

EVALUATING VULNERABILITY DIVERGENCE BETWEEN ADVANCED ECONOMIES AND EMDE IN RESPONSE TO EXTERNAL SHOCKS

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Abstract

This study examines the heterogeneous effects of oil price fluctuations, global demand shifts, and U.S. monetary policy changes on economic growth in advanced economies (AEs) and emerging market and developing economies (EMDEs). Using a System GMM framework on panel data from 57 countries over 2003 to 2023, we identify significant differences in how these shocks transmit across country groups, covering the 2008 financial crisis, the COVID-19 pandemic, and the 2022-2023 monetary tightening cycle.

Three main findings emerge. First, U.S. monetary policy has a significant positive effect on EMDE growth (at 5%) but only a weak negative effect on AE growth (at 8%), suggesting that commodity-exporting EMDEs benefit from the global demand conditions that accompany U.S. expansions. Second, oil price increases significantly reduce AE growth, while their aggregate effect on EMDEs is statistically insignificant, reflecting the offsetting dynamics between oil exporters and importers and the role of subsidy policies. Third, nominal effective exchange rate movements show no significant impact on GDP growth in either group, consistent with the dominant currency pricing paradigm of Gopinath et al. (2020).

These results call for differentiated policy responses: EMDEs need stronger financial buffers, while AEs should prioritize energy transition investment and international monetary cooperation.

Keywords: Oil price shocks, monetary policy transmission, economic resilience, GMM estimation, advanced vs emerging economies.



1. Introduction

External shocks do not affect all economies equally. A spike in oil prices, a contraction in world demand, or a sudden tightening of U.S. monetary policy can set in motion very different chains of events depending on where a country sits in the global economic hierarchy, its financial depth, its trade structure, its institutional capacity, and its room for policy maneuver. Documenting and explaining these differences is one of the more practically consequential tasks in international macroeconomics, yet the literature has tended to address each shock type separately and to concentrate attention on advanced economies. This paper takes a different approach: we analyze all three shock types simultaneously and compare their transmission across advanced economies (AEs) and emerging market and developing economies (EMDEs) within a single empirical framework.

The motivation for doing so has sharpened considerably over the past fifteen years. The 2008 global financial crisis marked the beginning of a sustained period of unconventional monetary policy in the major advanced economies, quantitative easing, forward guidance, near-zero interest rates, each of which opened new channels for cross-border spillovers that went well beyond traditional trade linkages (Bhattarai et al., 2021). When the COVID-19 pandemic hit in 2020, the divergence between AEs and EMDEs became even more visible: advanced economies deployed large fiscal and monetary responses, while many developing countries faced binding constraints from elevated debt burdens, limited fiscal space, and capital outflows. Ha et al. (2023) show that oil price shocks contributed substantially more to inflation variability in advanced economies during this period; Carriere-Swallow et al. (2023) find that supply chain disruptions passed through more severely to inflation in countries with weaker monetary frameworks. Both findings point in the same direction as the results we report here. More recently, the rapid Fed rate increases of 2022-2023 sent fresh shockwaves through EMDE financial markets, reviving familiar concerns about the asymmetric reach of U.S. monetary decisions, a dynamic carefully documented by Lastauskas and Nguyen (2024).

Why would the same shock produce different outcomes across these country groups? The structural explanation is well established. Advanced economies tend to have diversified productive bases, deep financial markets, credible monetary institutions, and meaningful room for countercyclical policy. Emerging and developing economies, by contrast, depend more heavily on commodity exports, face tighter constraints on external financing, and carry greater

vulnerability to exchange rate pressure and capital flow reversals. When oil prices move, when global demand shifts, or when the Fed changes course, these structural differences do not merely modulate the size of the response, they can alter its sign.

Despite broad agreement on this general picture, several specific debates remain unsettled. The global financial cycle literature, most influentially Rey (2015), holds that U.S. monetary policy effectively overrides domestic monetary autonomy in open EMDEs regardless of their exchange rate regime. Against this, Obstfeld (2015) and Klein and Shambaugh (2015) argue that exchange rate flexibility still provides meaningful, if partial, insulation. Both positions find empirical support in some samples and time periods, but neither has been decisively confirmed in a post-COVID, multi-shock comparative framework. The question of oil price sensitivity is similarly contested: Blanchard and Gali (2010) showed that advanced economies became progressively less disrupted by oil shocks after the mid-1980s, but whether that trend has continued, and how it interacts with the heterogeneous oil trade positions of EMDEs, remains unclear. And on exchange rates, the dominant currency pricing paradigm of Gopinath et al. (2020) implies that nominal exchange rate movements may have far weaker growth effects than classical expenditure-switching models predict, a hypothesis that rarely gets tested comparatively across development groups.

This paper addresses all three debates. By estimating oil price, global demand, and Federal Funds Rate effects simultaneously within a System GMM framework, and running separate regressions for AEs and EMDEs on a panel covering 2003-2023, we can directly compare the magnitude and direction of shock transmission across country groups while accounting for dynamic persistence and endogeneity. Our three main contributions are: a direct empirical test of the sign reversal in monetary policy effects across groups; a decomposition of the null oil price result for EMDEs that traces it to within-group heterogeneity and policy buffering; and comparative evidence on NEER insignificance that speaks to the dominant currency pricing debate.

