

# Cross-Sectional Facts for International Macroeconomists CONFERENCE DRAFT

Sergio de Ferra\*  
University of Oxford

June 16, 2022

## Abstract

How do countries around the world differ in terms of output growth and current account balances? What is the distribution of economies over these two key variables in international macroeconomics? This paper presents key facts about recent trends in the global distribution of countries over current account balances and output growth rates. The analysis focuses on the years between 1997 and 2021, a period of rising integration of international financial markets during which two global crises took place.

Three main results emerge: First, during the Global Financial Crisis the dispersion of current account balances contracted, while the COVID crisis was followed by a sharp rise in this dispersion. Second, the dispersion and the positive skewness of the distribution of output growth have moved in lockstep, rising prior to the Global Financial Crisis and falling in the period between the two crises. Third, during both crises the dispersion of output growth rates rose sharply, but it was not accompanied by greater skewness. Finally, in the bivariate distribution of growth rates and current account balances, positive and negative relationships exist between the two variables in emerging and advanced economies, respectively. The United States and China, however, are entirely responsible for each, and the relationship is flat in their absence.

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\*Email: [sergio.deferra@economics.ox.ac.uk](mailto:sergio.deferra@economics.ox.ac.uk). I am very grateful to the organizers for inviting me to submit this paper to the IMF Economic Review Summer 2022 conference. I am grateful to Francesco Coppola for outstanding research assistance and to Bertrand Gruss for sharing his data. I thank seminar participants at Oxford for very helpful feedback, and in particular Andrea Ferrero, Federica Romei and Francesco Zanetti. Thanks to Michel Juillard and DBnomics for facilitating access to the data. [Link to latest draft.](#)

# 1 Introduction

Output growth and the current account balance are two crucial variables of interest for international macroeconomists. The former captures the growth in the total amount of goods and services produced by one country, thus measuring its residents' improvement in standards of living. The latter is closely related to the growth in a country's external wealth. Holdings of external assets or liabilities are determinants of a country's vulnerability to external crises, of its ability to insure against domestic shocks, and of its exposure to foreign ones. The global distributions of output growth and current account balances jointly determine the international demand and supply for goods and financial assets, and therefore key variables of interest for policy-makers such as world interest rates, exchange rates and commodity prices.

This paper empirically analyses the distribution of advanced and emerging economies over output growth rates and current account balances for the period between 1997 and 2021. In this period, two sharp and widespread recessions hit the global economy, in 2009 and 2020, and international capital market integration intensified in many countries.

A methodological contribution of this project lies in adopting techniques previously employed in the literature on heterogeneous households, workers or firms and applying them to the study of the heterogeneous countries that make up the world economy. In this sense, the paper forms part of a broader research agenda to bring together the literature on agent heterogeneity and international macroeconomics. The techniques employed to analyse the distribution of countries over output growth and current account balances are relatively simple and they amount to study means and higher-order moments of these variables for advanced and emerging economies, over periods or in the cross-section. This study of the distribution is thus informative of the behaviour of key elements of interests such as the mean output growth in the global economy, the dispersion in current account balances, the asymmetry in the distribution, as well as the relationship between the two variables when analysing their bivariate distribution.

Two main broad insights derive from the analysis of these data on the global economy. First, the world's two largest economies, the United States and China, are crucial drivers of aggregate variables for both the groups of advanced and emerging economies, as well as at the world-level. Their output growth rate is higher than the average one for advanced and emerging economies, respectively, and each has experienced a sizeable current account balance in the period considered, on average negative for the United States and positive for China. Hence, to account for the contribution of these two large economies to aggregate dynamics, the paper presents in several instances moments of the distributions computed with or without the inclusion of the two, and highlight the key resulting differences.

Second, the distribution of advanced and emerging economies over growth and current account balances has been highly non-stationary in the period considered. For both variables, considerable changes have occurred in the distribution's mean, dispersion, tails, and degree

of asymmetry in the past two decades. Significant changes have taken place both during periods of expansion in global output and during the global crises. A leading example of these changes in the distribution is the widening of the distribution of external positions, known as global imbalances, that preceded the Global Financial Crisis (GFC) of 2008-09. After the expansion in capital flows during the economic expansion, a sharp contraction in external positions occurred during the GFC. Dispersion and asymmetry also rose prior to the GFC in the distribution of countries over output growth rates, and they contracted after that. The dispersion of output growth rates also rose sharply during the COVID recession of 2020.

