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Global Shocks, Institutional Development, and Trade Restrictions: What Can We Learn from Crises and Recoveries Between 1990 and 2022?

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ABSTRACT

The Global Financial Crisis and the COVID-19 pandemic were two major shocks to the world economy in the 21st century. In this study, we analyze the patterns of recessions and recoveries of 101 advanced and developing economies. We identify the turning points of recessions and expansions between 1990 and 2022, and perform cross-country analysis of domestic and external drivers of economic recovery. In addition to the standard independent variables, we include institutional development, political stability, the extent of democracy, and trade restrictions indexes, and explore their roles in explaining recessions and recovery patterns. For the whole sample, we find that deeper recessions are followed by stronger recoveries, in line with Friedman's plucking model of the business cycle. However, the empirical evidence for the plucking model becomes weaker if institutional development is limited and trade restrictions are high. We show that recessions that create conflict and trade tensions differ sharply from those that do not. Finally, since developing countries tend to have weaker institutions and higher trade barriers, our evidence suggests that countercyclical monetary and fiscal policy may have to play a bigger role in cushioning global shocks in those countries. This, in turn, requires more robust and credible monetary and fiscal policy frameworks.

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1. Introduction

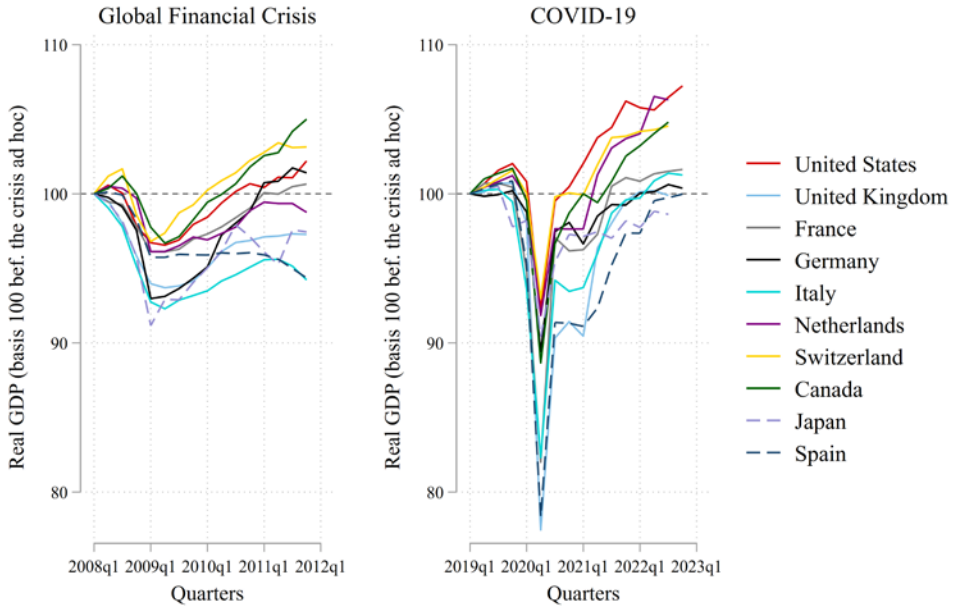
During the past 20 years, the world economy suffered two major crises, namely, the global financial crisis (the GFC hereafter) of 2008-2009 and the pandemic crisis (the COVID-19 hereafter) of 2019-2020. The drivers of the two crises are fundamentally different since one was a financial crisis while the other was a public health crisis. The origins of the GFC can be traced to the rapid growth of risky financial assets, especially subprime mortgages, which led to excessive leverage and an unsustainable housing market bubble. On the other hand, the origin of COVID-19 lay in the outbreak and the diffusion of the SARS-CoV-2 virus around the world. The GFC, also known as the Great Recession, was ultimately the result of lax financial supervision, which failed to keep up with questionable financial engineering that sought to maximize yield in a low-interest rate environment. In contrast, COVID-19, sometimes known as the Pandemic Recession (Diebold, 2020), erupted when a mysterious and deadly virus spread like wildfire across the world. However, one important common denominator between the two crises is that both impacted the entire world rather than just one region or one group of countries. Our objective is to analyze and compare the recoveries after these two global recessions. We also assess the drivers of recovery from the two crises. Such an analytical comparison is especially useful since the two crises occurred within a short period, reducing the likelihood of major structural shifts.

An important research question is to empirically explore whether the drivers of recovery after the Great Recession and the Pandemic Recession are similar or not. We will also examine the determinants of the intensity of the recessions. Do some economic and institutional factors enable greater resilience after global shocks? What are the most important drivers of recovery after 4 and 8 quarters? The answers to these questions are of utmost importance for policymakers. Indeed, empirical evidence can help policymakers tailor their policy responses to global shocks. For instance, Aizenman et al. (2024a) and Aizenman and Saadaoui (2025) provide empirical evidence that international reserves (IR), current account surpluses, financial development, and institutional quality boost economic resilience. Aizenman et al. (2024b) also found that political stability promoted resilience during US monetary tightening cycles. Exploring nonlinearities in the role of economic and institutional variables in economic recoveries is an additional contribution of our study.

Two distinct models of economic recessions can be identified. The first, a Hamiltonian recession, is derived from the pioneering work of James Hamilton (Hamilton, 1989) and foresees recessions that prevent economies from returning to their pre-crisis growth trajectory. This type of recession typically leads to a permanent reduction in an economy's productive capacity and income level. The second model

of recession, conceptualized in modern economic discourse by Milton Friedman (Friedman, 1964, 1993), assumes dynamics known as a Friedman-like recession are akin to the response of a stretched guitar string. The further the economy is pushed downward, the more forcefully it rebounds.[2] Productive capacity remains largely intact, and the economy does not suffer a permanent loss of income. The supply side remains resilient, in contrast to the Hamiltonian scenario. Countercyclical monetary and fiscal policies may yield very different results in the two models. The significance of the Hamiltonian and Friedman-like models will become clearer in Section 4, when we use them as the central framework for interpreting our main empirical results.

Figure 1. Comparing Two Recoveries: GFC Versus COVID-19 in Industrialized Economies



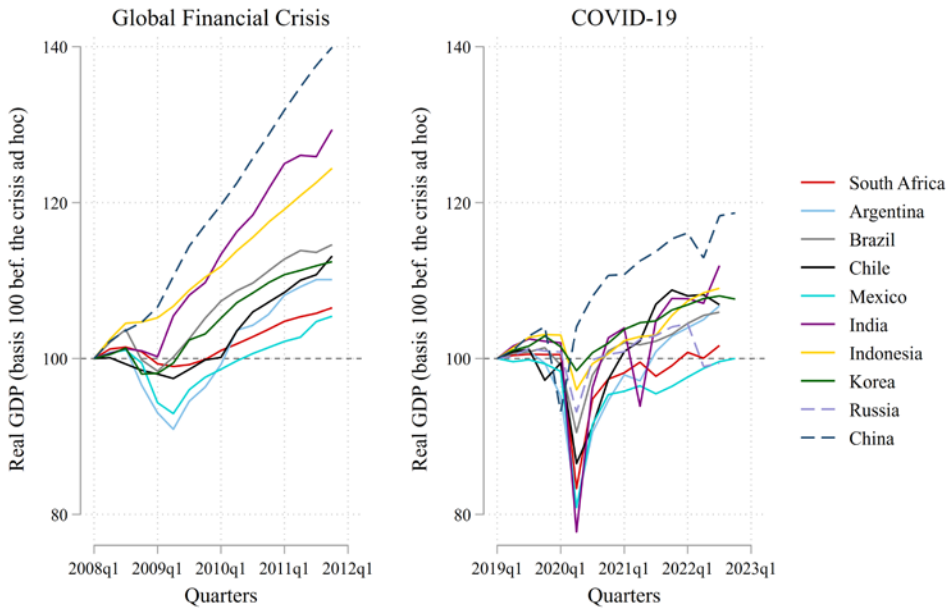
Note: The recessions are compiled using the Bry-Boschan algorithm. Real GDP is normalized to an index with 2008q1 set at 100 for the GFC and 2019q1 set at 100 for the COVID-19 crisis.
Source: Authors' calculations.

In Figure 1, we can observe a clear difference in the recovery pattern of a group of ten industrialized economies in the face of the two global shocks. GFC seems to have had a longer-lasting impact on this group, with recovery mostly sluggish. For instance, Switzerland and Canada managed to reach their pre-crisis real output level only in the first quarter of 2010. Meanwhile, the peripheral euro-area countries were subsequently hit hard by the euro crisis. On the other hand, the impact of COVID-19 was much bigger than that of the GFC, with Japan and Spain suffering real GDP losses of 20 percent. However, the

[2] This can be illustrated by the following metaphor: "Like a guitar string, the harder an economy is "plucked down", the stronger it should come back up" (Kohlscheen, Moessner and Rees, 2023).

recovery was also much faster and stronger than during the GFC. The downturn lasted less than two quarters in most cases. For instance, the US and Switzerland managed to recover their pre-crisis real output in the second quarter of 2020. Once again, the recovery was more sluggish for peripheral euro-area countries.

Figure 2. Comparing Two Recoveries: GFC versus COVID-19 in Emerging Economies

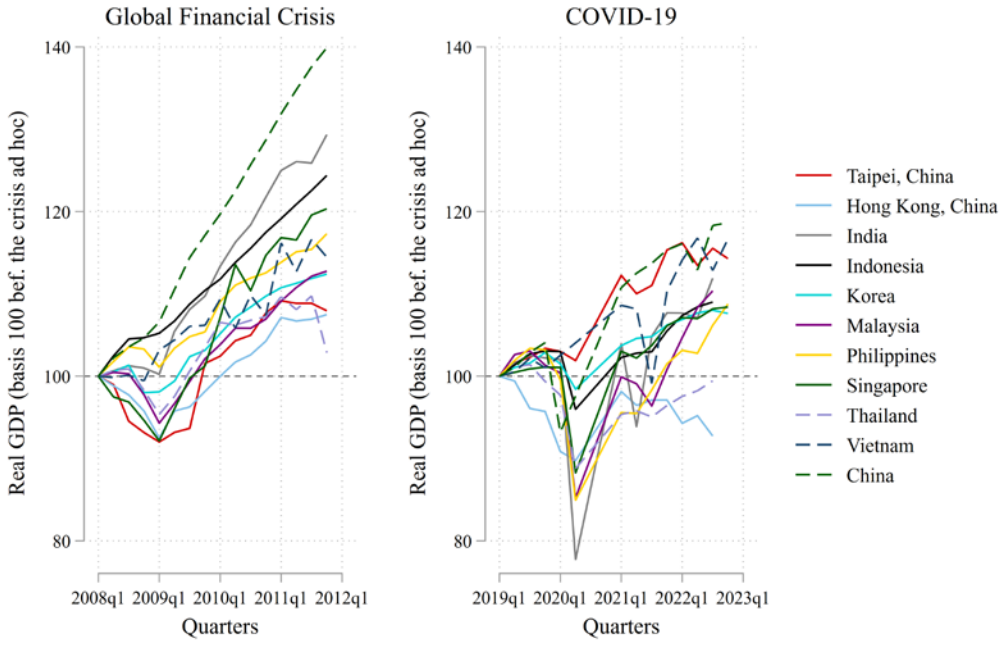


Note: The recessions are compiled using the Bry-Boschan algorithm. Real GDP is normalized to an index with 2008q1 set at 100 for the GFC and 2019q1 set at 100 for the COVID-19 crisis. We have no data for Russia during the GFC.
Source: Authors' calculations.