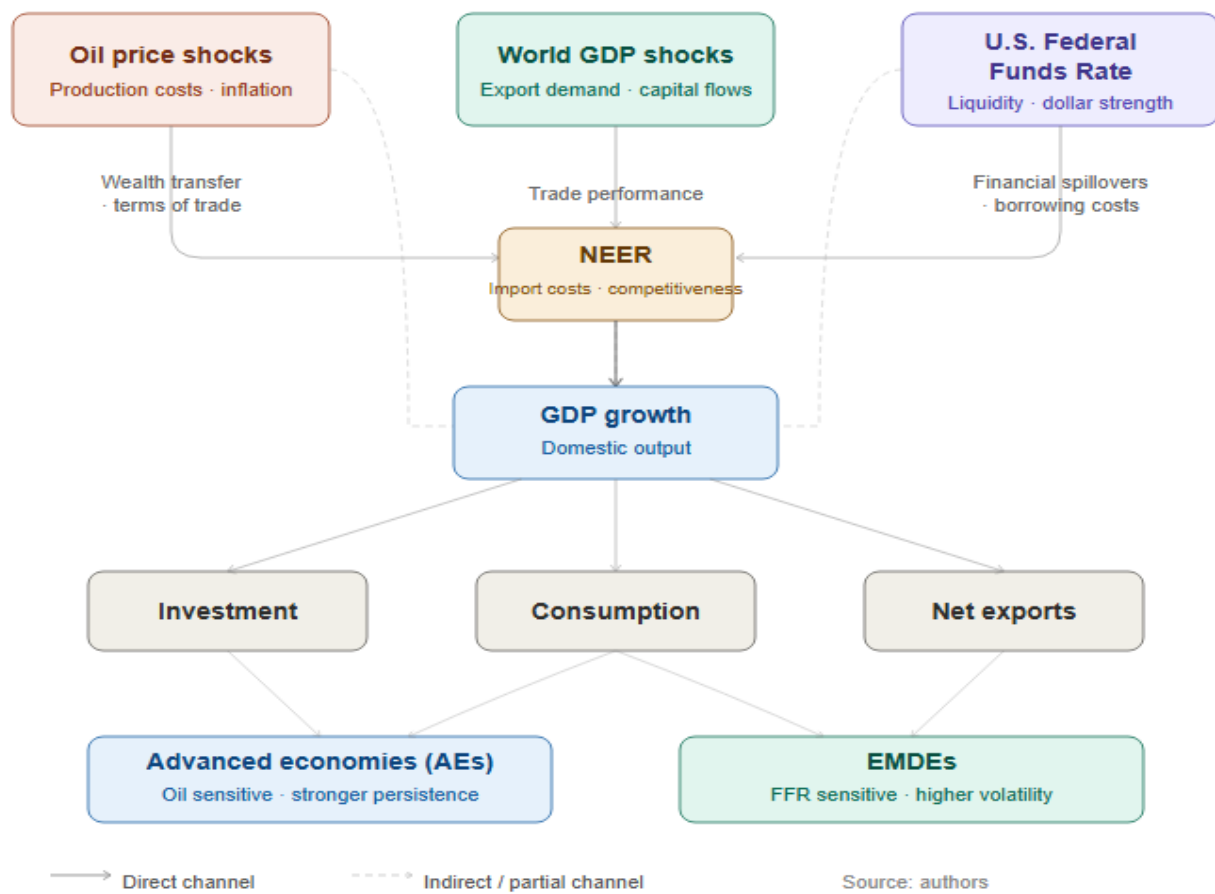


Figure1. Transmission channels of oil price, U.S. monetary policy and global demand shocks

Source: author

Figure 1 maps the transmission architecture underlying the analysis. Oil price shocks reach the domestic economy through production costs, inflation, and wealth transfers that feed back into exchange rates. World GDP shocks operate mainly through export demand and capital flows. Changes in the Federal Funds Rate create financial spillovers via global liquidity and dollar strength. The nominal effective exchange rate sits at the intersection of these forces, linking external conditions to domestic outcomes through import costs and export competitiveness, though, as our results show, this link has weakened considerably. All of these channels eventually bear on GDP growth through investment, consumption, and net exports. The paper's task is to measure how much each channel matters, and for whom.

The paper proceeds as follows. Section 2 reviews the literature across all four transmission channels and identifies the specific gaps this study addresses. Section 3 describes the data and methodology. Section 4 presents and interprets the results. Section 5 concludes.

2. Literature review

A large body of research has examined how oil price fluctuations, U.S. monetary policy, and exchange rate movements affect economic growth. However, most of this work studies each channel in isolation and focuses on advanced economies. Studies that predate the 2008 crisis and the COVID-19 pandemic also miss important structural changes in how shocks transmit. Three debates remain particularly open: whether demand- or supply-driven oil shocks are more harmful, and for which economies; whether the global financial cycle genuinely removes monetary autonomy from EMDEs or whether domestic policy can provide insulation; and whether exchange rate flexibility still dampens external shocks in a world where most trade is priced in dollars. This paper addresses all three by comparing shock transmission across AEs and EMDEs in a single unified framework using post-crisis data that spans the 2008 financial crisis, the COVID-19 pandemic, and the 2022-2023 monetary tightening cycle, episodes that have collectively reshaped transmission channels, policy capacity, and the architecture of global financial integration in ways that earlier comparative studies could not capture.

1.1. Oil Price Shocks and Economic Growth

A key insight from the literature is that the source of an oil price change matters as much as its size. Kilian (2009) developed a structural VAR model that separates oil supply disruptions from global demand shocks and precautionary demand shifts. He showed that supply-driven price increases tend to be more damaging for oil-importing economies, while demand-driven increases are less harmful because they reflect strong global growth. Hamilton (2009) applied this framework to the 2007-2008 episode and found that the price surge was mainly demand-driven, though it still imposed significant costs on oil importers.

Later research has complicated this picture. Baumeister and Hamilton (2019) showed that standard identification methods in structural VARs may be misspecified, suggesting that oil supply shocks are more contractionary than earlier estimates implied. Caldara et al. (2019) found that financial market conditions play a larger role in transmitting oil price changes than previously recognized, a finding that became especially relevant after 2008, when tight credit amplified the real economy effects of energy price swings. Blanchard and Gali (2010) documented a broader structural change: oil shocks became less disruptive for advanced economies after the mid-1980s, due to better monetary policy, more flexible labor markets, and

lower energy intensity in production. This long-run trend is directly relevant to interpreting the results in Section 4.

The comparison between AEs and EMDEs adds further layers of complexity. Peersman and Van Robays (2012) and Baumeister et al. (2010) find that advanced economies have historically suffered larger disruptions from oil price swings because of their high dependence on imported energy. Yet Tang et al. (2010) note that energy-intensive manufacturing in EMDEs creates its own vulnerability, and Rafiq et al. (2016) show that whether a country exports or imports oil fundamentally changes the direction of the effect. These two positions are in genuine tension and have not been fully reconciled in the literature.

Within EMDEs, the heterogeneity is especially large. Kilian et al. (2009) show that oil-exporting EMDEs benefit from price increases while importers see their trade balances worsen. Cashin et al. (2014) formalize this by demonstrating that the opposing effects across exporters and importers tend to cancel out in aggregate panel estimates, which helps explain the insignificant oil coefficient for the EMDE sample in our results. More recently, Hmadouch (2025) documents that oil-importing EMDEs have used subsidies and price controls effectively to reduce the inflationary pass-through of global oil price shocks, adding another reason why aggregate effects are muted.

Most comparative studies treat AEs and EMDEs as internally homogeneous groups and rely on pre-2010 data that misses these structural shifts. This paper addresses this limitation by embedding oil price shocks within a multi-shock framework using a post-crisis panel that captures changes in energy intensity, policy capacity, and within-EMDE heterogeneity.

1.2. Monetary Policy Spillovers

How much does U.S. monetary policy affect economic conditions in other countries, and does this differ between AEs and EMDEs? This question has generated some of the most active debate in international macroeconomics since 2008. Rey (2015) argues that changes in the Federal Funds Rate drive global capital flows, credit conditions, and risk appetite in ways that severely limit EMDE monetary autonomy, regardless of whether they have fixed or flexible exchange rates. Under this view, the classic open-economy trilemma becomes a dilemma: open capital accounts mean that monetary conditions are largely imported from the U.S.

This claim has been challenged. Obstfeld (2015) and Klein and Shambaugh (2015) maintain that flexible exchange rates do provide real, if imperfect, insulation from external monetary shocks, and that the magnitude of spillovers depends on how open the capital account is. Georgiadis (2016) takes a middle position, finding substantial heterogeneity in how U.S. policy transmits across countries and noting that financial deepening has narrowed but not closed the AE-EMDE gap. The disagreement between these positions remains unresolved, particularly for the post-COVID period.

The period since 2008 introduced new complications. U.S. quantitative easing generated spillovers quite different from conventional rate changes. Bhattarai et al. (2021) find that QE effects on EMDEs were highly uneven: economies with stronger fundamentals attracted capital inflows, while weaker ones faced volatile capital flows. This heterogeneity is important for interpreting aggregate EMDE panel estimates. More recently, Lastauskas and Nguyen (2024) study the 2022-2023 tightening cycle and find that monetary policy uncertainty amplified spillovers in financially vulnerable EMDEs, while commodity exporters were comparatively insulated, a pattern consistent with the positive FFR coefficient we find for EMDEs overall.