**Literature Review.** The paper builds on an extensive literature in international macroeconomics that documents the quantitative properties of countries' external balance and output growth. The paper's key contribution is in emphasizing the cross-sectional dimension of the analysis, drawing on insights from the literature that studies individual-level data.

First, this paper contributes to the strand of the literature on business cycles across countries and, in particular, in emerging market economies. [Uribe and Schmitt-Grohé \(2017\)](#) provide an extensive overview of business cycle facts across countries. [Aguiar and Gopinath \(2007\)](#) is a seminal contribution that also studies how the properties of the business cycle in emerging market economies differ from those in advanced economies. The key finding is that shocks to the trend in output growth are the key driver of business cycles in emerging economies, and they also drive the cyclical properties of the current account balance in those countries. This paper shares with these contributions the scope of the analysis on a wide set of countries, and the objective to highlight differences between emerging and advanced economies. The analysis here, however, focuses on the time-varying properties of the cross-sectional distributions across all economies, rather than on the time-series variation of the main macroeconomic variables within each country.

Second, research in the strand of the literature on the capital allocation puzzle has highlighted that poorer countries where capital is likely to be scarcer have not systematically received greater capital inflows. This project contributes to the strand of the literature on the capital allocation puzzle by analyzing the across-country heterogeneity in current account balances and output growth dividing the sample across advanced and emerging economies, and showing the important quantitative implications of the United States and China for both groups of countries and both variables. In particular, China contributes positively to the high average growth rate and current account surplus experienced by emerging economies, while the United States reduce the average current account balance of advanced economies but contribute positively to the average output growth rate. [Lucas \(1990\)](#) is a seminal contribution arguing that the baseline macroeconomic model would predict much larger international flows of capital from rich to poor countries than those that are empirically observed. [Gourinchas and Jeanne \(2013\)](#) document the capital allocation puzzle, arguing that capital actually flows in the opposite direction than the one that the baseline model would predict. [Benhima \(2013\)](#) shows through a model that differences across countries in uninsurable investment risk can rationalize the puzzle. [Alfaro et al. \(2008\)](#) document the

important role of sovereign-to-sovereign transactions in driving the puzzling observations.

Third, this paper is related to the research agenda on agent heterogeneity in international macroeconomics. In previous research, [de Ferra et al. \(2020\)](#) show that in small open economies, the magnitude of a recession associated with a sudden stop is amplified when households at the bottom of the income and wealth distribution are leveraged and hold foreign-currency liabilities. In [de Ferra et al. \(2021\)](#), we show that countries with greater income inequality have systematically received capital inflows from more equal countries, in the decade prior to the GFC. This paper contributes to that strand of the literature by making use of techniques developed to analyze cross-sectional household-level micro data. [Krueger et al. \(2010\)](#) present cross-sectional facts on within-country inequality, for a number of countries, and the title of this paper is an homage to that insightful research agenda.

The rest of the paper is organized as follows. Section 2 briefly describes the data used for the empirical analysis. Section 3 discusses persistent heterogeneity across countries, presenting the cross-sectional distributions over mean output growth and current account balance for the entire period. Section 4 describes the time-varying properties of the distributions of countries over the two individual variables. Section 5 describes the bivariate distribution of current account balances and output growth, in the cross-section of advanced and emerging economies.

## 2 Data

This paper uses publicly available data from the [IMF \(2022\)](#) World Economic Outlook database. The database contains data at annual frequency for a number of aggregate macroeconomic variables and for a large number of countries. The key variables of interest in this paper are countries' current account balance, expressed as a fraction of their gross domestic product, and growth in real gross domestic product.

Countries with relatively high income per capita, typically described as emerging and advanced economies, are the unit of observation throughout the analysis. These economies account for the vast majority of global output and international capital flows. In addition, data for these countries are available for sample periods that extend further in the past.

Throughout the paper, the classification of countries as either advanced, emerging or developing follows closely the methodology in [Uribe and Schmitt-Grohé \(2017\)](#). Countries are classified in the three groups according to their mean per-capita Gross Domestic Product, evaluated at purchasing power parity, for the period between 2013 and 2019. Countries with per-capita GDP of at least USD 38,000 are classified as advanced, and countries between 6,000 and 38,000 are classified as emerging. Countries for which data are not available for the full period from 1997 to 2021 are not considered. In total, the sample includes 107 countries, 75 of which are classified as emerging and 32 as advanced. Appendix [A.1](#) provides the full

list of countries in the sample and in the two groups. <sup>1</sup>

Unless otherwise specified, countries are weighted by their individual nominal GDP when computing averages or distribution quantiles. Weighting countries by nominal GDP is intuitive as it implies that the weighted average of individual countries' current account balance to GDP ratios equals the ratio of the sum of the countries' current account balances to the sum of their nominal GDP. Given the weights, larger economies thus carry a proportionally larger weight in the empirical findings. The United States and China are the two economies with the largest weights at the end of the sample, while Japan is the second-largest economy at the beginning of the sample. Given the granularity of the data, sensitivity analyses where the United States and China are excluded are presented throughout. Appendix [A.1](#) graphically presents the weights associated with the largest economies considered.