In Figures 2 and 3, we compare the two recoveries for a selective group of emerging market economies (EMEs) and Asian economies, respectively. In the left panels, we can observe that the recoveries after the GFC are more rapid and robust in EMEs than in industrialized countries. This is not surprising because the GFC primarily affected the economies with financially advanced economies. Among the Asian economies, we observe greater heterogeneity in the post-GFC recovery period compared to the broader group of EMEs. China, India, Indonesia, and the Philippines did not experience any decline in real GDP since the first quarter of 2008. In the left panel of Figure 2, the post-COVID-19 recovery patterns were similar between the groups of EMEs and industrialized economies. The COVID-19 recession was very short, lasting only around 2 quarters, but also very deep. For instance, India suffered a decline of more than 20 percent in its real GDP during 4 quarters. All three figures show a similar pattern, namely a severe but short downturn followed by a rapid and robust recovery. Interestingly, the real GDP of China, where

the SARS-CoV-2 first emerged before spreading globally, began to decline a quarter before the rest of the world.

Figure 3. Comparing Two Recoveries: GFC versus COVID-19 in Asia

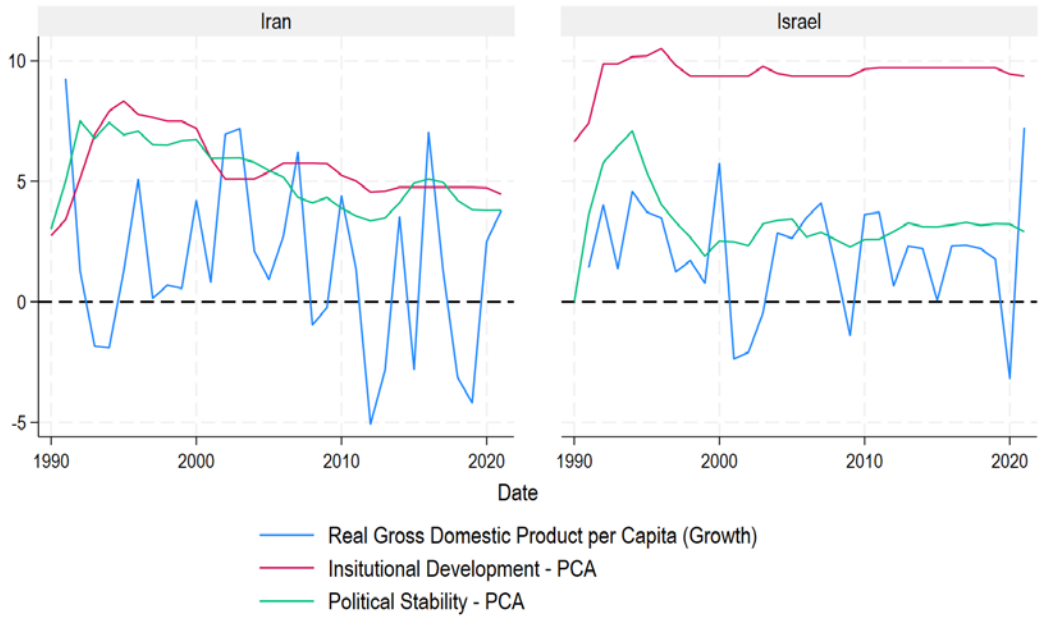


Note: The recessions are compiled using the Bry-Boschan algorithm. Real GDP is normalized to an index with 2008q1 set at 100 for the GFC and 2019q1 set at 100 for the COVID-19 crisis.
Source: Authors' calculations.

How do conflicts and other political instabilities shape economic recoveries? Following the work of Aizenman and Glick (2006), we examine whether and how conflicts and military expenditures affects economic growth, and, possibly, recoveries.

Figure 4 compares the growth patterns of Israel and Iran. Both countries face the high probabilities of conflicts and the constant threat of terrorism and wars. Israel is more developed and more democratic than Iran. The experiences of the two countries suggest that a high-conflict environment may be detrimental to economic development. In particular, if these economies experience recession, intense conflict environments may undermine market confidence, erode human and tangible capital, degrade infrastructure, and reduce overall productive capacity, all of which contribute to harming recovery.

Figure 4. Real GDP growth, institutional development, political stability



Note: The institutional development index is the principal component of the following ICRG dataset variables: bureaucracy quality, anti-corruption, law and order, and democratic accountability. A higher value indicates more institutional development. The political stability index is the principal component analysis of the following ICRG dataset: government stability, military in politics, external conflicts, religious tensions, and ethnic tensions. A higher value indicates more political stability. These indexes fluctuate between 0 and 1. Here, we multiply the indexes by twelve for readability purposes.
Source: Authors' calculations.

In the following section, we review the relevant literature. In Section 3, we present summary statistics of our variables of interest, including the onset of recession, the depth of recession, its duration, and the extent of recovery measured by the output level after four and eight quarters relative to the lower value for the GDP. In Section 4, we conduct more formal empirical analysis and examine the determinants of recession and recovery in more detail. Furthermore, we investigate the nonlinear impacts of the determinants of recession and recovery by interacting with international reserves, trade restrictions, political stability, and others. Section 5 concludes the paper.

2. Literature review

Our research relates to three different strands of literature that investigate the existence, the shape, and the consequences of recessions and recoveries. The first body of literature examines the determinants of recessions and recoveries, exemplified by Eichengreen et al. (2021, 2024). Bry and Boschan (1971) provide an example of research identifying the dates of recessions and recovery phases in the business

cycles. Eichengreen et al. (2021) also classify recessions as demand-driven, supply-driven, or both supply- and demand-driven to explain growth dynamics.

Eichengreen et al. (2024) investigate a sample of over 70 economies and find that the depth of a recession is an important factor in subsequent recoveries. Deeper recessions are associated with stronger recoveries, consistent with Friedman's plucking model (Friedman, 1993). They also find that the longer the recession, the weaker the recovery tends to be, which is consistent with Hamilton (1989) and the existence of the scarring effect and hysteresis.

Chen et al. (2024) have expanded the scope of factors influencing the characteristics of recovery by including institutional and political factors in the investigation. In particular, they provide empirical evidence that strong governmental institutions mitigate output losses and reduce the length of the recession. These findings are in line with Aizenman et al. (2024b), who find that government stability is a crucial factor for enhancing the resilience of emerging markets during the US monetary tightening cycles, more so than during the easing cycles. Chen et al. (2024) also show that various dimensions of institutional development[3] reduce the depth and the length of the recessions. According to their study, more economic and political freedom is also associated with shorter recessions.

In contrast, Cerra and Saxena (2008) empirically show that financial crises, especially twin crises (banking and currency crises), are associated with permanent output losses. Furthermore, twin political crises (civil war and stronger executive power) are also correlated with less persistent output losses. These research studies are related to our focus on the shape of recovery after adverse global shocks and examine the impacts of conflicts, trade frictions, and institutional development.

The third branch of literature is about Friedman's plucking model (Friedman, 1964, 1993). Dupraz, et al. (2025) show that the US unemployment rate is better characterized by the plucking model, rather than fluctuations around a natural rate. In particular, increases in the US unemployment rate/number are followed by similar decreases, which is in line with the plucking model that predicts deeper recessions tend to be followed by strong recoveries. Their estimations also suggest that a decrease in the US unemployment rate is not followed by a subsequent increase, contrary to what the 'natural rate' hypothesis

[3] In particular, they rely on the Economic Freedom Index of the Fraser institute (https://www.fraserinstitute.org/categories/economic-freedom), which includes five dimensions: government size, robust legal system and adequate protection of property rights, sound money, freedom to participate in international trade, and domestic regulations.

would suggest. Thus, this asymmetry in the consequence of US unemployment variation suggests the presence of welfare gains from stabilization; dampening the "pluck" is welfare improving.

Our research makes several novel contributions to the literature. First, compared to Eichengreen et al. (2021, 2024), we analyze a larger sample of industrialized and emerging countries between 1990, which kicked off a period of unprecedented trade and financial globalization, and 2022, a period of high inflation and geographical instabilities and uncertainties. Furthermore, prior to 1990, industrialized economies accounted for the bulk of recessions, which would have led to a relative paucity of emerging market recessions in our sample. Therefore, our choice of sample period allows us to gain a more profound understanding of the dynamics of recessions and recoveries in both groups of countries. As underlined by Kose et al. (2020), our sample period contains numerous global and regional shocks, including the 1991 global recession, the Asian Financial Crisis in 1997-1998, the 2001 dot-com recession, the global financial crisis (GFC) of 2008-2009, the euro area crisis of 2010-2012, and the COVID-19 recession of 2020.

Second, compared to Chen et al. (2024), we perform in-depth analyses of the drivers of economic downturns and recoveries by examining the impacts of political stability and institutional development on traditional macroeconomic explanatory variables. Previous studies do not clearly distinguish between the role of political instability and institutional development in shaping the depth of recessions and the strength of recoveries. This is partly due to the country coverage and sample period, which only included a limited number of emerging markets. Thus, it biases the sample of recession episodes to those that occurred in industrialized countries, which generally have more robust institutions.

In addition, we investigate the role of trade restrictions in the pattern of recessions and recoveries. During the last two global recessions, namely the GFC in 2009 and the COVID-19 recession in 2020, the world economy was hit by a sharp decline in international trade. The decline in trade was primarily caused by the credit crunch in financially developed industrialized countries. In contrast, the decline in trade during the COVID-19 recession was triggered by lockdowns and cross-border travel restrictions (Berthou and Stumpner, 2024). Countries with stringent trade restrictions were unable to fully benefit from the export-led growth opportunities provided by the global recovery from the two recessions.

Third, another significant contribution of our research lies in empirically testing the validity of Friedman's plucking model of the business cycles against the backdrop of fragile institutions and high trade barriers. According to Friedman's model, the deeper the recession is, the stronger the recovery. To our knowledge,

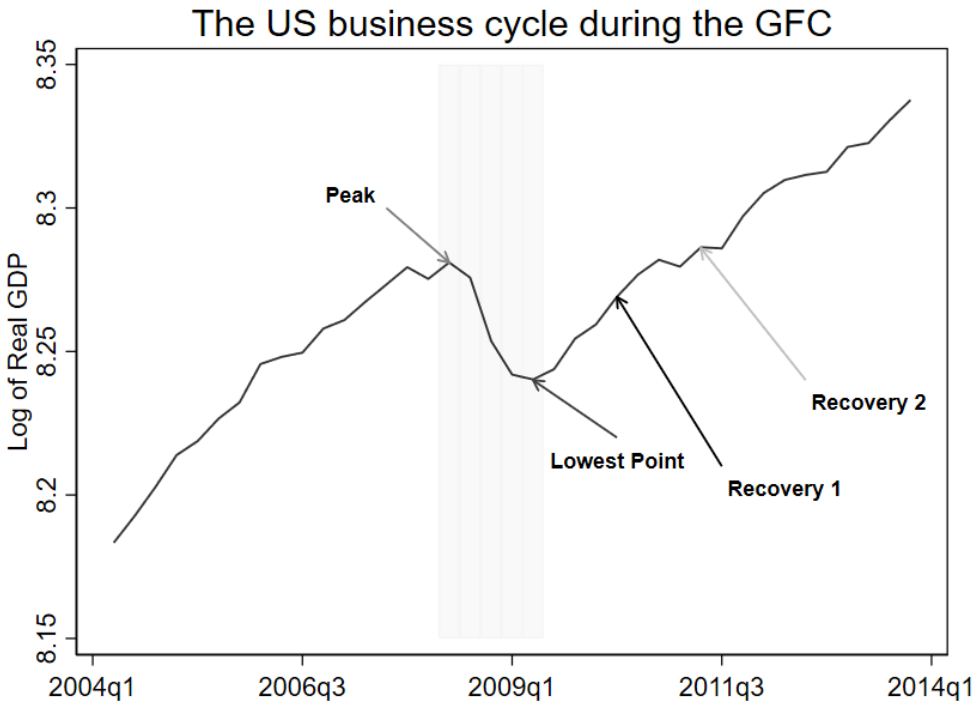
our analysis is the first to provide global empirical evidence showing that Friedman's plucking model is less relevant in describing an economy's recovery path in the presence of weak institutions and extensive trade restrictions. Our evidence is especially meaningful in the current global environment of heightened geopolitical uncertainty and intensifying trade restrictions.

