims of positivity refer to the point estimate rather than to uniformly significant effects across the whole path. Taken as a whole, the profile suggests a gradual and

persistent pass-through from exports to output, with considerable uncertainty about the precise magnitude at different horizons.

7.3.2. Germany

Table 7.2 summarises Germany's export shocks and associated GDP responses (both in standard-deviation units) across major episodes.

Table 7.2. Impact of accession and various crises on exports and GDP response, Germany

Country	Accession, crises	Shock to exports (in standard deviations)	Response of GDP (in standard deviations)
Germany	accession to the EU	0.073	0.061
	financial crisis	-0.433	-0.314
	sovereign debt crisis	none	none
	COVID-19	-1.06	-0.889

Source: based on Eurostat Database.

EU accession appears as a small positive disturbance to exports ($+0.073\sigma$) with a positive GDP reaction ($+0.061\sigma$). The implied output-to-export transmission is 0.84 ($0.061/0.073$), indicating a modest aggregate pass-through. The global financial crisis records a negative export shock (-0.433σ) and a GDP response of -0.314σ , for a transmission of 0.73; output moved less than one-for-one with exports in standard-deviation terms, consistent with partial absorption through domestic buffers. The sovereign debt crisis shows no distinct shock in this specification, suggesting the episode does not yield a statistically separable export disturbance for Germany in the underlying identification. The COVID-19 shock is the largest in magnitude (-1.06σ on exports) and maps to -0.889σ on GDP, a transmission of 0.84.

Figure 7.4 below presents IRF of GDP to a shock in exports for Germany.

The point estimate turns positive in the first quarters, reaches a local maximum of roughly EUR 2,000 million within about 2–3 quarters, then retraces toward EUR 700–1,000 million around quarters 5–7, and gradually rises to a plateau near EUR 1,500 mln by quarter 20. The 90% confidence band is wide and overlaps zero at several horizons, so this profile should be interpreted as a positive point estimate rather than a uniformly significant effect across the whole path.

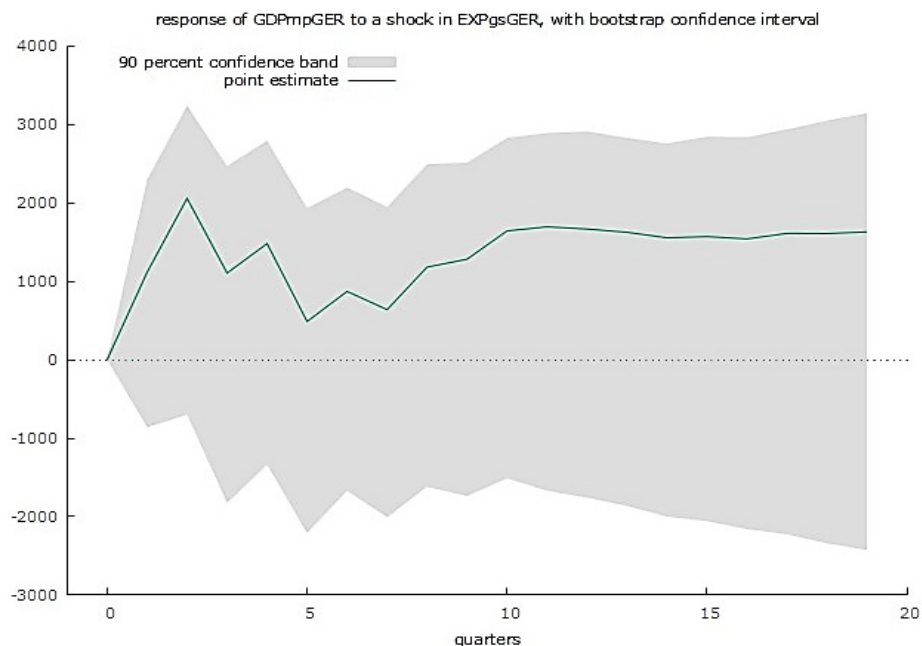


Figure 7.4. Response of GDP in EUR mln to shocks in exports for Germany

Source: based on Eurostat Database.