### 3 Persistent Heterogeneity and Long-Run Distributions

This section discusses the persistent heterogeneity of countries in terms of output growth rates and current account balances. Heterogeneity is persistent if countries differ in average values of the two variables computed over long periods of time. To assess the extent of this persistent heterogeneity, this section presents cross-sectional distributions of advanced and emerging economies over the means of output growth rates and current account balances, for the entire period between 1997 and 2021.<sup>2</sup>

Three key facts characterize the distribution of average output growth rates: First, this distribution is bimodal. China is an outlier, both when considering the entire sample of countries and when focusing on emerging economies, only. Second, the distribution for emerging economies is to the right of the one for advanced economies, as the former typically have experienced higher growth rates than the latter. The distributions for the two groups, however, do overlap. Third, the distribution among emerging market economies is more dispersed than the one among advanced economies, and it is positively skewed. The skewness is negative for advanced economies. United States and China are crucial drivers of these differences in dispersion and skewness.

The distributions for advanced and emerging economies over current account balances overlap to an important degree, and they are positively skewed. In addition, these distributions are multi-peaked, owing to the granularity of the data: among emerging economies, two modes are present, in correspondence of deficit countries and of China, with a positive current account surplus. Among advanced economies, the United States account for one major peak in correspondence of a deficit, with Japan, Germany and other European economies accounting for three smaller peaks in correspondence of higher current account balances.

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<sup>1</sup>Alternative classifications of economies into groups of advanced and emerging economies are, of course, possible, including the classification adopted in the IMF Fiscal Monitor.

<sup>2</sup>Appendix [A.2](#) presents the distributions excluding China and the United States.

### 3.1 Persistent Heterogeneity in Output Growth Rates

Figure 1 presents the cumulated distribution of countries over mean real GDP growth rates in the sample period.<sup>3</sup> The figure also presents the density of the distribution, obtained via a kernel density estimator, to help illustrate the location of countries over their mean growth rates.

Three main stylized facts emerge from the analysis of the distribution over mean output growth rates. First, both the joint distribution for all countries and the partial distribution for emerging economies are bimodal. Both distributions present a first local maximum close to the median growth rate of 2% and a second one in the right part of the distribution, at 8.5%. The high mode of both distributions occurs in correspondence of the growth rate of China. China is an outlier relative to the rest of economies in the sample, also if restricting attention to emerging economies, only. In addition, it is a large economy and hence it is associated with a large weight in the distribution.<sup>4</sup> Hence, the extreme growth performance of China is the ultimate driver of the bimodality of the distribution, both for emerging economies in isolation and for the overall sample of advanced and emerging economies.