3. Data

3.1. Data pertaining to economic recessions and recoveries

Our dataset consists of two groups of variables: target variables in quarterly frequency, and predictor variables about macroeconomic and institutional variables that are in annual frequency. Data descriptions and sources are presented in Appendix 1.

Figure 5. A schematic view of the US business cycle during the GFC



Note: Grey bars refer to the recession dummies identified by the Bry-Boschan (B.B.) algorithm.
Source: Authors' calculations.

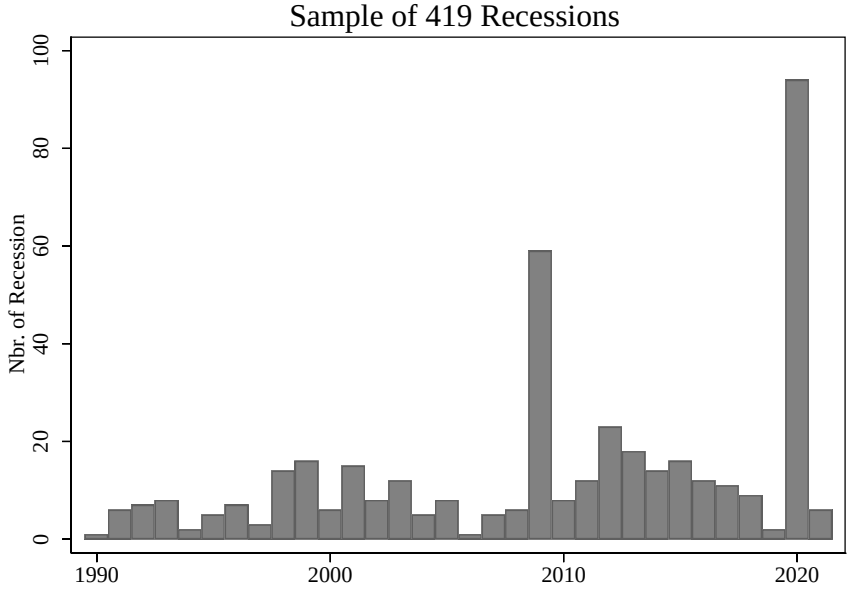
To identify economic recessions and recoveries, we use the Bry-Boschan (B.B.) algorithm. It automates the cycle-dating procedure in line with the National Bureau of Economic Research (NBER) tradition (Bry and Boschan, 1971). Essentially, this method applies specific rules regarding the series' behavior to identify peaks and troughs. In this framework, a recession spans from peak to trough, while an expansion extends from trough to peak, as we can see in Figure 5. The process begins by selecting a window for

detecting local maxima $(y_{t-k}, y_{t-1} < y_t > y_{t+1}, \dots, y_{t+k})$ and minima $(y_{t-k}, \dots, y_{t-1} > y_t < y_{t+1}, \dots, y_{t+k})$ in the reference series (parameter *k*). Then, a minimum length for each phase of the cycle—either peak to trough or trough to peak—is specified (parameter *p*). Lastly, the algorithm defines a minimum length for the entire cycle, spanning from peak to peak or trough to trough (parameter *c*).[4]

The set of target variables includes 5 variables, presented in Figures 6 to 9a and 9b: 1) the dummy for an onset of a recession; 2) the length of an identified recession in quarters; 3) the depth of a recession in percentage (as a share of GDP); and 5) the probability of recovery occurring after four and eight quarters in percentage.

Using the B.B. algorithm, we identify 419 recessions in our sample of 101 countries over the period 1990-2022. The frequency distribution of the recessions is depicted in Figure 6. We find that 59 recoveries occurred in 2009 (i.e., the GFC) and 94 occurred in 2020 (i.e., the COVID-19 crisis). Not surprisingly, the number of recessions is high in these years. Notably, the number of recessions during the COVID-19 crisis is twice as many as during the GFC, illustrating the significant impact of the pandemic. Although many EMEs experienced financial crises in the late 1990s and early 2000s, the number of recessions is not as frequent, suggesting that the crises in EMs were regionally contained.

Figure 6. Frequency distribution of the recession occurrences

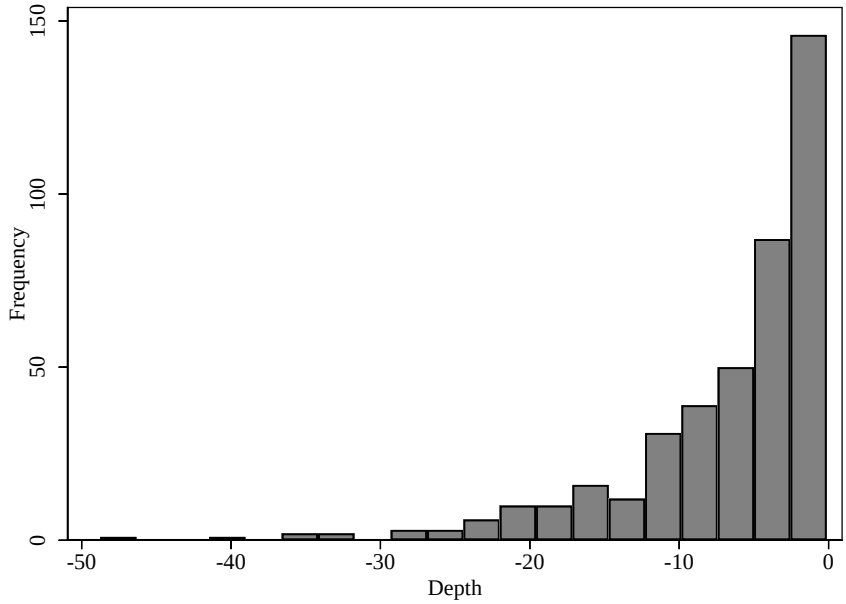


Note: We apply the Bry-Boschan algorithm to quarterly real GDP data in local currency to obtain a recession dummy variable.
Source: Authors' calculations.

[4] In our application, we follow Harding and Pagan (2002), setting $k = 2$, $p = 2$, and $c = 5$ quarters.

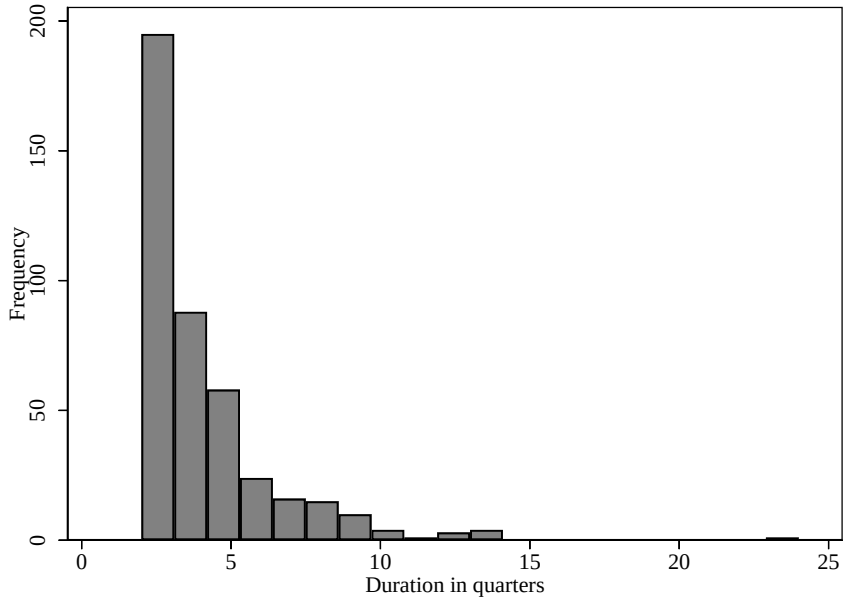
Figure 7 illustrates the frequency of the depth of economic recessions. The depth of a recession is defined as the difference between the start of the recession and the lowest point for the GDP. The average depth of the recession is equal to -6.78 percent of GDP, and the standard deviation is equal to 7.16 percent of GDP.

Figure 7. Frequency distribution of the depth of recessions



Note: We define the depth of a recession as the difference between the log of real GDP at the start of the recession and the log of the lowest point of real GDP during the recession, expressed as GDP percentage points.
Source: Authors' calculations.

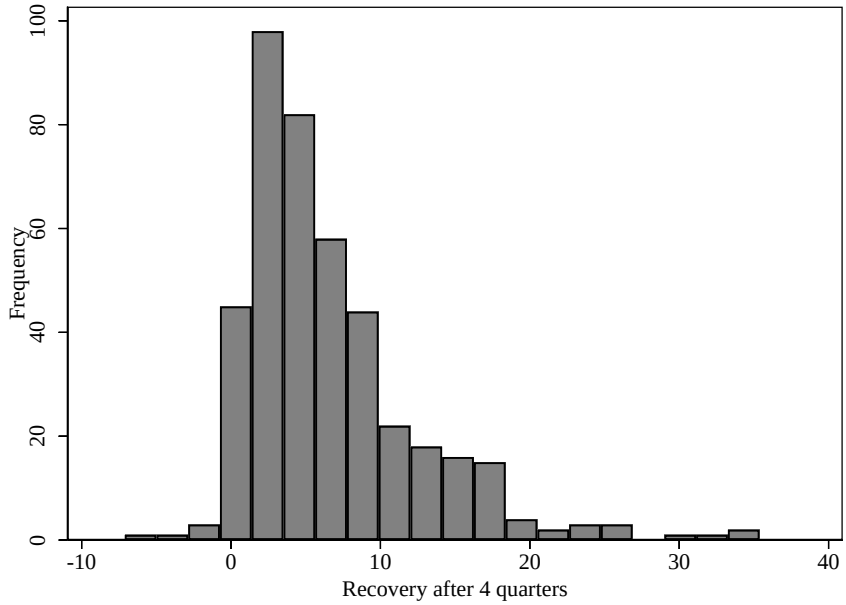
Figure 8. Length of recessions



Note: The length of a recession is measured by the number of quarters during which the economy is found to be in recession based on the Bry-Boschan algorithm. In other words, that is when the GDP series lies between two turning points: the real GDP peak and the real GDP lowest point of the recession.
Source: Authors' calculations.

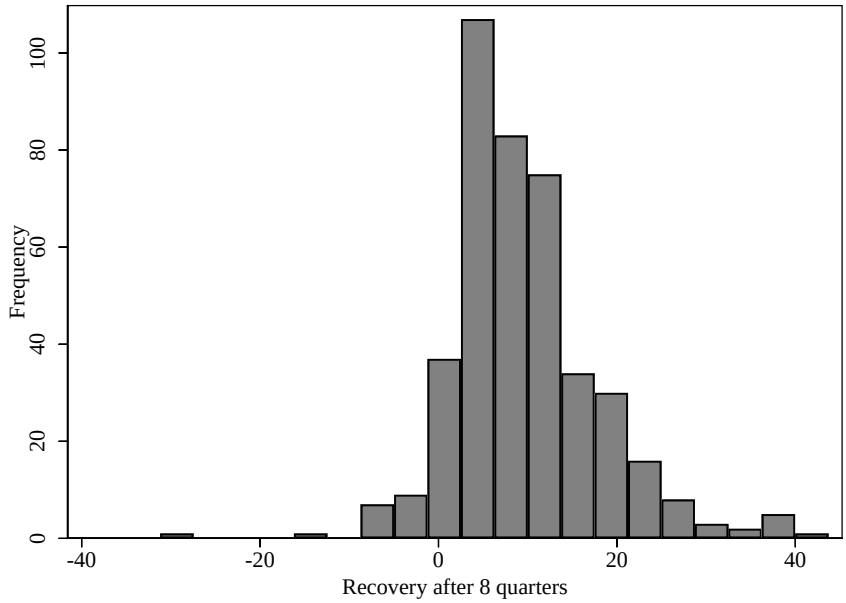
The duration of a recession, expressed in the number of quarters and shown in Figure 8, is defined as the number of quarters needed to reach the lowest point for the GDP (local minimum). The average length of the recession is 4.28 quarters, and the standard deviation is equal to 2.33 quarters.