The literature identifies three main channels through which U.S. monetary policy reaches other economies: the financial channel (capital flows and credit conditions), the trade channel (U.S. demand and dollar pricing effects), and the confidence channel (global risk appetite). Mishra et al. (2014) show that EMDEs have weaker domestic monetary transmission due to underdeveloped financial systems and partial dollarization, which limits their ability to respond to external shocks. Forbes and Warnock (2012) and Bruno and Shin (2015) provide evidence on the capital flow channel, showing that U.S. tightening episodes tend to trigger capital outflows from EMDEs, as seen during the 2013 Taper Tantrum. Advanced economies are better protected from these dynamics due to deeper markets, stronger institutions, and access to hedging instruments (Jorda et al., 2019).

An important ambiguity nevertheless remains. Not all EMDEs suffer when U.S. rates rise. For commodity exporters, higher U.S. rates often coincide with strong U.S. economic activity, which supports commodity demand and export revenues. Aizenman et al. (2016) documented this offsetting mechanism, showing that U.S. rate increases can improve investor sentiment toward sound EMDEs by signaling global economic stability. Whether the net effect of U.S.

tightening on EMDE growth is positive or negative thus depends heavily on sample composition, a point that is central to interpreting our results.

The net effect of U.S. monetary tightening on EMDE growth thus remains contested, particularly for the post-COVID period. This paper contributes direct evidence by estimating the Federal Funds Rate effect separately for AEs and EMDEs, and documents a sign reversal that speaks to the unresolved tension between the global cycle view and the partial insulation view.

1.3. Exchange rate and economic growth

The relationship between exchange rates and economic growth has been revised considerably in recent years. Classical theory, following Obstfeld and Rogoff (1995), held that exchange rate movements were a key adjustment mechanism in open economies, depreciation improves export competitiveness, reduces import demand, and helps restore external balance. In the EMDE context, Calvo and Reinhart (2002) documented a widespread 'fear of floating,' where policymakers avoided exchange rate flexibility because currency movements, especially depreciations, could trigger financial instability through balance sheet effects and imported inflation.

Empirically, the evidence has always been mixed. Eichengreen et al. (1996) and Krugman (1999) found that sharp depreciations were often contractionary in EMDEs, particularly through their effects on foreign-currency debt and import prices. On the other side, Hausmann et al. (2001) showed that structural improvements in monetary frameworks and deeper foreign exchange markets had made EMDEs more resilient to exchange rate swings over time.

More recent work questions whether the exchange rate channel is still a meaningful growth driver at all. Gopinath et al. (2020) show that most international trade is invoiced in U.S. dollars, regardless of the currencies of the trading partners. If export prices are set in dollars, a depreciation of the local currency does not automatically lower the dollar price of exports, and the expenditure-switching effect that underpins classical theory largely fails to materialize. This dominant currency paradigm is a fundamental challenge to the traditional view, and it applies across development levels.

Other evidence points in the same direction. Abiad et al. (2015) find that inflation targeting, improved macroeconomic stability, and more flexible exchange rate management have together

reduced the direct growth impact of nominal exchange rate changes in EMDEs. The large accumulation of foreign exchange reserves after the crises of the 1990s further reduced vulnerability (Aizenman and Lee, 2007). Moutaib and Lahrichi (2023) add that proactive reserve management can produce similar growth outcomes across different exchange rate regimes during external shocks, suggesting that the regime itself matters less than the supporting policy toolkit.

This divergence between contractionary balance-sheet effects and declining NEER relevance is rarely examined comparatively across AEs and EMDEs in a unified empirical model. This paper contributes direct post-crisis evidence that NEER is insignificant for both groups, supporting the dominant currency pricing and policy-buffer arguments.

1.4. Global Demand Shocks

Global demand conditions are often treated as a control variable in empirical growth models. However, there are strong reasons to treat them as a structurally important driver in their own right. Stock and Watson (2005) estimate that global demand shocks explain up to 30% of GDP fluctuations in open economies, and Kose et al. (2012) show that deeper global integration has amplified these spillovers over time, particularly for EMDEs. What has received less attention is how global demand conditions shape the transmission of other shocks, for example, by moderating the effects of oil price changes or amplifying monetary policy spillovers differently across country groups.

The COVID-19 pandemic highlighted this mediating role clearly. The simultaneous collapse and rebound in global demand between 2020 and 2022 interacted with supply chain disruptions to produce inflation even as output was contracting, a pattern that standard models struggled to explain. Ha et al. (2023) show, using a global inflation database covering 196 countries, that oil price shocks contributed more to inflation variability in advanced economies than in EMDEs during this period. Carriere-Swallow et al. (2023) find that global shipping cost increases passed through more strongly to domestic inflation in countries with weaker monetary policy frameworks, showing how global supply shocks interact with domestic institutional capacity to produce uneven outcomes.

For commodity-dependent EMDEs, global demand conditions create a two-way exposure. When global demand is strong, rising commodity prices can offset the negative effects of higher import costs, a moderating mechanism noted by Coady et al. (2010). When demand collapses,

commodity dependence becomes a direct source of vulnerability. Ahmed and Zlate (2014) and Bruno and Shin (2015) both find that global demand conditions are among the main factors differentiating AE and EMDE growth responses, with EMDEs showing greater volatility in both upturns and downturns. Miranda-Agrippino and Rey (2020) further show that U.S. monetary policy affects global demand through credit and risk appetite channels, reinforcing the connections among the variables in this paper.

Structural differences explain why global demand shocks propagate differently across the two groups. AEs have diversified export portfolios, deep integration in global value chains, and access to financial hedging instruments that allow them to maintain production volumes during demand disruptions (Hidalgo and Hausmann, 2009; Baldwin and Freeman, 2022). EMDEs, with more concentrated trade relationships and fewer policy tools, are more exposed to slowdowns in a small number of key trading partners and less able to smooth the impact of demand contractions (Forbes and Warnock, 2012; Georgiadis and Mehl, 2016).

Despite this, most comparative studies examine one shock type at a time, treat global demand as a control variable rather than a mediating force, and rely on pre-crisis data. This paper addresses all three limitations by using System GMM on a post-crisis panel of AEs and EMDEs, comparing the effects of multiple shocks simultaneously while allowing global demand conditions to shape their transmission.

3. Methodology

The following equation is employed across AEs and EMDEs (Table A, Appendix) in order to assess the impact of external shocks on GDP growth for both samples. The equation is structured as follows:

$$\mathbf{GDP}_{gi,t} = \mathbf{c1 GDP}_{gi,t-1} + \mathbf{c2 NEER}_{i,t} + \mathbf{c3 Poil}_{i,t} + \mathbf{c4 Usr}_{i,t} + \mathbf{c5 WGDPP}_{i,t} + \mathbf{\epsilon}_{i,t}$$

Where $\mathbf{GDP}_{gi,t}$ represents the GDP growth rate of country i at time t , $\mathbf{NEER}_{i,t}$ is the first difference of the Nominal Effective Exchange Rate, $\mathbf{Poil}_{i,t}$ is the Brent crude oil price, $\mathbf{Usr}_{i,t}$ is the US federal funds rate, and $\mathbf{WGDPP}_{i,t}$ captures global demand shocks through world GDP.