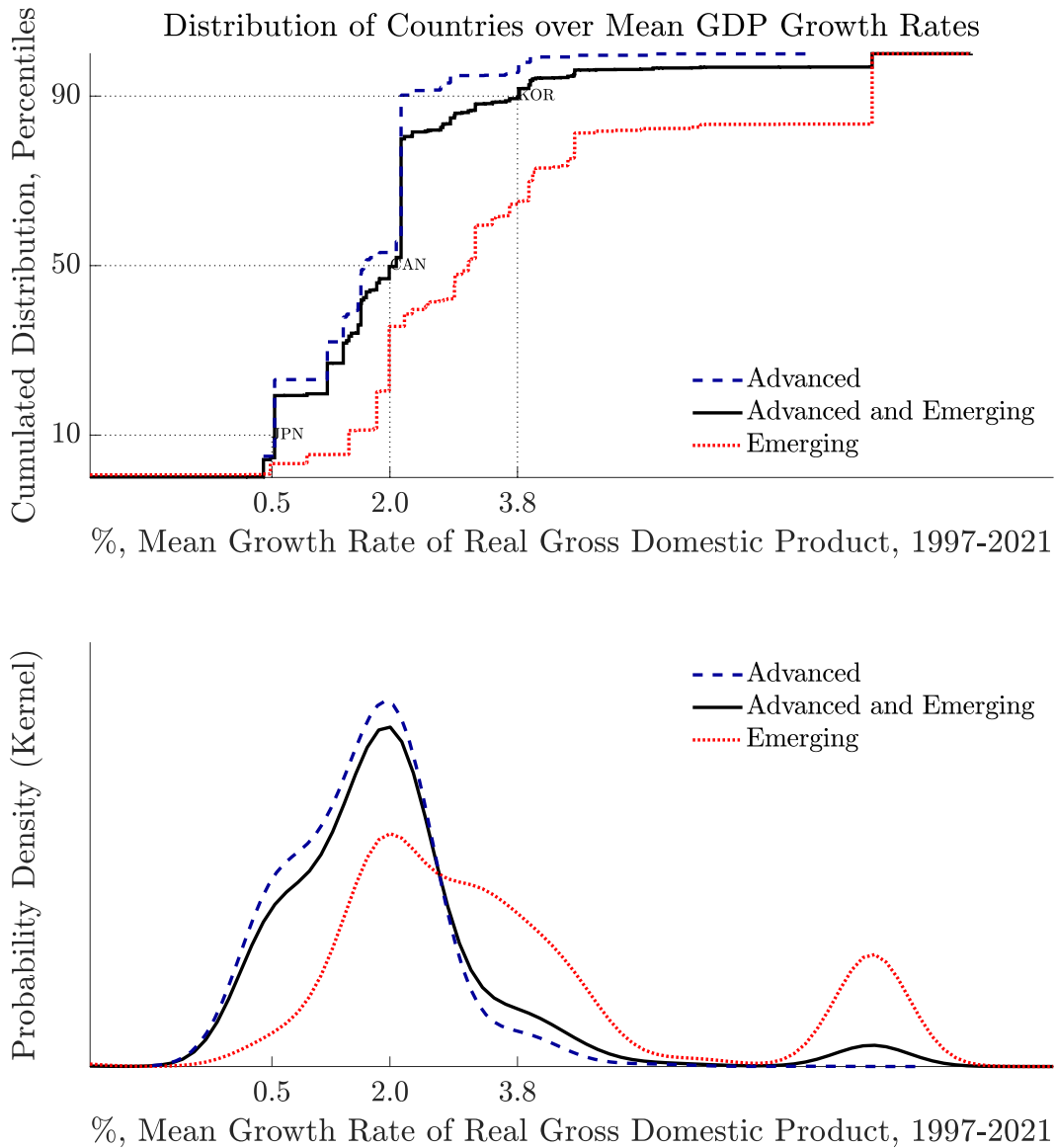
Second, the distribution for emerging economies is located to the right of the one for advanced economies. Emerging economies grow faster than advanced ones: The median growth rates among emerging economies equals 3%, 1.3 percentage points higher than the one advanced economies, that equals 1.7%. In addition, the majority of emerging economies grow faster than the fastest-growing advanced economies: 60% of the mass of the emerging economies' distribution falls to the right of the 90th percentile of the advanced economies' distribution, which equals 2.1%.

Third, dispersion and skewness of the distribution also differ between emerging and advanced economies. The distribution among emerging economies is more dispersed than the one among advanced economies. The range between the 90th and 10th percentile is of 7.1 and 1.7 percentage points for emerging and advanced economies, respectively. Skewness of the distribution is positive for emerging economies, and negative for advanced ones. Among emerging economies, the right tail of the distribution is longer than the left tail, as the ratio between the 90th-50th and 50th-10th inter-percentile ranges equals 3.4. Among advanced economies, the reverse is true, and this ratio equals 0.3. If the distributions were symmetric, these inter-percentile range ratios would equal unity. China and the United States are key drivers of the differences in dispersion and skewness across the two distributions. Excluding the biggest economy from each of the two distributions causes the magnitudes of the

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<sup>3</sup>Mean growth rates are computed as geometric averages of yearly growth rates, or as the overall growth in the sample period, to the power of the inverse of the number of years in the sample, i.e.  $\Delta\%RGDP = \left(\frac{RGDP_{i,2021}}{RGDP_{i,1997}}\right)^{\frac{1}{2021-1997}} - 1$ . The weight of each country in the distribution is equal to its initial period (1997) nominal GDP in USD, relative to total USD nominal GDP in the sample.

<sup>4</sup>Note that the weights used here are given by nominal GDP at the beginning of the sample, so that the weight of China in the overall distribution equals 3%. Using end-of-sample GDP weights, China would account for 19% of the overall distribution, thus amplifying the bimodality further.