Figure 9a. "Extent of recovery" after the *fourth* quarter since the occurrence of a recession



Note: The size of recovery as of the fourth quarter since the occurrence of the recession is computed as the difference between the log value of the real GDP four quarters after the expansion starts and the value of the real GDP at the lowest point of the recession, expressed as a percentage of real GDP.
Source: Authors' calculations.

Figure 9b. "Extent of recovery" after the *eighth* quarter



Note: The size of recovery as of the eighth quarter since the occurrence of the recession is computed as the difference between the log value of the real GDP eight quarters after the expansion starts and the value of the real GDP at the lowest point of the recession, expressed as a percentage of real GDP.
Source: Authors' calculations.

Figures 9a and 9b illustrate the "size or extent of recovery" after the *fourth* or *eighth* quarter after the onset of a recession. It is measured similarly to the previous case. The average size of recovery is 6.62 percent of GDP as of the fourth quarter after the onset of a recession, and the comparative figure for the 8th quarter is 9.57 percent of GDP.

In the regressions, we will investigate the determinants of the above variables related to recessions and recovery. Candidate variables include macroeconomic and institutional variables that are observed at the annual frequency.

Table 1 and Appendix C provide summary statistics of the variables involved in this research. The predictor variables include two sets of variables. The first is a set of macroeconomic variables identified as important in Eichengreen et al. (2024). The second set includes institutional variables, based on the principal components (PC) of ICRG variables. The first PC is the legal development based on the ratings for bureaucratic quality, anti-corruption measures, and law & order. We create the institutional development index that also includes democratic accountability in addition to the variables used for the calculation of the first PC. The second PC is the political stability index based on ICRG ratings for government stability, the lack of military in politics, and the lack of external and internal conflicts, religious tensions, and ethnic tensions. Higher levels of these ratings indicate higher levels of institutional development or political stability.

In the second group of variables, we also include the aggregate trade restrictions (Estefania-Flores et al., 2024). With the return of trade tensions and restrictions since 2018 (Bown and Kolb, 2022) at the global level, we expect that trade restrictions may influence the extent of the recoveries after the most recent recession episodes. Estefania-Flores et al. (2024) provide empirical evidence that a one standard deviation increase in aggregate trade restrictions reduces the level of output by around 0.2 percent immediately after the shock, and by 0.7 percent after 5 years. Indeed, trade restrictions may be considered a form of market inefficiency that hinders countries from recovering more strongly when the global shocks are associated with trade collapse, like during the GFC and the COVID recession.

During the recession, the level of IR holding is significantly higher than when the economy is not in a recession. This finding may confirm the buffer effect of IR during financial crises (Dominguez et al., 2010). Trade restrictions are significantly lower during the recession. Not surprisingly, the levels of

national debt and fiscal deficits are significantly higher during economic downturns than during periods not in recession.

The levels of financial development, especially the one for bank credit misalignment, are remarkably higher during recession times. During economic downturns, the proportion of economies adopting inflation targeting and floating exchange rates increases, but the difference regarding exchange rate regimes is not statistically significant.

Table 1. Descriptive statistics for the recession episodes

	No Recession 2,813 (87.0%)	Recession 419 (13.0%)	Total 3,232 (100.0%)	Test
Recession & recovery				
Depth	—	-6.78 (7.16)	-0.88 (3.44)	—
Length in quarters	—	4.28 (2.33)	0.58 (1.74)	—
Recovery after 4 quarters	—	6.62 (5.86)	0.87 (3.08)	—
Recovery after 8 quarters	—	9.57 (8.38)	1.27 (4.44)	—
Macroeconomic, financial, and other traditional variables				
Current Account Balance	-1.51 (9.52)	-0.33 (7.31)	-1.35 (9.26)	0.017
International Reserves-to-GDP ratio	14.93 (15.42)	18.26 (19.62)	15.37 (16.08)	<0.001
Gov. Net Lending	-2.04 (6.08)	-3.79 (5.01)	-2.28 (5.97)	<0.001
General Gov. Gross Debt	52.72 (34.97)	58.37 (39.17)	53.53 (35.65)	0.004
Consumer Price Inflation	21.36 (157.56)	28.70 (377.07)	22.34 (201.12)	0.493
Fuel Export on Total Exports in %	16.42 (25.01)	13.77 (22.76)	16.04 (24.72)	0.045
Fuel Import on Total Exports in %	12.98 (8.48)	12.28 (7.09)	12.88 (8.30)	0.114
De facto measure of financial openness	65.54 (25.61)	75.58 (23.85)	66.89 (25.60)	<0.001
Inflation Targeters	0.20 (0.40)	0.28 (0.45)	0.21 (0.41)	<0.001
Financial institution index [0-100]	44.15 (23.30)	51.64 (21.40)	45.12 (23.19)	<0.001
Financial market index [0-100]	28.56 (26.11)	32.01 (26.95)	29.01 (26.24)	0.012
Exchange Rate Stability Index [0-100]	57.10 (30.48)	54.58 (32.25)	56.76 (30.73)	0.127
Central Bank Independence [0-100]	64.02 (17.38)	67.68 (17.38)	64.50 (17.42)	<0.001
EMP based currency crisis dummy	0.28 (0.45)	0.31 (0.46)	0.28 (0.45)	0.276
REER misalignment	0.03 (17.77)	-0.16 (9.06)	0.00 (16.81)	0.856
Banking credit misalignment	-0.52 (8.83)	3.07 (10.30)	-0.00 (9.14)	<0.001
Institutional, political risk, and trade restrictions				
Legal development	0.56 (0.22)	0.59 (0.23)	0.56 (0.22)	0.020
Institutional development	0.58 (0.22)	0.61 (0.22)	0.58 (0.22)	0.003
Political Stability	0.68 (0.17)	0.71 (0.16)	0.68 (0.17)	<0.001
Matrix of aggregate trade restrictions	9.46 (4.37)	8.93 (4.27)	9.39 (4.36)	0.023

Note: The figures represent the mean values of the variables: 1) when the economy of concern is in a recession, 2) when the economy is not in a recession, and 3) the total. The figures in parentheses indicate the standard deviations. The last column reports the p-value from the t-test examining whether the means between the recession and non-recession samples are equal.

4. Empirical results

4.1. Baseline results

We estimate the determinants of the variables that may affect the onset of an economic recession and the characteristics of recovery, using the specification below:

$$y_{i,t} = \alpha + \beta_1 Macro_{i,t} + \beta_2 Institutional_{i,t} + \epsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is one of the four variables related to recession or recovery: 1) the onset of a recession, 2) the depth of recession, 3) its length, and 4) the size of recovery as of the eight-quarter compared to the local minimum of GDP.[5]

The vector *Macro* contains the variables related to macroeconomic conditions, while the vector *Institutional* includes the variables such as legal or institutional development, political stability, the extent of democracy, and trade restrictions.

The estimation method differs depending on the dependent variable. When we estimate the likelihood of entering a recession, we use the logit estimation model, whereas for the other three dependent variables, we use the OLS estimation method.[6]

Appendix D reports the estimation results for our four variables related to recession and recovery.[7] For each variable of recession or recovery, the estimation is conducted for the full sample (FULL), the GFC (i.e., the period from 2008 through 2010); the COVID crisis (i.e., the period from 2019 to 2021); a subsample of industrial countries (IDC)[8]; and a subsample of EMEs.[9]

First, we estimate the probability of an economy entering a recession and use the panel logit model for it. The timing of entering a recession is based on the B.B. algorithm. The set of independent variables is included in the vector of macroeconomic and institutional variables as described.[10]

This investigation may involve endogeneity or bilateral causality. To mitigate these concerns, all the independent variables are lagged for one year, except for certain cases as explained below.

The estimation results (reported in Appendix Table D-1) indicate that higher government debt or budget deficit, excessive credit creation, fuel imports, and greater EMP would lead to a higher probability of a recession. However, a higher conflict rating would increase the probability of a recession occurring, which is counterintuitive. While the impact of higher inflation is not captured in the full sample, higher inflation

[5] We also estimate the extent of recovery as of the fourth quarter compared to the deepest point of GDP. The estimation results are available from the authors upon request.
[6] The estimates shown in the tables for logit estimation results are marginal effects, not estimated coefficients.
[7] All the estimation tables omit the estimate of the constant term to preserve space although it is included in the estimations.
[8] IDC includes the countries whose IMF country codes are in the 100s except for Türkiye and South Africa.
[9] Emerging market economies are those classified as either emerging or frontier in 1980–1997 by the International Financial Corporation, plus Hong Kong and Singapore.
[10] We use annual data in all the regressions. Quarterly data estimated with the B.B. algorithm are collapsed into annual data.

does lead to a higher likelihood of the onset of a recession for the subsamples of the GFC, IDCs, and EMEs. Overall, the estimated magnitude and statistical significance of marginal effects are highly heterogeneous across different subsamples.

The estimation results of the depth of recession are reported in Appendix Table D-2 and suggest that tighter trade restrictions are associated with shallower recession during the GFC and among IDCs, though the positive sign is partially counterintuitive. One possible explanation is that trade restrictions may help mitigate the impacts of external shocks and help stabilize the economy.

The counterintuitive finding that more restricted trade is linked with less severe output loss during the GFC, especially among IDCs, contradicts the general belief that trade openness leads to more efficient resource allocations and thereby is welfare-improving. Restricting trade served as a "second-best policy" (Lipsey and Lancaster, 1956) to protect economies from global cycles and smooth output (Eichengreen & Irwin, 2010). By protecting local industries, such protectionism may preserve production and jobs in the short term (Bown & Crowley, 2013). Protective trade policy can act as a countercyclical tool to offset external shocks (Gawande, Hoekman & Cui, 2015). Nevertheless, trade protection would prevent recovery and competitiveness in the long term (Irwin, 2012).

In Appendix Table D-3, we see that the greater the bank credit misalignments, the more long-lasting a recession is. This finding matches well with what happened during the GFC and among IDCs. More stringent trade restrictions are associated with shorter recessions, which again may be inconsistent with what theory predicts. The higher the IR holding, the shorter the economic recession would be. This result is reasonable given that a large amount of IR holdings can help mitigate liquidity shortage during a recession.

The estimation of the size of recovery (as a share of GDP) as of the eighth quarter compared to the deepest local minimum is reported in Appendix Table D-4. Holding greater IR helps to achieve a higher level of output recovery according to the full sample, but the opposite is true for the EME subsample. Moderate inflation contributes to higher GDP levels as of the eighth quarter compared with the lowest point in the recovery path. The smaller the bank credit misalignment is, the better the post-recession output performance would be. The higher the EMP is, the weaker the post-recession output performance will be.

4.2. Interaction with political stability and trade restrictions

Given the heterogeneity of our sample economies, it is natural to think that the correlation between the dependent variable and some explanatory variables can be influenced by other economic conditions or policies. In other words, the estimated coefficients can be nonlinear, which could explain the reason for insignificant coefficients or results that contradict theoretical predictions.