Table 1. Source of variables

Variable	Description	Source
GDPg	GDP growth (annual %)	World bank
NEER	Exchange Rates, Nominal Effective Exchange Rate, Index	International Financial Statistics (IFS)
Poil	Brent crude oil price nominal US dollars (\$/bbl)	World bank
Usr	Federal Funds Effective Rate, Percent, Annual, Not Seasonally Adjusted	Federal Reserve Economic Data, Federal Reserve Bank of St. Louis
WGDPP	Gross Domestic Product for World, Percent Change, Annual, Not Seasonally Adjusted	Federal Reserve Economic Data, Federal Reserve Bank of St. Louis

Table 2. Descriptive statistics for EMDE

Variable	Obs	Mean	Std. dev.	Min	Max
GDPg	567	4.014	5.218	-28.758	63.439
NEER	567	96.363	25.741	17.564	189.733
Poil	567	71.933	24.592	28.851	111.965
Usr	567	1.478	1.671	0.08	5.024
WGDPP	567	5.589	5.670	-5.683	14.091

Source: Author's calculations using Stata and panel data for EMDEs (2003–2023)

The descriptive statistics for EMDEs (table 2) show that GDP growth has a mean of 4.01% with significant variability (std. dev. of 5.22), ranging from a deep contraction (-28.76%) to strong expansion (63.44%). The Nominal Effective Exchange Rate averages 96.36, with values spanning from 17.56 to 189.73, indicating diverse currency strength across countries. Oil prices have a mean of \$71.93 per barrel, fluctuating between \$28.85 and \$111.97. The US Federal Funds Rate remains relatively low on average (1.48%), with a maximum of 5.02, reflecting global monetary conditions. Lastly, World GDP averages 5.59% but varies widely (-5.68% to

14.09%), highlighting periods of both global recessions and booms. These statistics reflect the volatility and external dependencies of EMDE economies.

Table 3. Descriptive statistics for AE

Variable	Obs	Mean	Std. dev.	Min	Max
GDPg	630	2.226	3.676	-16.040	24.615
NEER	630	101.763	12.021	71.941	207.813
Poil	630	71.933	24.590	28.851	111.965
Usr	630	1.478	1.671	0.08	5.024
WGDPP	630	5.589	5.670	-5.683	14.091

Source: Authors' calculations using Stata and panel data AEs (2003–2023)

The descriptive statistics for Advanced Economies (table 3) show that GDP growth has a lower mean (2.23%) compared to EMDEs, with less volatility (std. dev. of 3.68) and a narrower range (-16.04% to 24.62%), indicating more stable economic performance. The NEER averages 101.76, with a smaller standard deviation (12.02) than in EMDEs, suggesting more stable exchange rates. Oil prices are identical to EMDEs since they are a global variable. The US Federal Funds Rate also remains the same across both groups, reflecting its role as an external factor. World GDP has the same mean and variation as in EMDEs, as it is a common global indicator. These results highlight that AEs experience lower but more stable GDP growth, with less currency fluctuation than EMDEs.

We use the System Generalized Method of Moments (System GMM) estimator to investigate the divergent impacts of oil price, global demand and monetary policy shocks on GDP growth in Advanced Economies and Emerging Market and Developing Economies over the period 2003 to 2023 using annual data. System GMM, introduced by Arellano and Bond (1991) and refined by Blundell and Bond (1998), is well-suited for dynamic panel data models with macroeconomic variables due to its ability to address endogeneity, unobserved heterogeneity, and autocorrelation in the presence of lagged dependent variables.

The presence of endogeneity, confirmed through statistical tests, arises due to the potential reverse causality between GDP growth and the explanatory variables. System GMM addresses

this endogeneity by using lagged levels and lagged differences of the explanatory variables as instruments. The underlying model takes the form:

$$Y_{it} = \alpha y_{i,t-1} + \beta X_{i,t} + \mu_i + \epsilon_{i,t}$$

where $y_{i,t}$ is GDP growth rate for country i at time t , $X_{i,t}$ is vector of explanatory variables (NEER, oil price, US federal funds rate, world GDP), μ_i is unobserved country-specific effects, $\epsilon_{i,t}$ stands for error term.

First-differencing eliminates fixed effects:

$$\Delta y_{i,t} = \alpha \Delta y_{i,t-1} + \beta \Delta X_{i,t} + \Delta \epsilon_{i,t}$$

System GMM combines this first-differenced equation with the level equation to improve efficiency by using lagged differences of the explanatory variables as instruments for the level equation and lagged levels as instruments for the differenced equation. This approach strengthens instrument validity and improves estimation efficiency, particularly when the panel is relatively short in terms of time periods. The presence of endogeneity, confirmed through statistical tests, along with the fact that some explanatory variables were found to be stationary at the first difference, justified the use of System GMM.

To ensure instrument validity and detect potential endogeneity issues, we conduct the Difference-in-Hansen test, which assesses the validity of over-identifying restrictions and checks whether the instrument set is exogenous (i.e., uncorrelated with the error term). The test equation is given by:

$$J_D = (\theta_{GMM} - \theta_{IV})' [V_{GMM}^{-1} - V_{IV}^{-1}] (\theta_{GMM} - \theta_{IV})$$

Where:

- θ_{GMM} is the GMM estimator (including the instrument set).
- θ_{IV} is the IV estimator using a different instrument set (typically the "inner" instrument set).
- V_{GMM} is the variance-covariance matrix of the GMM estimator.
- V_{IV} is the variance-covariance matrix of the IV estimator.

The statistic J_D follows a chi-squared distribution with degrees of freedom equal to the number of over-identifying restrictions (instruments minus the number of endogenous regressors). This test helps validate the choice of instruments and ensures robustness in the estimation.

The decision to use only five explanatory variables is grounded in both theoretical and methodological considerations. In macroeconomic modeling, a compromise must be found between including a sufficient number of variables to capture the main drivers of economic growth and maintaining a parsimonious model to avoid overfitting and multicollinearity. The five selected variables represent the most important channels through which external shocks affect GDP growth. This selection aligns with well-established macroeconomic frameworks that emphasize the interaction of exchange rates, commodity prices, monetary policy, and global demand in driving GDP growth. System GMM is sensitive to the number of instruments, too many instruments relative to the sample size can lead to overfitting and biased estimates. Keeping the number of explanatory variables low reduces the total number of instruments generated, improving the Hansen test's validity and ensuring consistent estimates. Including only five key variables helps control the instrument-to-observation ratio, which strengthens model identification and reduces the risk of instrument proliferation. Furthermore, the focus on external shocks rather than domestic variables (e.g., inflation, fiscal policy) allows for a cleaner identification of the causal impact of external shocks without introducing noise from domestic factors. Since most variables are stationary at the first difference, using a smaller set of well-behaved variables maintains model stability and reduces the risk of misleading regression. Including more non-stationary or highly volatile variables could undermine the consistency of the GMM estimator.