**Figure 1.** Distribution of countries over mean growth rates of real, gross domestic product over the period between 1997 and 2021. The top panel displays the cumulated distribution of countries. The bottom panel displays the probability density, obtained via a kernel density estimator. The dashed, blue line represents the distribution for advanced economies. The solid black line represents the joint distribution for advanced and emerging economies. The dotted, red line represents the distribution for emerging economies. The weight of each country in the distribution is given by its nominal GDP at the beginning of the sample, in 1997.

dispersion to converge and makes both distributions mildly positively skewed. The 90-10 inter-percentile ratio falls to 3.1 percentage points in emerging economies and rises to 2.3 percentage points in advanced ones. The 90-50/50-10 interpercentile range ratio falls to 1.3 for emerging economies and rises to 1.6 for advanced economies.

## 3.2 Persistent Heterogeneity in Current Account Balances

Figure 2 presents the cumulated distribution of countries over mean current account balance to GDP ratios period.<sup>5</sup> As for output growth rates, the figure also presents the kernel-estimated density of the distribution.

The distribution of mean current account balances has two salient features. First, the two distributions for advanced and emerging economies overlap substantially. Both the 10th and the 90th percentiles are close across the two conditional distributions. Hence, both are close to the 10th and the 90th percentiles of the overall distribution which equal -3.4% and 4.8% of GDP respectively. The median of the overall distribution is -0.4% of GDP. The right tail of the distribution is thus longer than the left one, indicating a positive degree of skewness. The median of the emerging economies distribution equals -1.3% and it is thus lower than the one for the all distribution. The lower median for the emerging economies' distribution also indicates a greater degree of positive skewness in this group.

Second, the distributions for both advanced and emerging economies have multiple peaks. The multiple peaks are particularly evident from the observation of the estimated probability density. These peaks emerge because of the granularity of the data, as several countries in the distribution account for large individual weights, and they differ substantially in terms of current account balances. Among emerging economies, two main peaks are present, one in correspondence of a deficit of 1.9% of GDP and one in correspondence of a surplus of 3.2% of GDP. The former captures countries that ran deficits in this period, such as Brazil, Mexico, Argentina or Turkey, while China accounts for the latter. This evidence shows that many emerging economies tend to run current account deficits, with the important exception of China. Among advanced economies, a main peak is present in correspondence of the United States, with a deficit of 3.4% of GDP. Further peaks are present at 0.3%, 2.9%, and 4.8%, in correspondence of France and Italy (jointly), Japan and Germany.

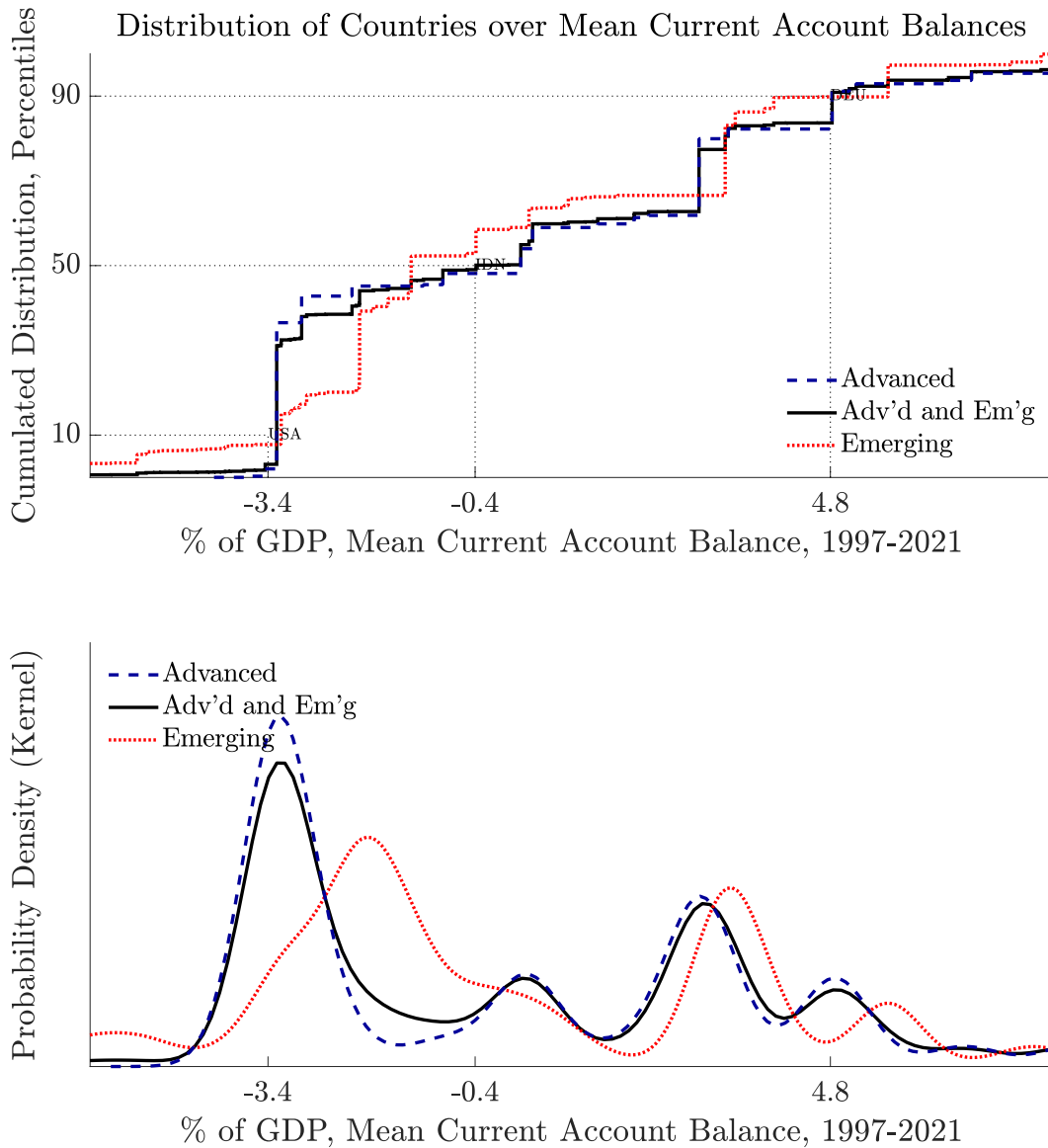
## 4 The Time-Varying Distributions of Growth and the Current Account