Now, we assume that some betas in equation (1) could be affected by several third factors. We capture this possibility by including interactive terms in the estimation, as specified below:

$$y_{i,t} = \alpha + \beta_1 Macro_{i,t} + \beta_2 Institutional_{i,t} + \beta_3 Macro \times Institutional_{i,t} + \epsilon_{i,t} \quad (2)$$

Table 2a presents the results of the panel logit estimation augmented with the interaction terms: *RESGDP* × *Political stability*, *FI* × *Political stability*, and *IT* × *Political stability*. We assume that the marginal effects of *RESGDP*, *FI*, and *IT* can be affected by *Political stability*. To preserve space, we report only relevant estimated coefficients.

According to the table, worsening fiscal space (higher budget deficit or government debt), being a major fuel importer, and excessive bank credit availability are associated with a higher likelihood of recession.

Table 2a. Interaction with political stability for the recession episodes (Panel logit)

Dependent Variable: Recession Dummy	
IR as % of GDP (RESGDP)	0.026
	(0.020)
Financial Institution (FI)	0.057**
	(0.025)
Inflation Targeting (IT)	3.400***
	(0.868)
Institutional stability	7.899***
	(2.441)
RESGDP × Political stability	-0.045*
	(0.024)
FI × Political stability	-0.073**
	(0.032)
IT × Political stability	-4.307***
	(1.211)
Observations	951

Note: The estimates reported in the table are marginal effects, not estimated coefficients. To preserve space, we report only relevant estimated coefficients.
Source: Authors' calculations.

Further investigation provides an interesting interpretation of the interactive terms. For example, the positive, but insignificant estimate of *RESGDP* and the significantly negative estimate of the interaction term (*RESGDP* × *Political stability*) suggest that while *RESGDP* alone has no impact on the likelihood of the occurrence of a recession, the negative estimate of the interaction term suggests that a higher level of *Political stability* can help *reduce* the probability of the onset of a recession.

Table 2b presents the total effect of [*RESGDP* + (*RESGDP* × *Political stability*)] for the three levels of Political stability: high political stability, intermediate political stability, and low political stability, along with the statistical significance of the total marginal effects. According to the table, the threshold of *political stability* is 0.58, which means that only when the level of *political stability* is sufficiently high, holding a higher amount of *international reserves/GDP* reduce the probability of a recession.

Table 2b. Marginal effects from interactive analyses

	Marginal effect	P-value
IR as % of GDP (RESGDP)		
Low political stability (PStab = 0)	0.002	0.189
Intermediate political stability (PStab = 0.5)	0.0003	0.680
High political stability (PStab = 1)	-0.002***	0.004
Threshold of political stability = 0.58		
Financial Institution (FI)		
Low political stability (PStab = 0)	0.005**	0.029
Intermediate political stability (PStab = 0.5)	0.002*	0.092
High political stability (PStab = 1)	-0.002	0.111
Threshold of political stability = 0.78		
Inflation Targeting (IT)		
Low political stability (PStab = 0)	0.32***	0.000
Intermediate political stability (PStab = 0.5)	0.13***	0.000
High political stability (PStab = 1)	-0.12**	0.053
Threshold of political stability = 0.79		

Source: Authors' calculations.

We repeat the same exercise for the other interaction terms. The development of financial institutions (*FI*) decreases the probability of a recession when the political situation in the economy of concern is stable.

However, if the level of *political stability is low or intermediary*, the effort of developing financial institutions would more likely induce a recession.[11]

An economy with an inflation-targeting policy tends to experience a higher probability of recession if its political stability is at a low or intermediate level. The probability of a recession can be lower for an IT economy if the level of political stability is higher.

In Table 3a, we conduct a similar exercise using aggregate trade restrictions (*MATR*) instead of the *threshold of aggregate trade restrictions = 5*. We compute the marginal effects for different levels of trade restrictions (2 for the low level of trade restrictions, 5 for the intermediate level, and 19 for the high level) (Table 3b). The results again reveal important asymmetry. Higher levels of holding IR would reduce the probability of a recession, but only for low levels of trade restrictions (i.e., freer trade). This result echoes in the finding of Aizenman et al. (2024a) about the complementarity between the holding of IR and capital account restrictions in the context of terms-of-trade shocks.

Table 3a. Interaction with trade restrictions for the recession episodes (Panel logit)

Dependent Variable: Recession Dummy	
IR as % of GDP (RESGDP)	-0.030**
	(0.012)
Financial Institution (FI)	-0.024
	(0.017)
Inflation Targeting (IT)	-1.021*
	(0.527)
Measure of Aggregate Trade Restrictions (MATR)	-0.435***
	(0.142)
RESGDP × MATR	0.003
	(0.002)
FI × MATR	0.004**
	(0.002)
IT× MATR	0.159***
	(0.051)
Observations	951

Note: The estimates reported in the table are marginal effects, not estimated coefficients. To preserve space, we report only relevant estimated coefficients.
Source: Authors' calculations.

The buffer effect of IR is only observed when the economy is sufficiently open to trade. When the level of trade restriction is too high, the holding of IR is no longer associated with a reduction of the probability of a recession. Likewise, a higher level of financial institution development is associated with an increase in the probability of a recession when associated with stringent trade restrictions, but has no effect

[11] The results of the interaction with legal and institutional development are qualitatively similar.

otherwise. The inflation-targeting status is associated with an increase in the probability of recession when a higher level of trade restrictions is observed, but has no effect with a low or a moderate level of trade restrictions.

Overall, tighter trade restrictions affect the impact of macroeconomic variables on the probability of a recession. The higher the trade restrictions, the higher the probability of a recession. When trade restrictions are too high, the buffer effect of macroeconomic variables disappears.

Table 3b. Marginal effects from interactive analyses

	Marginal effect	P-value
IR as % of GDP (RESGDP)		
Low number of trade restrictions (MATR = 2)	-0.003**	0.008
Moderate number of trade restrictions (MATR = 5)	0.0018**	0.002
High number of trade restrictions (MATR = 19)	0.003	0.172
Threshold of aggregate trade restrictions = 9		
Financial Institution (FI)		
Low number of trade restrictions (MATR = 2)	-0.002	0.244
Moderate number of trade restrictions (MATR = 5)	-0.0002	0.794
High number of trade restrictions (MATR = 19)	0.006*	0.087
Threshold of aggregate trade restrictions = 5		
Inflation Targeting (IT)		
Low number of trade restrictions (MATR = 2)	-0.097	0.116
Moderate number of trade restrictions (MATR = 5)	-0.029	0.459
High number of trade restrictions (MATR = 19)	0.202***	0.000
Threshold of aggregate trade restrictions = 6		

Source: Authors' calculations.

4.3 Plucking model, political stability, and trade restrictions

In this section, we examine whether Hamilton's model or Friedman's model better represents the recovery path in the aftermath of a recession. First, we run panel OLS regressions on the size of recovery as of the fourth or eighth quarter on the depth and length of the recession as determinants. The estimation model also includes *Political Stability* and its interactions with *Depth* and *Length.* Table 5 presents the estimation

results.[12] In this section, we use panel weighted least squares with the population as the weight. The rationale behind this is that the sample economies are quite heterogeneous and that the size of the economies should matter. Hence, those heterogeneous economies should not be treated on an equal footing.[13]

Tables 4a and 4b suggest that in a stable political environment (PStab equals 1), recessions during which the GDP decreases by an additional 1 percent induce a stronger output recovery of around 0.9 percent after 4 quarters[14], and the length of the recession has no significant effects on the extent of the recovery 4 quarters later. The panel regressions with random or fixed effect regressions generate similar results, largely favoring the plucking model.[15]

Table 4a. Plucking model and political stability
(Panel weighted least square, weighting variable: population)

	(1)	(2)
	Recovery after 4 quarters	Recovery after 8 quarters
Depth	-0.163	-0.716***
	(0.145)	(0.181)
Length	-1.779	-2.978**
	(1.098)	(1.192)
Political Stability	-17.968**	-25.750**
	(8.620)	(12.780)
Depth × Political Stability	-0.729***	-0.051
	(0.193)	(0.212)
Length × Political Stability	1.375	2.784*
	(1.483)	(1.639)
Observations	383	383
R-squared	0.708	0.631

Source: Authors' calculations.

Tables 5a and 5b suggest that when the number of trade restrictions is "very low" (MATR equals 2), a recession during which the GDP decreases by one percentage point would induce a stronger output recovery of around 0.8 percent as of the fourth quarter [16], and the length of the recession has no significant effects on the extent of the recovery 4 quarters later. As a robustness check, we include fixed effects in

[12] The variables, *Depth* and *Length*, are contemporaneous variables, i.e., not lagged.
[13] In Appendix E, we consider the influence of the number of years without recession.
[14] The computation is simple here: -1 times the -0.893 coefficient in column 2 of Table 4-2.
[15] These results are available upon request.
[16] The computation is simple here: a deeper recession by 1 percent is equal to -1 times the -0.820 coefficient in column 2 of Table 5-2.

these regressions. The panel regressions with fixed effects generate similar results, largely favoring the plucking model.[17]

Our estimation exercise yields results consistent with the anecdotes of some economies. For example, Israel experienced recessions along with the high levels of political instabilities. The 2001 recession in Israel lasted 6 quarters, with output losses of around -3 percent between the peak and the lowest point. However, the real GDP barely recovered after four quarters. This episode is different from the recession in 2009 when the GFC occurred. During that crisis, the depth of the recession was only -1 percent; that is an output decrease of one percent between the peak and the lowest point. Besides, the extent of the output recovery after 4 quarters was equal to 5 percent, compared to the lowest point of that recession. As shown in Table 3, the interaction between IR and political stability may matter. The relatively good performance of the Israeli economy may be attributed to the accumulation of IR, which increased from around 17 percent to more than 28 percent between 2000 and 2007.

Table 4b: Marginal effects from interactive analyses (Recovery after 4 quarters)

	Marginal effect	P-value
Depth		
Low political stability (PStab = 0)	-0.163	0.263
Intermediate political stability (PStab = 0.5)	-0.455***	0.000
High political stability (PStab = 1)	-0.893***	0.000
Length		
Low political stability (PStab = 0)	-1.779*	0.109
Intermediate political stability (PStab = 0.5)	-1.091***	0.004
High political stability (PStab = 1)	-0.403	0.338

Source: Authors' calculations.

This can be explained by the buffer effect of IR holding explored in Aizenman and Riera-Crichton (2008). Aizenman et al. (2024) underlined that: "the mitigation effect of terms-of-trade shocks may result from reducing real exchange rate adjustments due to capital flows; thus, reducing the probability of a full-blown financial crisis, as explained by Aizenman and Riera-Crichton (2008). Dominguez (2010) explains that firms in emerging countries with underdeveloped financial markets tend to rely excessively on external financing, using a simple model of private-sector external underinsurance. Then, private firms will exhibit

[17] These results are available upon request.

underinsurance against future capital shortfall. In these countries, governments may accumulate *ex ante* reserves to mitigate this exposure."

Recession episodes with the highest levels of aggregate trade restrictions can be found in India and other EMEs. Like in many other emerging markets during the GFC, the depth of the 2009 recession in India was moderate, with output losses of around -1 percent between the peak and the lowest point. The recovery after 4 quarters was equal to more than 12 percent, compared to the lowest point. In contrast, the pandemic-driven recession in 2020 was quite deep, around -28 percent between the peak and the lowest point. Furthermore, this recession lasted longer than the 2009 recession (4 quarters), and the extent of the recovery after 4 quarters was around 18 percent, compared to the lowest point of that recession.