We use the `xtabond2` command in Stata applying a two-step procedure with robust standard errors corrected using the Windmeijer (2005) correction to mitigate small-sample bias. The lag structure and instrument choice were tailored to the specific economic characteristics of each sample. In the case of Advanced Economies, only the first lag of GDP growth is used as an instrument lag (1 1) to account for endogeneity while avoiding overfitting and instrument proliferation, which is a common concern in stable economic environments where feedback effects are limited. The explanatory variables are entered as instruments in the level equation. This reflects the greater stability and predictable transmission of economic shocks in advanced economies. Conversely, the specification for Emerging Market and Developing Economies is

more complex due to higher volatility and structural rigidities. The lag structure is more extensive to account for the greater persistence of economic shocks and noisier data signals. Lag (1 3) of GDP growth is used as GMM instrument, reflecting the slower adjustment of EMDEs to shocks. Lag (1 2) of NEER and the US federal funds rate are included as GMM instruments to address potential endogeneity arising from volatility and monetary instability. The increased use of lags and instruments increases the statistical power of the model and strengthens identification in the presence of greater data volatility and feedback effects typical of EMDEs. The differentiated lag structure is a key methodological asset, reflecting the distinct economic realities of the two samples. The longer lag horizon for EMDEs indicates greater persistence of economic shocks, probably due to more limited shock absorption capacities and greater structural rigidities. In contrast, the shorter lag structure for AEs reflects more stable economic conditions and faster adjustment mechanisms. This personalized approach enhances the credibility of the results by taking into account structural and institutional differences between advanced and developing economies.

4. Results and discussion

The System GMM estimates show systematic differences in how external shocks affect GDP growth across AEs and EMDEs. These differences are not just a matter of size, in the case of U.S. interest rates, the sign of the effect is opposite across the two groups. Table 4 presents the full results.

Table 4. Results

Variable	AE	EMDE
Lagged GDP growth	0.274*** (0.002)	0.137** (0.022)
World GDP	0.338*** (0.000)	0.326*** (0.000)
US Federal Funds Rate	-0.407* (0.08)	0.412** (0.004)
Oil Prices	-0.016*** (0.000)	0.008 (0.171)
NEER	-0.032 (0.663)	0.024 (0.629)

<i>Model diagnostics</i>		
AR(1) p-value	0.001	0.076
AR(2) p-value	0.247	0.415
Hansen J-test	0.360	0.139
Diff-in-Hansen (levels)	0.360	0.526
N (countries)	30	27

*Note: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Two-stage System GMM with Windmeijer (2005) correction. Estimated using xtabond2 (Roodman, 2009).*

Before discussing the economic interpretation, it is important to confirm that the model is well-specified. In both samples, the AR(2) test is clearly insignificant ($p = 0.247$ for AEs; $p = 0.415$ for EMDEs), which confirms the absence of second-order autocorrelation and validates the instrument conditions. The Hansen J-test and Diff-in-Hansen tests all exceed the 10% threshold, with one exception: the oil price and world GDP instruments in levels for the EMDE sample return a p-value of 0.077, which still clears the 5% threshold. The slightly elevated AR(1) p-value for EMDEs (0.076) is not a concern, Labra and Torrecillas (2018) and Flannery and Hankins (2013) note that this pattern is consistent with the structure of dynamic panel models. Overall, the diagnostic tests confirm that the instruments are valid and that the model is not over-fitted.

a. Lagged GDP Growth

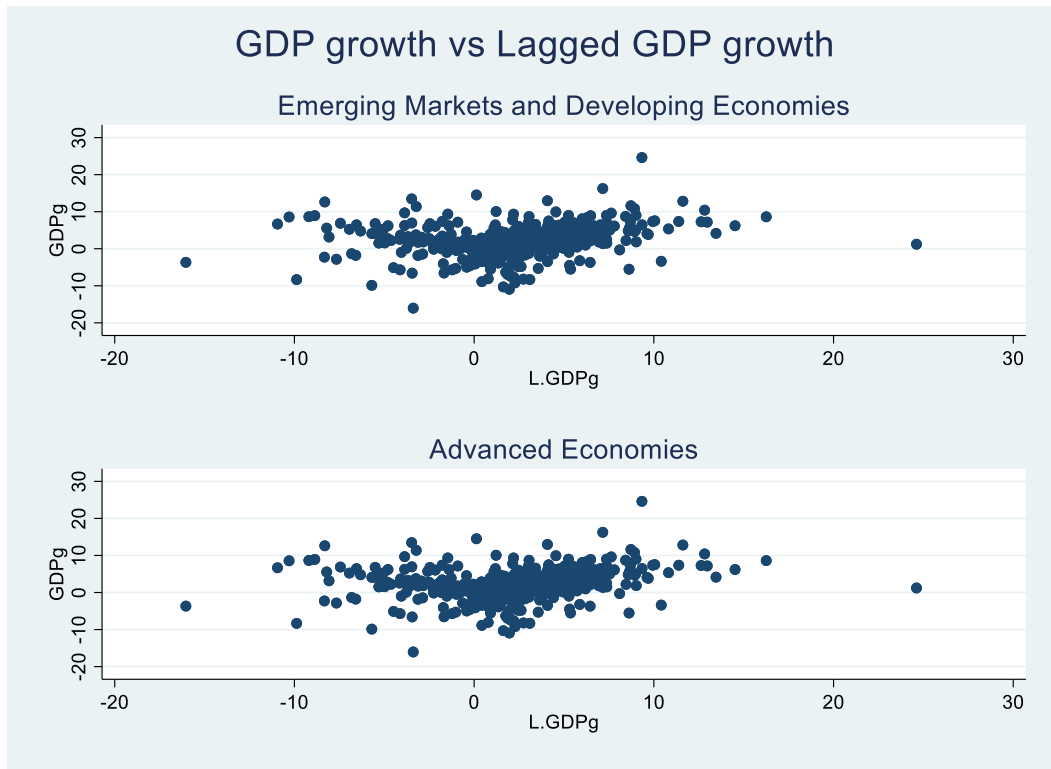


Figure 2. Relationship Between GDP Growth and Lagged GDP Growth in EMDEs and AEs

Source: authors using Stata

The coefficient on lagged GDP growth is much larger for AEs (0.274) than for EMDEs (0.137). This means that past growth is a stronger predictor of current growth in advanced economies, reflecting greater macroeconomic stability. In AEs, growth momentum is supported by independent central banks, effective automatic stabilizers, and the capacity for countercyclical fiscal and monetary policy. The Federal Reserve and the European Central Bank have consistently used interest rate adjustments and quantitative easing to prevent downturns from becoming prolonged. These institutional strengths help AEs maintain their growth trajectory even when external conditions are unfavorable, consistent with the findings of Eickmeier and Ng (2015).

In EMDEs, growth persistence is weaker because structural vulnerabilities are more likely to interrupt momentum. Commodity dependence exposes growth to terms-of-trade swings. Institutional weaknesses reduce the effectiveness of policy responses. Limited fiscal space prevents large stimulus packages. And the absence of robust social safety nets means that private consumption tends to fall sharply during downturns without the cushion of automatic

stabilizers. The COVID-19 pandemic illustrated these differences clearly: EMDE output losses were more persistent than those in AEs, with a larger share of developing countries experiencing lasting damage to their growth potential. This asymmetry is not simply a cyclical phenomenon, it reflects structural differences in policy capacity that persist across episodes.