This section presents the key facts about the distribution of countries over output growth rates or current account balances for the past two decades. Both distributions are highly non-stationary. This non-stationarity arises from both secular trends and cyclical fluctuations in the distribution of countries over current account balances and output growth rates.

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<sup>5</sup>Mean current account balances are simply computed as arithmetic averages over the multiple years for each country. For consistency with the output growth rate distribution, the weight of each country in the distribution is again equal to its initial period (1997) nominal GDP in USD, relative to total USD nominal GDP in the sample.





**Figure 2.** Distribution of countries over mean current account balances in the period between 1997 and 2021. The top panel displays the cumulated distribution of countries. The bottom panel displays the probability density, obtained via a kernel density estimator. The dashed, blue line represents the distribution for advanced economies. The solid black line represents the joint distribution for advanced and emerging economies. The dotted, red line represents the distribution for emerging economies. The weight of each country in the distribution is given by its nominal GDP at the beginning of the sample, in 1997.

First, the section presents data for the first moments of the distributions. The yearly average current account balance and output growth rate among advanced and emerging economies, respectively are the key estimates discussed. Advanced and emerging economies differ starkly in terms of the levels and the evolution over time of average current account balance and output growth. Compared to advanced economies, emerging economies have experienced sharper fluctuations in current account balances and significantly higher output growth on

average in the past 25 years.

The United States and China play a major role in driving fluctuations for advanced and emerging economies, respectively. To isolate the effect of these two large economies, the paper also presents averages excluding them from the two groups. The exclusion of China substantially reduces the average current account and output growth rate of emerging economies. The exclusion of the United States results in a higher current account balance and a slightly lower output growth rate for advanced economies.

Second, the section describes trends in moments beyond the first one for the cross-sectional distribution of countries over current account balances or output growth rates.

The analysis of the wider distribution clarifies whether fast-growing countries have systematically diverged from slow-growing ones, or whether countries running positive current account surplus have done so relative to countries running current account deficits. To analyze trends in the tails of the distribution, this section presents yearly data about the 10th, 50th and 90th percentile of the distribution of countries. In the distribution of current account balances, the 90th and 10th percentiles diverged prior to the GFC, as current account surpluses and deficits both rose in absolute value, and they stabilized after the crisis. In the distribution of output growth rates, the 90th percentile rose before the GFC and fell in its aftermath, signalling an acceleration and deceleration in the output performance of the fastest growing economies. No corresponding upward or downward trend is instead visible in the performance of the slowest growing economies.