Economic resilience and interpretation of magnitudes

Expressing the impulse responses as a share of GDP yields a consistent ordering: Poland's GDP responds more strongly to an export shock than Germany's across all five normalisations. Poland's peak effect lies between 3.26% of GDP (2004Q2 baseline) and 0.71% (2025Q2); the corresponding range for Germany is 0.45% to 0.23%. The implied Poland-minus-Germany peak gap is therefore about 0.52 to 2.90 percentage points. Persistence is also greater for Poland in relative terms. The cumulative response over 0–20 quarters, measured in percent-quarters of GDP, exceeds Germany's by roughly 4.6 to 29.4, depending on the baseline. The temporal profiles differ: Germany's point estimate spikes early and then flattens, whereas Poland's rises gradually and peaks late within the 20-quarter window. In absolute euro amounts, Germany remains larger, but after scaling by GDP Poland exhibits the larger relative pass-through from external demand and a more persistent profile. Confidence bands in the original figures overlap zero at several horizons for Germany and are wide for Poland, hence assertions of positivity refer to point estimates rather than uniformly significant effects.

Conclusions and discussion

Three results emerge. Firstly, when impulse responses are scaled by GDP, Poland's GDP reacts more strongly to an export shock than Germany's across all five normalisations. Poland's peak response ranges from 3.26% to 0.71% of GDP, while Germany's ranges from 0.45% to 0.23%. The Poland-minus-Germany gap at the peak lies between 0.52 and 2.90 percentage points. The cumulative effect over 0–20 quarters is also larger in Poland by about 4.6 to 29.4 percent-quarters, which points to greater persistence in relative terms. Germany's point estimate peaks early and flattens, whereas Poland's rises more gradually and peaks late. In levels, Germany remains larger, but once scaled by GDP, Poland exhibits the stronger relative pass-through.

Secondly, table evidence on episode-specific shocks aligns with this ranking and clarifies why the long-run comparison favours Poland. For Poland, the accession impulse is positive on exports ($+0.013\sigma$) and GDP ($+0.029\sigma$). Crisis shocks are negative but of moderate size: financial crisis -0.065σ on exports and -0.135σ on GDP, COVID-19 -0.175σ and -0.193σ . For Germany, accession is also positive ($+0.073\sigma$ on exports, $+0.061\sigma$ on GDP), yet crisis shocks are much larger in absolute σ terms: financial crisis -0.433σ with -0.314σ on GDP, COVID-19 -1.06σ with -0.889σ on GDP. Hence the accession benefit is present in both economies, but Germany's stronger exposure to adverse global shocks offsets it more forcefully over longer horizons.

Thirdly, the pattern is consistent with an integration-driven resilience mechanism operating more powerfully in Poland after 2004. Accession coincided with deeper market access, capital inflows and institutional convergence that raised export capacity and lowered risk premia. The result is a larger relative elasticity of GDP to external demand and a more persistent adjustment profile. Germany's aggregate, while benefiting from accession, appears more insulated in percent-of-GDP terms due to size and diversification, and at the same time more exposed to large negative external disturbances that hit its export mix during crisis episodes.

Taken together, the figures and tables support the following conclusion. In the post-accession era, Poland displays stronger and more persistent responses to export impulses relative to its size, while Germany registers earlier but smaller relative movements and a heavier imprint of crisis shocks. This combination explains why Poland's medium-to-long-run profile in the IRFs is positive and upward in relative terms, and why Germany's positive accession effect is more fully offset by the magnitude of subsequent global crises.

Further research could expand cross-country comparisons by extending the analysis beyond Poland and Germany to include a broader set of EU newcomers and EU-15 members to assess the generality of the accession-led resilience mechanism across different institutional contexts and development levels, taking into account membership or non-membership of the euro area. Moreover, empirical findings would be situated within a broader theoretical framework of integration-induced resilience, linking micro-level policy actions (e.g., policy credibility, diversification of trade, structural funds) to macro-level outcomes in GDP stability and recovery dynamics.

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