b. World GDP

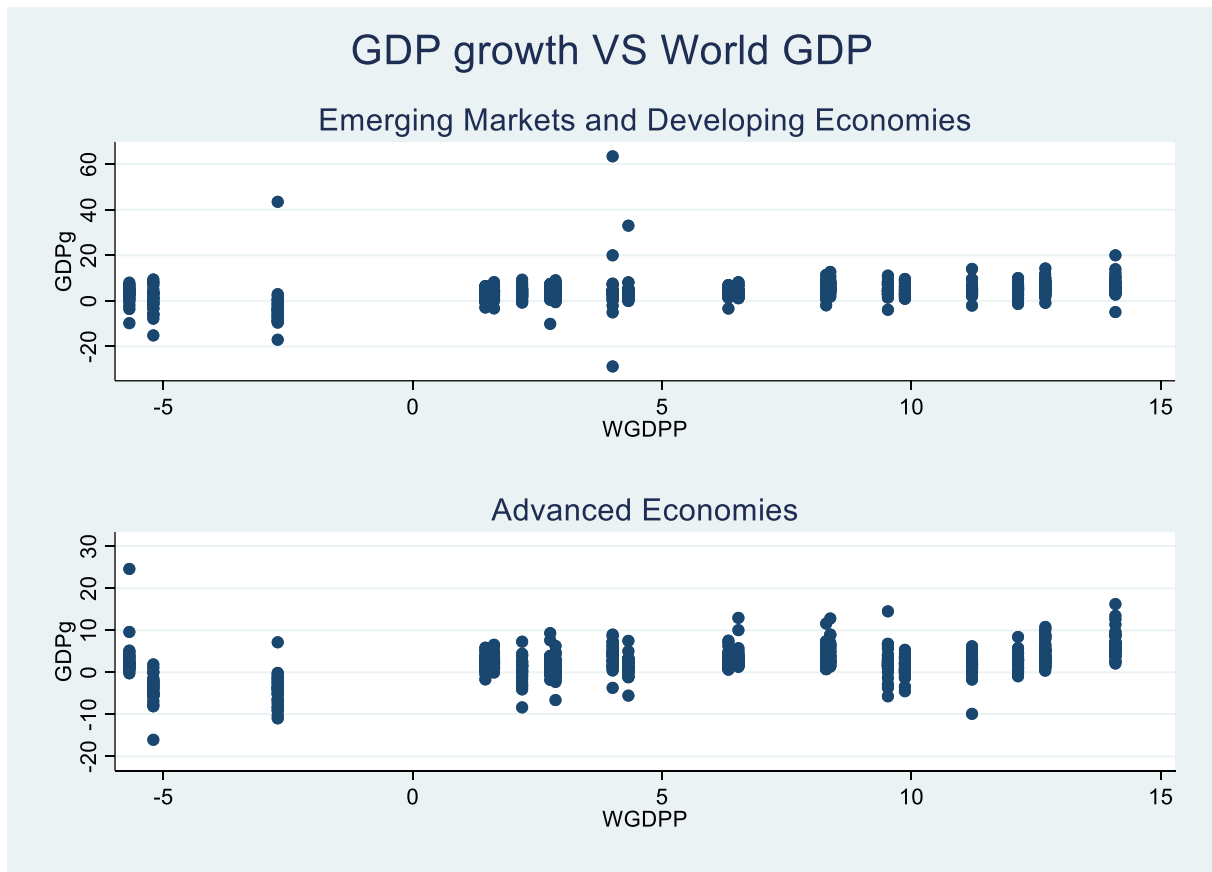


Figure 3. Relationship Between GDP Growth and World GDP in EMDEs and AEs

Source: authors using Stata

World GDP growth is a highly significant driver of domestic growth in both AEs (0.338) and EMDEs (0.326), with nearly identical coefficients. This suggests that global demand conditions matter equally for both groups on average. However, the channels through which global demand operates differ substantially, and these structural differences have important implications for resilience.

For AEs, global demand reaches the domestic economy mainly through diversified export portfolios that include high-value goods, financial services, and advanced technology. Deep

integration in global value chains allows AEs to shift production across sectors and geographies in response to changing demand patterns (Hidalgo and Hausmann, 2009; Baldwin and Freeman, 2022). Access to currency hedging instruments and derivatives provides additional insulation against the volatility that often accompanies global demand shifts.

For EMDEs, the transmission channel is narrower and more fragile. Growth is heavily tied to commodity exports and concentrated trade relationships with a small number of partners. When global demand collapses, as in 2020, fiscal buffers erode quickly, and the subsequent recovery is constrained by supply-side bottlenecks rather than a simple rebound. Carriere-Swallow et al. (2023) document this dynamic for commodity-exporting EMDEs during the 2020-2022 cycle. The similar coefficients across the two groups therefore conceal an important vulnerability gap: EMDEs face the same average global demand exposure but with far fewer tools to manage it when conditions deteriorate.

c. Federal Funds Rate

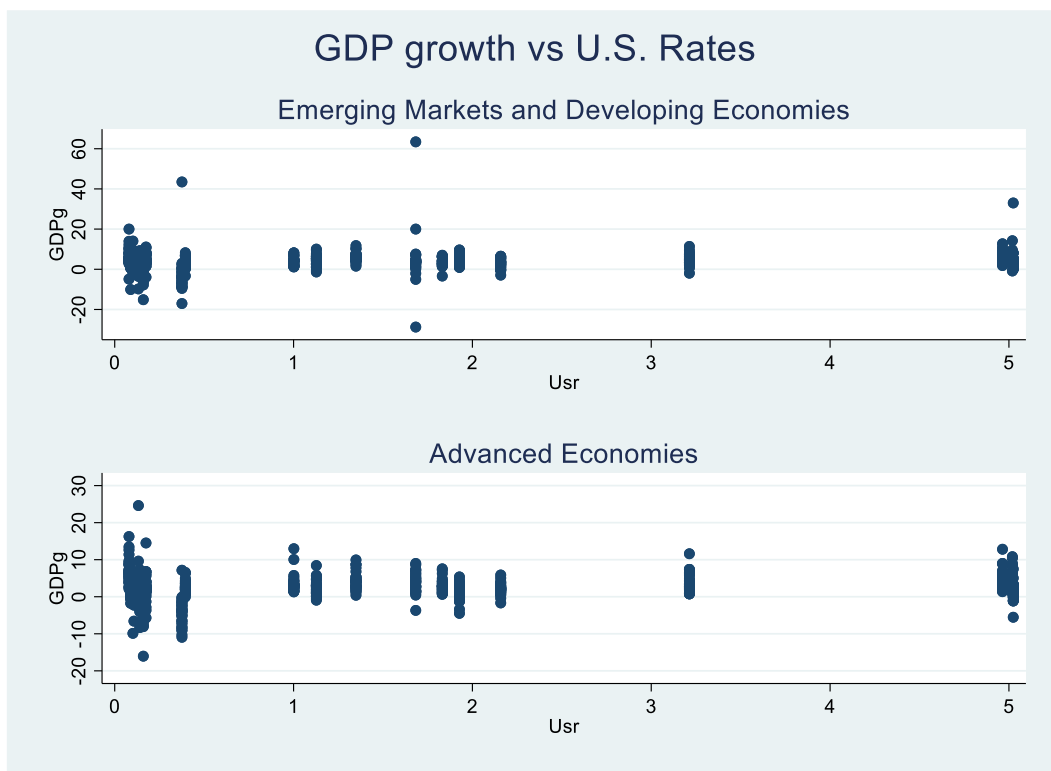


Figure 4. Relationship Between GDP Growth and U.S. Rates in EMDEs and AEs

Source: authors using Stata

The Federal Funds Rate has a negative but only marginally significant effect on AE growth (-0.407 , $p = 0.08$) and a positive and significant effect on EMDE growth (0.412 , $p = 0.004$). This sign reversal is the most striking finding in the paper, and it requires careful interpretation.

For AEs, the negative effect is in line with standard monetary transmission mechanisms: higher U.S. rates raise global borrowing costs, strengthen the dollar, reduce asset prices, and dampen investment (Bernanke and Gertler, 1995). The weak significance at 8% rather than 5% reflects the ability of AEs to absorb external monetary shocks through deep capital markets, diversified financing sources, and hedging instruments (Georgiadis, 2016; Obstfeld, 2021).