Trends in the dispersion of current account balances and output growth emerge clearly from the analysis of the distribution of countries. High dispersion in the the distribution of current account balances signals the presence of “global imbalances”, the simultaneous presence of countries with large positive and negative current account balances. Conversely, the dispersion contracts when countries’ external balances contract in absolute magnitude and net capital flows become less intense. Consistently with this intuition, the dispersion in current account balances rose in the period that preceded the GFC. During the crisis, this dispersion fell very sharply, and it did not return to its pre-crisis levels in the period of global recovery. After the COVID crisis, a sharp rise in this dispersion occurred in 2021.

Cross-sectional dispersion in output growth is indicative of heterogeneity in economic performance across countries. Output growth dispersion may also fluctuate over the cycle: Output growth dispersion rises during global crises if the severity of such crises is heterogeneous across countries in the world economy. This may be the case because countries are hit by shocks of heterogeneous magnitude, or because the same shock hits different countries to different degrees. Relatedly, a contraction in the dispersion of output growth during global expansions indicates that countries’ economic performance tends to converge in more tranquil times. This analysis finds that output growth dispersion rose in the lead up to the GFC, it peaked during the crisis, it contracted in the expansion that followed, and it rose again in the COVID crisis.

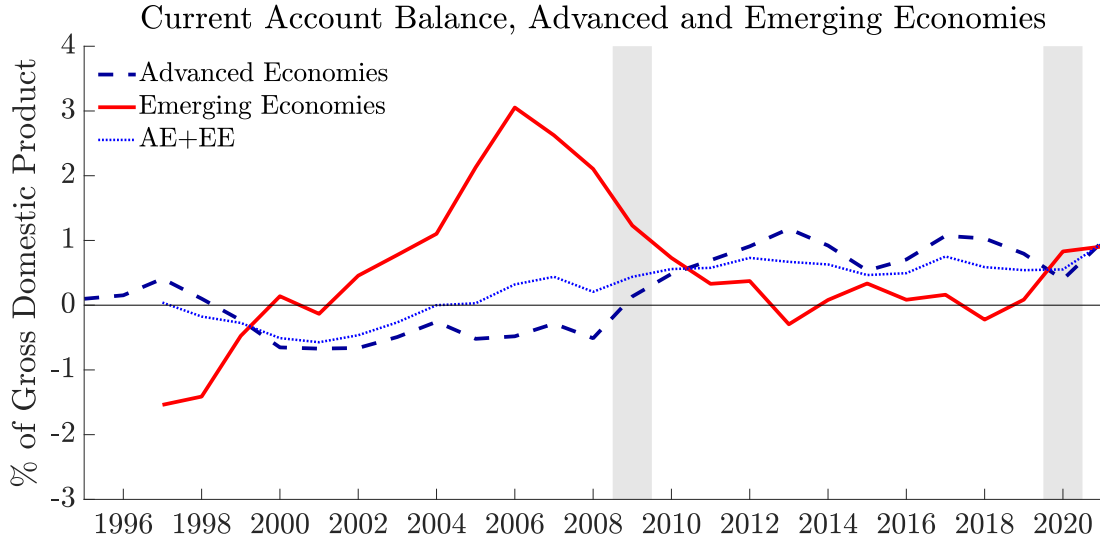
Finally, the asymmetry of the distribution of output growth rates is also analyzed. Such asymmetry has risen before the GFC, and it has contracted after it. Asymmetry in output growth does not systematically rise in global crises, however, unlike the dispersion in the distribution.

## 4.1 Advanced and Emerging Economies, Mean Trends

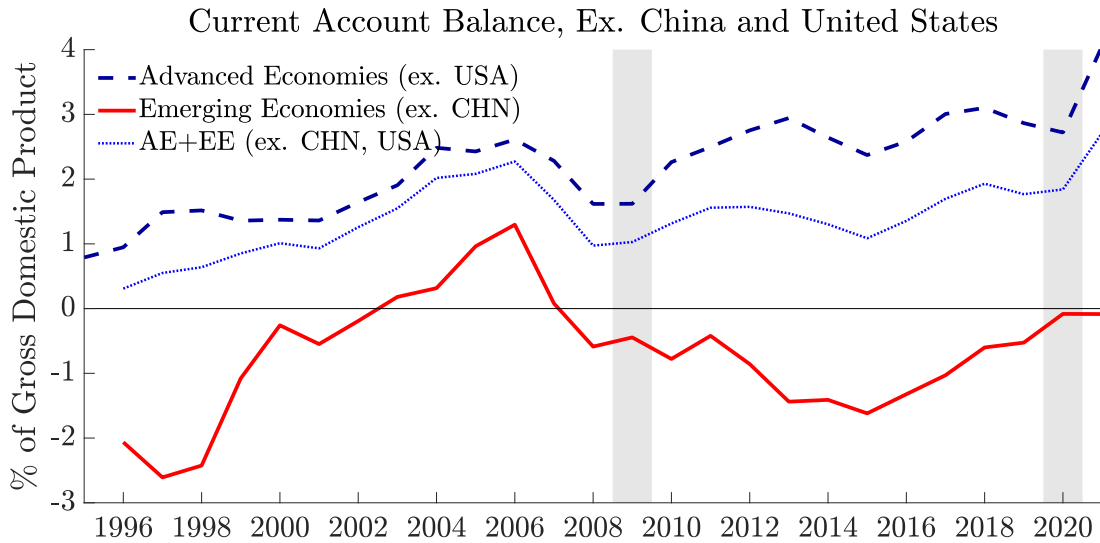
**Mean Current Account Balances in Advanced and Emerging Economies.** Average current account balances have differed substantially across advanced and emerging economies in the period between 1997 and 2021. Figure 3 presents the data for average current account balances in these two groups of countries. To explore the role of major economies in these trends, figure 4 presents the same averages omitting data for the United States and China from advanced and emerging economies, respectively.