Table 5a. Plucking model and trade restrictions
(Panel weighted least square, weighting variable: population)

	(1)	(2)
	Recovery after 4 quarters	Recovery after 8 quarters
Depth	-0.891***	-0.945***
	(0.074)	(0.078)
Length	-0.105	0.265
	(0.405)	(0.573)
MATR	0.727**	1.115**
	(0.296)	(0.487)
Depth × MATR	0.023***	0.010
	(0.007)	(0.009)
Length × MATR	-0.071	-0.133**
	(0.050)	(0.065)
Observations	392	392
R-squared	0.681	0.652

Source: Authors' calculations.

This aligns with the evidence found in Krishna and Mitra (1998) for the Indian economy. Trade restrictions can cause market failures that negatively impact productivity. Here, the plucking model is less relevant. Trade restrictions hinder the optimal functioning of the market; that is, market equilibrium is inside the production possibilities frontier. Thus, the subsequent output recovery is weaker than with lower trade restrictions.

Table 5b: Marginal effects from interactive analyses (Recovery after 4 quarters)

	Marginal effect	P-value
Depth		
Low number of trade restrictions (MATR = 2)	-0.820***	0.000
Moderate number of trade restrictions (MATR = 5)	-0.772***	0.000
High number of trade restrictions (MATR = 19)	-0.438***	0.000
Length		
Low number of trade restrictions (MATR = 2)	-0.320	0.433
Moderate number of trade restrictions (MATR = 5)	-0.608***	0.001
High number of trade restrictions (MATR = 19)	-1.471**	0.020

Source: Authors' calculations.

5. Conclusion

The Global Financial Crisis and the COVID-19 pandemic were two major shocks to the world economy in the 21st century. In this study, we analyze the patterns of recessions and recoveries of 101 advanced and developing economies. We identify the turning points of recessions and expansions between 1990 and 2022, and perform cross-country analysis of domestic and external drivers of economic recovery.

In addition to the standard independent variables, we include institutional development, political stability, the extent of democracy, and trade restrictions indexes, and explore their roles in explaining recessions and recovery patterns. For the whole sample, we find that deeper recessions are followed by stronger recoveries, in line with Friedman's plucking model of the business cycle. However, the empirical evidence for the plucking model becomes weaker if institutional development is limited and trade restrictions are high. We show that recessions that create conflict and trade tensions differ sharply from those that do not, a relevant finding in the current global climate of heightened trade tensions and geopolitical uncertainty.

Our research makes several novel contributions to the literature. First, we analyze a larger sample of industrialized and emerging countries between 1990, which kicked off a period of unprecedented trade and financial globalization, and 2022, a period of high inflation and geographical instabilities and uncertainties. Furthermore, our choice of sample period allows us to gain a more profound understanding of the dynamics of recessions and recoveries in both groups of countries. Second, we perform a more in-

depth analysis of the drivers of recessions and recoveries by clearly distinguishing between political stability and institutional development. The failure of previous studies to make such a distinction was partly due to the relative scarcity of emerging economies in the country sample. In addition, we empirically explore the role of trade restrictions in economic recovery. Third, another important novel contribution of our research lies in empirically testing the validity of Friedman's plucking model of the business cycle (Friedman, 1964, 1993) against the backdrop of political instability and high trade barriers. To our knowledge, our analysis is the first to provide global empirical evidence showing that the Friedman's plucking model is less relevant in describing an economy's recovery path in the presence of political instability and extensive trade restrictions.

Our central empirical findings about Friedman's plucking model, which implies quick, robust recovery from even large global shocks, have significant implications for countercyclical monetary and fiscal policy in emerging economies. More specifically, recall that the empirical validity of the model is weakened in the presence of weak institutions and high trade barriers. It is important to note that relative to industrialized economies, emerging economies tend to have weaker institutions and higher tariffs. For instance, corruption is generally more prevalent and the rule of law is weaker in emerging economies, which are sometimes plagued by internal conflict based on ethnicity or religion. At the same time, emerging economies tend to impose higher tariffs to generate fiscal revenues and protect domestic firms from foreign competition. Therefore, our evidence suggests that countercyclical monetary and fiscal policy must play a bigger role in cushioning global shocks in emerging economies, since the economy is less likely to recover strongly and quickly in response to global shocks. Effective countercyclical monetary and fiscal policy, in turn, requires building robust and credible monetary and fiscal policy frameworks.

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Appendix A. Data sources and definitions

Variables	Data descriptions, Frequency,	Sources
Dummies for recessions	Economic recessions identified based on the Bry-Boschan algorithm in quarterly frequency.	Own calculations based on Haver Statistic for real GDP Haver Statistics, s_ngpc_g10
Length of a recession in quarters	Number of quarters in the recession.	Own calculations
Depth of a recession	The depth of the fall in GDP between the previous peak and the lowest point of the recession in quarterly frequency	Own calculations
Recovery after 4 and 8 quarters	Recovery in GDP after the last recession (lowest point) in percentage of GDP after 4 or 8 months	Own calculations
Current Account Balance	Percent of GDP in annual frequency.	World Bank, WDI, BN.CAB.XOKA.GD.ZS
International Reserve-to-GDP ratio	Percent of GDP in annual frequency.	World Bank, WDI, FI.RES.XGLD.CD, NY.GDP.MKTP.CD
Net International Investment Position	Percent of GDP in annual frequency.	Lane-Milesi-Ferretti, https://www.brookings.edu/articles/theexternal-wealth-of-nations-database/, authors' computations
Gov. Net Lending/Borrowing	Percent of GDP in annual frequency.	IMF, WEO, GGXCNL_NGDP
General Gov. Gross Debt	Percent of GDP in annual frequency.	IMF, WEO, GGXWDG_NGDP
CPI Inflation	Annual data, Year-on-year growth rate in CPI	World Bank, WDI, FP.CPI.TOTL.ZG
Dummy for Fuel Exports	The dummy takes the value of one when the share of fuel exports in total exports is greater than the median.	World Bank, WDI, TX.VAL.FUEL.ZS.UN
Dummy for Fuel Imports	The dummy takes the value of one when the share of fuel imports in total imports is greater than the median.	World Bank, WDI, TM.VAL.FUEL.ZS.UN
Inflation Targeter dummy	Binary variable for inflation targeters.	As for the construction of the dummy, refer to Jahan (2017).
Financial Development Index	Index that ranges between 0 and 100 shows the extent of overall financial development.	IMF, FDI, FD_FD_IX
Exchange Rate Stability Index	Measure of exchange rate stability. The index ranges between 0 and 100 in annual frequency.	Aizenman-Ito-Chinn (2013), https://web.pdx.edu/~ito/trilemma_inde xes.htm
Central Bank Independence	Measure of exchange rate stability. The index ranges between 0 and 100 in annual frequency.	Romelli, https://dromelli.github.io/cbidata/index.html
Currency crisis dummy	Based on exchange market pressure (EMP), in annual frequency.	Own calculations
De facto Measure of Financial Openness	Annual data, Index that ranges between 0 and 100.	Ito-Kawai (2014, 2024), https://web.pdx.edu/~ito/ADBIWP381.pdf
Aggregate trade restrictions	Annual data, Number of trade restrictions	Estefania-Flores et al., https://sites.google.com/view/m-atr/
Institutional development	Annual data, First principal component of bureaucracy, corruption, law & order, democratic accountability	ICRG index, PRS group, https://www.prsgroup.com/
Legal development	Annual data, First principal component of bureaucratic quality, anti-corruption, law & order	ICRG index, PRS group, https://www.prsgroup.com/
Political Stability index	Annual data, First principal component of government stability, the lack of military in politics, external conflict, religious tensions and ethnic tensions.	ICRG index, PRS group, https://www.prsgroup.com/
CPI-Based Real Effect Ex. Rate	Annual data, Basis 100 in 2010, Deviation for HP filter-ed REER series.	IMF, IFS, EREER_IX, https://data.imf.org/?sk=4c514d48-b6ba-49ed-8ab9-52b0c1a0179b
Credit from Banks, domestic to Private non-financial sector at Market value	Quarterly data transformed into annual data, Percentage of GDP, Deviation for an HP filter	BIS, Q..P.B.M.770.A, https://data.bis.org/topics/TOTAL_CREDIT/data

Appendix B. Country list

Full sample (101 countries): United States, United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Greece, Iceland, Ireland, Malta, Portugal, Spain, Turkey, Australia, New Zealand, South Africa, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela, Belize, Bahrain, Cyprus, Iran, Israel, Jordan, Kuwait, Qatar, Saudi Arabia, Egypt, Brunei, Sri Lanka, India, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, Vietnam, Botswana, Cameroon, Ghana, Lesotho, Morocco, Mozambique, Nigeria, Seychelles, Senegal, Namibia, Tanzania, Tunisia, Uganda, Zambia, Azerbaijan, Belarus, Albania, Georgia, Kazakhstan, Kyrgyz Republic, Bulgaria, Moldova, Russia, China, Ukraine, Czech Republic, Slovak Republic, Estonia, Latvia, Hungary, Lithuania, Mongolia, Croatia, Slovenia, Macedonia, Bosnia and Herzegovina, Poland, Romania.

Industrialized countries (23 countries): United States, United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Greece, Iceland, Ireland, Malta, Portugal, Spain, Australia, New Zealand.

Emerging markets (35 countries): Turkey, South Africa, Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Venezuela, Israel, Jordan, Egypt, Sri Lanka, India, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, Botswana, Ghana, Morocco, Nigeria, Tunisia, Bulgaria, Russia, China, Czech Republic, Slovak Republic, Hungary, Lithuania, Slovenia, Poland.

Europe and Central Asia (23 countries): Türkiye, Azerbaijan, Belarus, Albania, Georgia, Kazakhstan, Kyrgyz Republic, Bulgaria, Moldova, Russia, Ukraine, Czech Republic, Slovak Republic, Estonia, Latvia, Hungary, Lithuania, Croatia, Slovenia, Macedonia, Bosnia and Herzegovina, Poland, Romania.

East Asia and Pacific (13 countries): Japan, Australia, New Zealand, Brunei, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, Vietnam, China, Mongolia.

Latin America (19 countries): Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela, Belize.

Financial Centers (11 countries): United Kingdom, Belgium, Luxembourg, Netherlands, Switzerland, Ireland, Malta, Panama, Bahrain, Cyprus, Singapore.