The positive EMDE coefficient is harder to interpret at face value. Higher U.S. rates would normally be expected to raise debt servicing costs for foreign-currency borrowers, trigger capital outflows, and tighten domestic financial conditions, all of which should slow growth. However, for commodity-exporting EMDEs, U.S. rate increases tend to accompany strong U.S. economic activity, which supports global commodity demand and export revenues. Aizenman et al. (2016) documented this offsetting mechanism, showing that U.S. monetary tightening can signal economic stability and improve investor sentiment toward sound EMDEs. Lastauskas and Nguyen (2024) confirm in the 2022-2023 context that commodity exporters were largely insulated from the negative spillovers of Fed tightening, while more financially vulnerable EMDEs suffered capital outflows.

The positive net coefficient for EMDEs likely reflects the composition of our sample, which includes a significant share of commodity exporters. For these countries, the income effects of stronger global demand, which accompanies U.S. expansions and rate increases, outweigh the financial tightening costs. This finding is consistent with Rey's (2015) global financial cycle framework but highlights an important heterogeneity within EMDEs that aggregate analyses often overlook.

d. Oil Prices

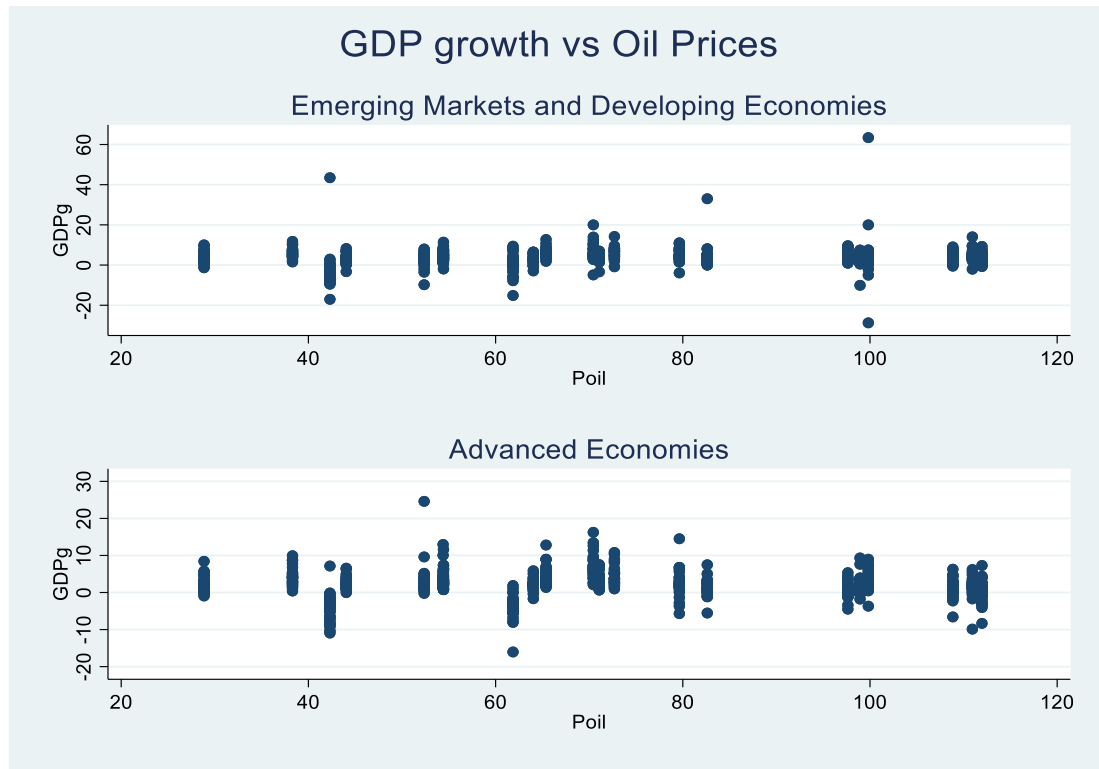


Figure 5. Relationship Between GDP Growth and Oil Prices in EMDEs and AEs

Source: authors using Stata

Oil price increases have a significant negative effect on AE growth (-0.016 , $p < 0.001$), consistent with the long-established finding that higher energy costs reduce consumer spending, raise production costs, and slow activity in energy-intensive industries (Jimenez-Rodriguez and Sanchez, 2005). The coefficient is relatively small in absolute terms, which reflects the structural reduction in oil sensitivity documented by Blanchard and Gali (2010): improved monetary policy, more flexible labor markets, and declining energy intensity in production have made advanced economies progressively less vulnerable to oil price swings since the mid-1980s.

For EMDEs, the oil price coefficient is positive but statistically insignificant (0.008 , $p = 0.171$). This result is not a data problem; it reflects genuine heterogeneity within the EMDE group. Cashin et al. (2014) show that the positive fiscal and income effects of higher oil prices for exporters tend to cancel out the negative effects for importers in aggregate panel estimates. On top of this, Hmadouch (2025) documents that oil-importing EMDEs have effectively used subsidies and price controls to limit the inflationary pass-through of global oil price shocks,

further dampening the aggregate growth effect. The combination of these two mechanisms, opposing trade positions and active policy buffering, produces the muted and insignificant aggregate result we observe.

The contrast between the two groups therefore reflects genuine structural differences in energy dependence and policy capacity, not estimation issues. AEs remain oil-sensitive despite efficiency improvements. EMDEs present a heterogeneous picture that averages out in aggregate but would likely reappear clearly if the sample were split between oil exporters and importers.