Appendix C: Summary Statistics

	Observations	Mean	SD	Min	Max
Variables related to recessions and recoveries					
Recession Dummy	3,232	0.13	0.34	0.00	1.00
Depth	3,232	-0.88	3.44	-48.77	0.00
Length in quarters	3,232	0.58	1.74	0.00	24.00
Recovery after 4 quarters	3,232	0.87	3.08	-7.12	35.38
Recovery after 8 quarters	3,232	1.27	4.44	-31.20	43.73
Macroeconomic conditions					
Current Account Balance — CAB	2,988	-1.35	9.26	-240.49	48.21
Gov. Net Lending — GDeficit	2,892	-2.28	5.97	-151.33	43.17
General Gov. Gross Debt — GDebt	2,750	53.53	35.65	0.00	327.73
Consumer Price Inflation — Inflation	3,050	22.34	201.12	-16.86	7,481.66
Fuel Export on Total Exports in % — FUELX	2,897	16.04	24.72	0.00	99.71
Fuel Import on Total Exports in % — FUELM	2,905	12.88	8.30	0.02	66.42
Institutional development					
Financial institution index [0-100] — FI	3,232	45.12	23.19	0.00	100.00
Financial market index [0-100] — FMD	3,232	29.01	26.24	0.00	100.00
Exchange Rate Stability Index [0-100] — ERS	2,991	56.76	30.73	0.38	100.00
Reserves-to-GDP ratio — IR	3,043	15.37	16.08	0.01	137.49
Inflation Targeters — IT	3,232	0.21	0.41	0.00	1.00
Central Bank Independence [0-100] — CBI	2,933	64.50	17.42	14.20	92.90
De facto measure of financial openness — FO	1,889	66.89	25.60	5.92	100.00
Legal development — Legal	2,920	0.56	0.22	0.00	1.00
Institutional development — Institute	2,920	0.58	0.22	0.00	1.00
Political Stability — PStab	2,920	0.68	0.17	0.00	1.00
Matrix of aggregate trade restrictions — MATR	2,964	9.39	4.36	2.00	19.00
EMP based currency crisis dummy — EMP	2,827	0.28	0.45	0.00	1.00
REER misalignment — MIS_REER	2,073	0.00	16.81	-124.94	472.44
Banking credit misalignment — MIS_CREDIT	1,276	-0.00	9.14	-35.27	67.49

Appendix D Baseline regressions

Appendix Table D-1: Onset of a recession (Panel logit) marginal effects

	Full	GFC	COVID	IDC	EME
	(1)	(2)	(3)	(4)	(5)
Current Account Balance (CAB)	-0.002	0.008	-0.003	0.002	-0.007
	(0.003)	(0.013)	(0.011)	(0.005)	(0.009)
IR as % of GDP (IR)	-0.001*	-0.006	-0.002*	0.000	-0.000
	(0.001)	(0.006)	(0.001)	(0.001)	(0.002)
Budget Deficit (GDeficit)	0.010***	0.011	0.052***	0.016***	0.003
	(0.003)	(0.011)	(0.012)	(0.005)	(0.009)
Government Debt (GDebt)	0.001***	0.009***	0.001	0.002***	0.002**
	(0.000)	(0.003)	(0.002)	(0.000)	(0.001)
CPI Inflation (Inflation)	0.003	0.106**	0.014	0.034***	0.005*
	(0.003)	(0.043)	(0.107)	(0.009)	(0.002)
Fuel Exporter dummy (fuelX)	-0.024	0.119	-0.039	0.007	-0.039
	(0.026)	(0.091)	(0.086)	(0.038)	(0.032)
Fuel Importer dummy (fuelM)	0.043**	0.119	0.106	0.054*	-0.021
	(0.021)	(0.134)	(0.087)	(0.031)	(0.047)
De Facto Financial Openness (FO)	0.001	-0.010**	-0.002	0.001	-0.000
	(0.001)	(0.005)	(0.006)	(0.001)	(0.002)
Financial Institution (FI)	-0.001	0.003	0.008**	-0.003*	0.006**
	(0.001)	(0.006)	(0.003)	(0.001)	(0.003)
Financial Market Development (FMD)	0.001	-0.002	-0.003	0.003**	0.000
	(0.001)	(0.004)	(0.003)	(0.001)	(0.003)
REER misalignment (MIS_REER)	0.001	-0.001	-0.024	0.002	-0.000
	(0.002)	(0.009)	(0.021)	(0.002)	(0.004)
Banking credit misalignment (MIS_CREDIT)	0.003***	0.009***	-0.000	0.004***	-0.000
	(0.001)	(0.003)	(0.005)	(0.001)	(0.003)
Inflation Targeting (IT)	-0.018	0.318**	0.012	-0.126***	0.037
	(0.033)	(0.132)	(0.155)	(0.047)	(0.069)
Central Bank Independence (CBI)	-0.000	0.010*	-0.000	-0.001*	0.001
	(0.001)	(0.005)	(0.003)	(0.001)	(0.001)
Legal development (Legal)	0.043	1.211**	-0.461	0.129	-0.138
	(0.089)	(0.470)	(0.539)	(0.151)	(0.138)
Political Stability (PStab)	0.263**	-0.154	-0.484	0.485***	-0.072
	(0.122)	(0.496)	(0.608)	(0.154)	(0.179)
Measure of Aggregate Trade Restrictions (MATR)	-0.005	0.029*	-0.019	-0.021*	-0.010**
	(0.005)	(0.018)	(0.016)	(0.012)	(0.004)
Exchange Rate Market Pressure (EMP)	0.069***	0.082	0.014	0.083***	0.038
	(0.025)	(0.132)	(0.310)	(0.031)	(0.052)
Observations	788	90	82	505	270

Appendix Table D-2: Depth of the recession (Panel OLS)

	Full	GFC	COVID	IDC	EME
	(1)	(2)	(3)	(4)	(5)
Current Account Balance (CAB)	0.079	-0.332***	0.400	0.080	0.791
	(0.129)	(0.090)	(0.459)	(0.183)	(0.448)
IR as % of GDP (IR)	-0.056***	-0.014	-0.018	0.004	-0.001
	(0.018)	(0.020)	(0.061)	(0.038)	(0.066)
Budget Deficit (GDeficit)	0.049	0.296***	0.665	0.185	0.135
	(0.124)	(0.073)	(0.797)	(0.137)	(0.425)
Government Debt (GDebt)	-0.017	-0.011	0.036	-0.015	-0.163*
	(0.017)	(0.016)	(0.043)	(0.021)	(0.087)
CPI Inflation (Inflation)	0.141	0.104	1.822	0.219	0.398
	(0.227)	(0.279)	(1.741)	(0.424)	(0.513)
Fuel Exporter dummy (fuelX)	-1.638	0.764	-5.918**	-0.216	-7.356
	(1.059)	(0.732)	(2.884)	(1.845)	(4.198)
Fuel Importer dummy (fuelM)	1.045	-0.353	3.333	3.609*	4.486
	(1.245)	(0.776)	(3.177)	(1.718)	(3.931)
De Facto Financial Openness (FO)	-0.058	0.051	-0.059	-0.087	0.137
	(0.038)	(0.037)	(0.098)	(0.056)	(0.135)
Financial Institution (FI)	-0.009	-0.012	-0.007	0.046	-0.409**
	(0.040)	(0.028)	(0.132)	(0.057)	(0.145)
Financial Market Development (FMD)	0.025	-0.006	0.029	0.008	0.164*
	(0.035)	(0.019)	(0.096)	(0.035)	(0.089)
REER misalignment (MIS_REER)	0.014	0.012	-1.832**	-0.058	0.171
	(0.057)	(0.044)	(0.679)	(0.086)	(0.251)
Banking credit misalignment (MIS_CREDIT)	0.054	-0.170***	0.165	0.053	0.120
	(0.089)	(0.028)	(0.153)	(0.091)	(0.210)
Inflation Targeting (IT)	-1.046	-0.655	-2.996	-3.496	4.265
	(0.978)	(1.076)	(4.501)	(2.092)	(10.370)
Central Bank Independence (CBI)	-0.014	0.032	-0.007	0.006	-0.156
	(0.036)	(0.025)	(0.092)	(0.039)	(0.146)
Legal development (Legal)	5.582	7.769**	17.293	6.632	-5.701
	(3.337)	(2.888)	(20.244)	(5.645)	(29.751)
Political Stability (PStab)	21.694***	-3.702	9.985	29.714***	1.692
	(5.784)	(4.495)	(16.642)	(5.305)	(35.482)
Measure of Aggregate Trade Restrictions (MATR)	0.340	0.512***	0.600	1.170**	0.351
	(0.216)	(0.161)	(0.627)	(0.492)	(0.518)
Exchange Rate Market Pressure (EMP)	4.030***	0.405	9.062	4.702***	-4.217
	(1.457)	(1.544)	(6.464)	(1.581)	(5.612)
Observations	125	26	29	93	32
R-squared	0.305	0.967	0.736	0.359	0.616

Appendix Table D-3: Length of a recession (Panel OLS)

	Full	GFC	COVID	IDC	EME
	(1)	(2)	(3)	(4)	(5)
Current Account Balance (CAB)	0.033	0.335***	-0.105	-0.057	0.070
	(0.097)	(0.099)	(0.101)	(0.172)	(0.159)
IR as % of GDP (IR)	-0.016	0.006	-0.011*	-0.013	0.016
	(0.011)	(0.038)	(0.006)	(0.010)	(0.054)
Budget Deficit (GDeficit)	-0.062	0.002	0.197	-0.046	-0.457*
	(0.078)	(0.147)	(0.205)	(0.093)	(0.235)
Government Debt (GDebt)	0.002	0.021	-0.004	0.000	-0.022
	(0.008)	(0.032)	(0.008)	(0.012)	(0.026)
CPI Inflation (Inflation)	0.068	0.004	-0.302	0.042	0.203*
	(0.098)	(0.424)	(0.399)	(0.283)	(0.111)
Fuel Exporter dummy (fuelX)	0.726	-0.592	0.527	-0.414	3.358***
	(0.642)	(0.943)	(1.059)	(0.934)	(0.939)
Fuel Importer dummy (fuelM)	0.141	1.523	-0.348	0.100	-1.596
	(0.459)	(0.959)	(0.821)	(0.802)	(1.327)
De Facto Financial Openness (FO)	-0.003	-0.049	-0.002	0.018	-0.088**
	(0.022)	(0.057)	(0.041)	(0.030)	(0.032)
Financial Institution (FI)	-0.012	0.091**	0.005	-0.053	0.127*
	(0.023)	(0.044)	(0.046)	(0.033)	(0.066)
Financial Market Development (FMD)	0.006	-0.030	0.001	-0.000	0.013
	(0.016)	(0.022)	(0.022)	(0.023)	(0.038)
REER misalignment (MIS_REER)	-0.017	-0.025	0.274	-0.014	-0.081
	(0.033)	(0.052)	(0.266)	(0.037)	(0.115)
Banking credit misalignment (MIS_CREDIT)	0.089**	0.195***	0.036	0.096**	0.145
	(0.039)	(0.045)	(0.041)	(0.040)	(0.100)
Inflation Targeting (IT)	-0.868	2.740**	-0.226	0.256	2.587
	(0.533)	(1.294)	(1.205)	(0.616)	(2.205)
Central Bank Independence (CBI)	-0.007	0.054	-0.027	-0.016	-0.032
	(0.014)	(0.036)	(0.023)	(0.014)	(0.056)
Legal development (Legal)	-3.316	-4.776	-5.188	-2.253	4.999
	(2.222)	(2.854)	(5.267)	(4.680)	(8.728)
Political Stability (PStab)	0.406	-5.426	-1.286	-1.769	-5.072
	(2.535)	(4.291)	(2.947)	(3.857)	(7.191)
Measure of Aggregate Trade Restrictions (MATR)	-0.278**	-0.136	-0.272	-0.553***	-0.426**
	(0.114)	(0.101)	(0.251)	(0.190)	(0.163)
Exchange Rate Market Pressure (EMP)	-0.076	-0.004	-0.374	-0.473	2.073
	(0.525)	(1.706)	(1.209)	(0.564)	(1.436)
Observations	125	26	29	93	32
R-squared	0.239	0.914	0.495	0.277	0.611