e. Nominal Effective Exchange Rate

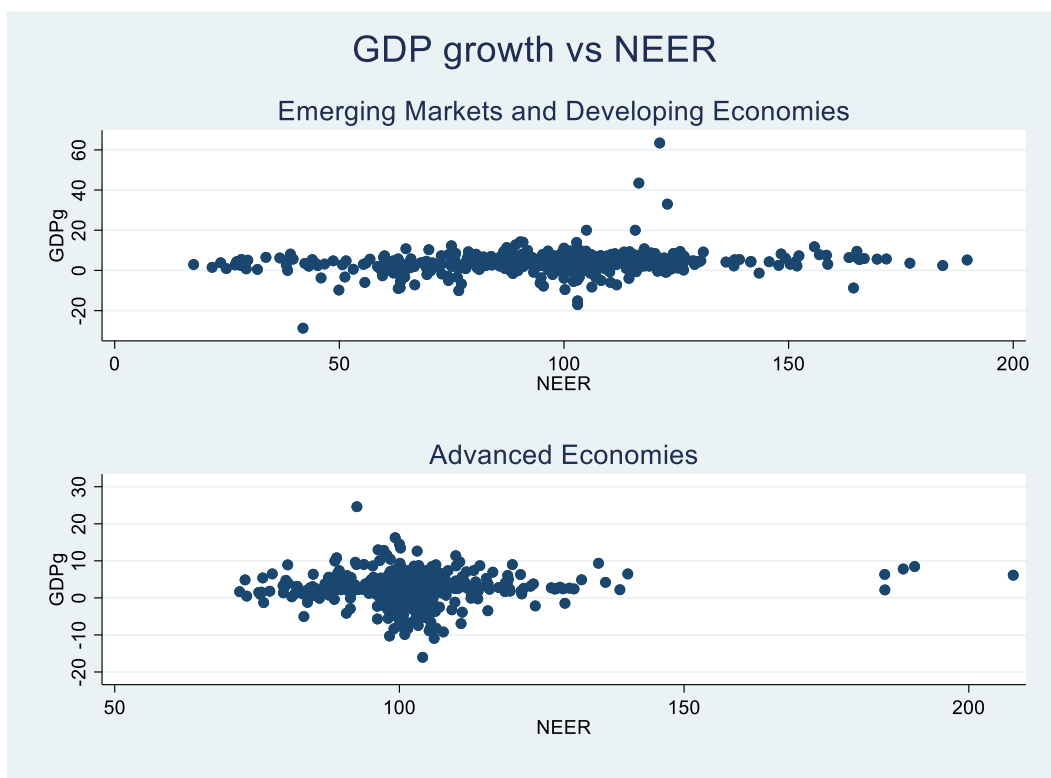


Figure 6. Relationship Between GDP Growth and NEER in EMDEs and AEs

Source: authors using Stata

The NEER is insignificant for both AEs (-0.032 , $p = 0.663$) and EMDEs (0.024 , $p = 0.629$). This result challenges the traditional view that exchange rate movements are a key channel through which external conditions affect economic growth. According to standard theory, a depreciation should improve export competitiveness, reduce import demand, and support GDP

growth. Our results suggest this channel is no longer operative, or is too small to detect, in either group.

For AEs, this is perhaps expected. Floating exchange rate regimes combined with forward markets, currency derivatives, and central bank coordination mean that nominal fluctuations are typically absorbed before they have lasting real economy effects. Even export-oriented economies like Germany and Japan appear to manage competitiveness through their position in global value chains rather than through exchange rate pricing.

The EMDE result is more surprising given the historical record of contractionary depreciations. Several developments help explain it. Gopinath et al. (2020) show that most global trade is priced in U.S. dollars, which means that a depreciation of the local currency does not automatically lower the dollar price of exports and so does not generate the competitiveness gains that classical theory predicts. Beyond this, Abiad et al. (2015) find that inflation targeting and improved macroeconomic frameworks have reduced exchange rate pass-through in EMDEs, and Moutaib and Lahrichi (2023) show that proactive reserve management can equalize growth outcomes across different exchange rate regimes.

This finding does not mean that exchange rates are unimportant. They still matter for inflation, financial stability, and debt sustainability. However, the direct growth channel appears to have weakened significantly in the post-crisis period, for both AEs and EMDEs. Policies focused on managing nominal exchange rates to support growth are therefore likely to have limited impact, while domestic demand, investment, and institutional quality remain the stronger determinants of growth performance.

5. Conclusion

This study examined how advanced economies and emerging market and developing economies respond to the same external shocks. Using System GMM on a panel of 57 countries from 2003 to 2023, a period that covers the 2008 financial crisis, the COVID-19 pandemic, and the 2022-2023 monetary tightening cycle, we find three main results, each of which contributes to an ongoing debate in the literature.

First, U.S. monetary policy tightening reduces AE growth marginally and increases EMDE growth significantly, a sign reversal that challenges the view that the global financial cycle contracts growth uniformly everywhere. We attribute this to the composition of the EMDE

sample, which includes many commodity-exporting countries that tend to benefit from the global demand conditions associated with U.S. economic expansions. This does not mean that all EMDEs gain from higher U.S. rates, commodity importers with high foreign-currency debt face the opposite dynamic. The result adds to a growing body of evidence, including Aizenman et al. (2016) and Lastauskas and Nguyen (2024), that EMDE exposure to U.S. monetary policy is more heterogeneous than aggregate models suggest. Future research should stratify the EMDE sample between commodity exporters and importers to test this interpretation directly.

Second, oil price increases significantly slow AE growth but have no significant aggregate effect on EMDEs. Two mechanisms explain this divergence. Within the EMDE group, the opposing fiscal and income effects of higher oil prices across exporters and importers cancel each other out in aggregate, as documented by Cashin et al. (2014). In addition, Hmadouch (2025) shows that subsidy and price control policies in oil-importing EMDEs have effectively limited the inflationary transmission of global oil shocks. For AEs, the negative effect is real but moderate, consistent with the structural decline in oil sensitivity described by Blanchard and Gali (2010).

Third, nominal effective exchange rate movements have no significant effect on GDP growth in either group. This supports the dominant currency pricing framework of Gopinath et al. (2020) and the growing evidence on reduced exchange rate pass-through associated with inflation targeting and reserve management (Abiad et al., 2015; Moutaib and Lahrichi, 2023). The traditional expenditure-switching channel appears to have weakened considerably in the post-crisis period.

These results carry different policy implications for each group. For EMDEs, the main vulnerability is financial: reliance on foreign-currency debt, limited reserves, and the absence of hedging instruments amplify the impact of external monetary shocks. Policies that build macroprudential frameworks, accumulate foreign exchange reserves, reduce external debt dollarization, and develop local currency bond markets would directly address the structural features driving EMDE vulnerability. The insignificance of exchange rate effects further suggests that currency management is not the most effective tool for smoothing the growth impact of external shocks, other levers matter more.

For AEs, the priority is energy. Oil price sensitivity remains significant despite decades of efficiency improvements, and accelerating the energy transition through renewable investment

and strategic reserve management would reduce this vulnerability. Our finding that U.S. monetary policy generates negative spillovers to other AEs also supports the case for closer international monetary coordination, particularly when designing policy normalization strategies.

Several limitations point to useful directions for future work. The pooled EMDE specification hides important heterogeneity between commodity exporters and importers that is clearly driving some of our key results. A sample split or threshold model would be the natural next step. The analysis also treats transmission channels as independent, whereas oil prices and U.S. monetary policy both influence global demand in ways that are likely nonlinear. Threshold VAR or panel smooth-transition frameworks could better capture these interactions. Finally, as more post-COVID data become available, it will be important to assess whether the transmission dynamics of the 2022-2023 tightening episode represent a lasting structural shift or a temporary anomaly.

In sum, this paper shows that vulnerability divergence between AEs and EMDEs is shaped by multiple structural factors: energy dependence, financial architecture, policy capacity, and the composition of trade relationships. Identifying which of these factors matters most in a given context is essential for designing macroeconomic policies that can withstand the persistent volatility in energy prices, capital flows, and global monetary conditions that characterizes today's international economy.

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Appendices

Table A. List of Advanced Economies and Emerging Market & Developing Economies in the Study

Advanced Economies (n=30)	Emerging Markets & Developing Economies (n=27)
Australia	Algeria
Austria	Bolivia
Belgium	Brazil
Canada	Bulgaria
Hong Kong SAR	Cameroon
Croatia	China
Cyprus	Colombia
Czech Republic	Costa Rica
Denmark	Dominican Republic
Finland	Fiji
France	Ghana
Germany	Guyana
Greece	India
Iceland	Malawi
Ireland	Mexico
Israel	Moldova
Italy	Morocco

Japan	Nicaragua
Latvia	Pakistan
Luxembourg	Paraguay
Malta	Philippines
Netherlands	Romania
New Zealand	Russian Federation
Norway	South Africa
Portugal	Tunisia
Singapore	Uganda
Slovak Republic	Ukraine
Spain	
United Kingdom	
United States	

Source: Country classification follows IMF World Economic Outlook (2023) criteria