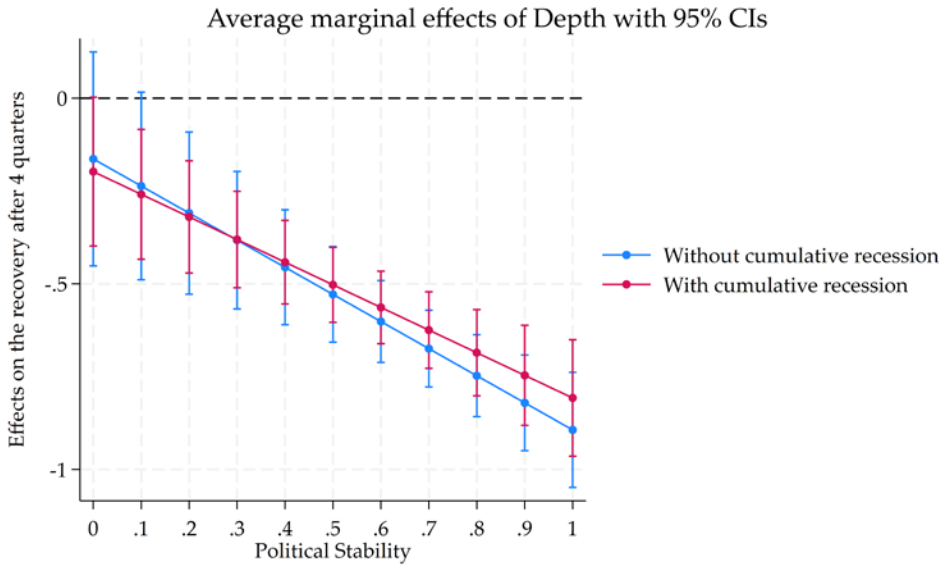
Appendix Table D-4: Recovery after 8 quarters (Panel OLS)

	Full	GFC	COVID	IDC	EME
	(1)	(2)	(3)	(4)	(5)
Current Account Balance (CAB)	-0.080	0.544*	-0.610	-0.188	-0.815
	(0.166)	(0.315)	(0.568)	(0.167)	(0.552)
IR as % of GDP (RESGDP)	0.113**	0.212*	0.012	-0.005	-0.119*
	(0.047)	(0.104)	(0.074)	(0.029)	(0.060)
Budget Deficit (GDeficit)	-0.206	-0.055	-1.025	-0.422**	0.603
	(0.179)	(0.323)	(1.006)	(0.154)	(0.348)
Government Debt (GDebt)	-0.020	-0.041	-0.020	-0.022	0.172
	(0.017)	(0.076)	(0.049)	(0.017)	(0.128)
CPI Inflation (Inflation)	-0.461*	-1.167	-0.942	-1.054***	-0.801*
	(0.253)	(1.134)	(2.383)	(0.356)	(0.398)
Fuel Exporter dummy (fuelX)	0.792	-0.070	5.550	-1.283	5.238
	(1.409)	(3.375)	(3.767)	(2.019)	(5.520)
Fuel Importer dummy (fuelM)	1.138	4.917*	-1.992	-2.427	-0.677
	(1.623)	(2.638)	(3.877)	(2.061)	(7.184)
De Facto Financial Openness (FO)	0.047	-0.101	-0.043	0.096*	-0.148
	(0.044)	(0.125)	(0.126)	(0.055)	(0.137)
Financial Institution (FI)	-0.025	0.109	-0.072	-0.086	0.248
	(0.043)	(0.104)	(0.171)	(0.053)	(0.176)
Financial Market Development (FMD)	-0.048	-0.118**	-0.035	-0.029	-0.073
	(0.038)	(0.052)	(0.127)	(0.031)	(0.168)
REER misalignment (MIS_REER)	-0.029	-0.074	0.984	0.056	-0.341
	(0.067)	(0.198)	(1.002)	(0.088)	(0.298)
Bank credit misalignment (MIS_CREDIT)	-0.238***	0.076	-0.111	-0.232**	-0.394*
	(0.081)	(0.133)	(0.185)	(0.091)	(0.197)
Inflation Targeting (IT)	0.657	1.476	-3.848	4.290*	-11.751
	(1.096)	(3.379)	(5.754)	(2.219)	(10.624)
Central Bank Independence (CBI)	0.021	0.062	-0.009	-0.001	0.250
	(0.044)	(0.108)	(0.118)	(0.040)	(0.217)
Legal development (Legal)	2.065	-15.556	2.988	6.051	3.348
	(4.241)	(13.171)	(24.820)	(6.582)	(38.071)
Political Stability (PStab)	-11.773	15.052	4.952	-20.533***	28.005
	(8.034)	(14.741)	(21.100)	(5.954)	(48.409)
Measure of Aggregate Trade Restrictions (MATR)	0.216	-0.305	-0.005	-0.802	0.036
	(0.293)	(0.571)	(0.955)	(0.589)	(0.572)
Exchange Rate Market Pressure (EMP)	-3.380*	5.045	-2.847	-5.085**	6.331
	(1.741)	(5.750)	(10.509)	(1.955)	(5.713)
Observations	125	26	29	93	32
R-squared	0.313	0.859	0.558	0.417	0.606

Appendix E. The influence of the number of years without recession

To examine how the number of years without a recession impacts recovery, a new variable is computed to count the years passed since the start of the last recession. Results from the unconditional logit regression indicate that the first lag of this variable has a positive effect on the likelihood of entering a recession. In Figures E1 to E4, the "number of years" variable is statistically significant but barely changes our main results in Section 4 of the main paper.

Appendix Figure E-1: Average marginal effects of the depth of a recession on the recovery after 4 quarters (political stability)



Appendix Figure E-2: Average marginal effects of the length of a recession on the recovery after 4 quarters (political stability)

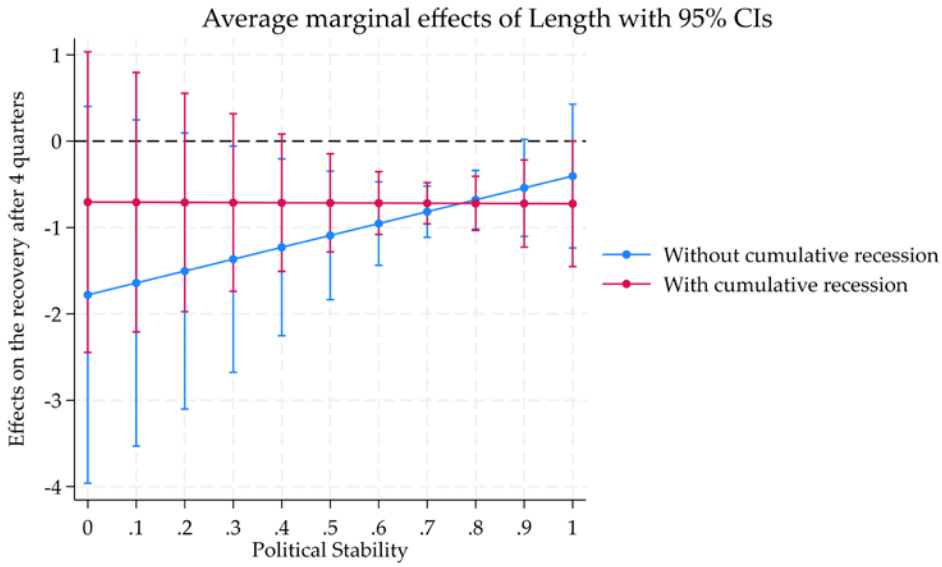
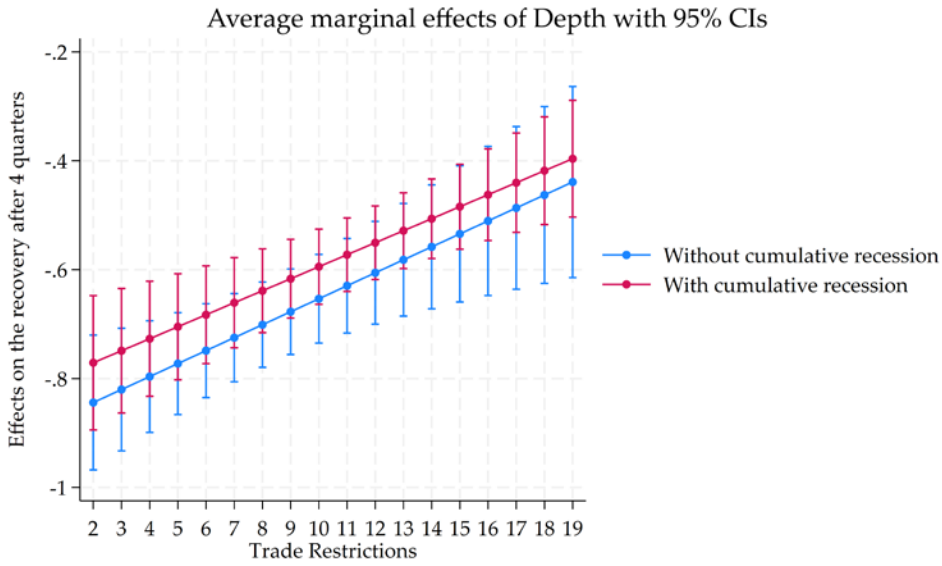


Figure E1 highlights that for countries with high political instability (PStab=0), the depth of a recession does not lead to a stronger recovery after 4 quarters. However, when political stability is intermediate or high (PStab > 0.1), a deeper recession—defined as a 1 percent decline in GDP—results in a notably stronger output recovery of about 0.9 percent after four quarters. This suggests that the positive effect of recession depth on recovery is diminished in the context of heightened political conflict.

Appendix Figure E-3: Average marginal effects of the length of a recession on the recovery after 4 quarters (trade restrictions)



Appendix Figure E-4: Average marginal effects of the length of a recession on the recovery after 4 quarters (trade restrictions)

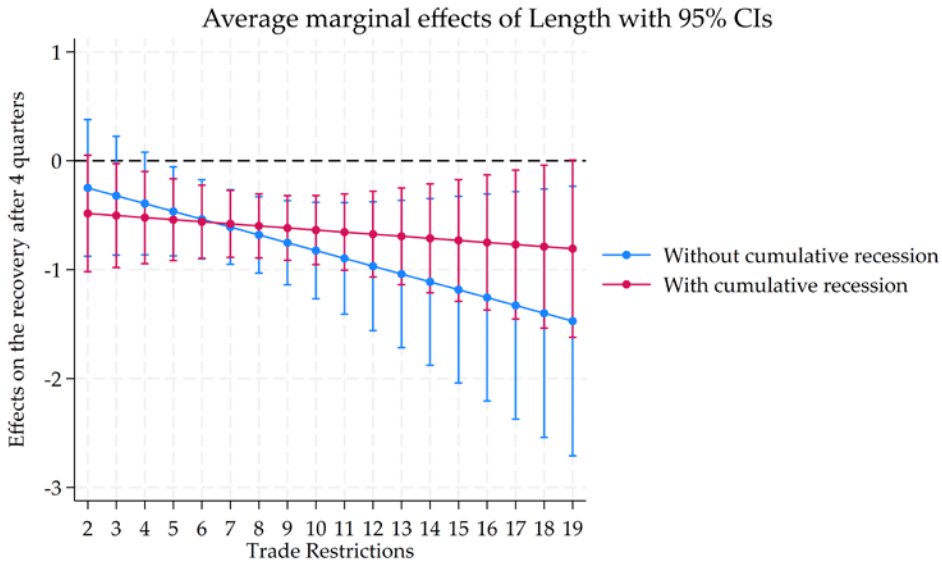


Figure E2 shows that, in countries with low political stability (PStab=0), the duration of a recession does not affect the strength of the recovery after four quarters. For countries with intermediate political stability (PStab > 0.3 and < 0.9), an additional quarter of recession is associated with a weaker recovery of -1 percent after four quarters.

Figure E3 shows that deeper recessions lead to stronger output recovery after 4 quarters, but trade restrictions reduce this effect. For example, with high trade restrictions (MATR=19), a 1% larger GDP drop leads to a 0.4% stronger recovery, while with low restrictions (MATR=2), the recovery is about 0.8%. Thus, trade restrictions weaken the positive effects of recession depth on recovery.

Figure E4 demonstrates that when trade restrictions are moderate to high (MATR=19), each additional quarter of recession results in about a 1.5% lower output recovery after four quarters. By contrast, recession length has little impact on recovery when trade restrictions are low (MATR=2).