Three key facts emerge from the analysis of these data. First, the two largest economies, United States and China, have a sizeable impact on the average current account balance of their respective groups. China accounts for a large fraction of the average current account balance of emerging economies, as do the United States for advanced economies. The exclusion of China reduces substantially the average current account balance of emerging economies. The reverse is also true if excluding the United States from advanced economies. The average current account balance to GDP ratio of emerging economies peaked in 2006, when it was equal to 3%. Removing China from the sample, the peak falls by 1.7 percentage points, to 1.3%. In 2006, the average current account balance to GDP ratio of advanced economies was equal to -0.5%. Removing the United States from the sample, the deficit of that year would turn to a surplus of 2.6% of GDP. More generally, when excluding China and the United States, the average current account has been in surplus for the advanced economies throughout the sample period, and it has been in deficit for emerging economies between 2007 and 2021. Japan and Germany are the biggest contributors to the current account surplus of the advanced economies. Brazil, Mexico and Argentina are the main contributors to the deficit among emerging economies in the beginning of the sample period.

Second, the average current account balance of emerging economies rose from the late 1990s until 2006, after which it declined, and it continued to do so until after the Global Financial Crisis. The average current account balance to GDP ratio of emerging economies (including China) rose by 4.5 percentage points between 1997 and 2006. After China, oil-exporting countries such as Russia, Brazil and Malaysia were the main contributors to this rise in the average current account balance. Between 2006 and 2011, emerging economies' average current account balance fell by 2.7 percentage points, and it has remained stable around zero between 2011 and 2019. The dynamics of smaller emerging economies' average current account balance before and around the GFC have been qualitatively similar but smaller in magnitude: The average current account balance to GDP ratio excluding China rose by 3.9 points between 1997 and 2006 and it fell by 1.7 between 2006 and 2011. After the GFC, this average ratio continued to fall until 2015, by 1.2 percentage points, and it rose back towards



**Figure 3.** Average current account balances in advanced and emerging economies. The dashed, blue line represents the average current account balance among advanced economies. The solid, red line represents the same figure among emerging economies. The thin blue dotted line represents the average for the consolidated group of advanced and emerging economies. All averages are weighted by individual countries' nominal gross domestic product. The grey shaded areas highlight the periods of global crisis of 2009 and 2020.



**Figure 4.** Average current account balances in advanced and emerging economies, excluding the two largest economies, China and the United States. The dashed, blue line represents the average current account balance among advanced economies, excluding the United States. The solid, red line represents the same figure among emerging economies, excluding China. The thin blue dotted line represents the average for the consolidated group of advanced and emerging economies, excluding China and the United States. All averages are weighted by individual countries' nominal gross domestic product. The grey shaded areas highlight the periods of global crisis of 2009 and 2020.

zero in 2020 and 2021.

Third, the average current account balance of advanced economies has been trending upwards since the beginning of the century. Between 2000 and 2017, advanced economies' average surplus rose from -0.7% to 1% of GDP. Excluding the United States, the same figure rose from 1.4% to 3%. The current account improvement observed in the United States and Germany in this period is the main driver of the increase in advanced economies' average current account balance. The current account balance of advanced economies excluding the United States also rose sharply in 2021, after the COVID crisis, to 4% of Output. Large current account improvements in Ireland and Switzerland, as well as in commodity exporting countries such as Saudi Arabia, Norway and Canada are the drivers of this average current account improvement.

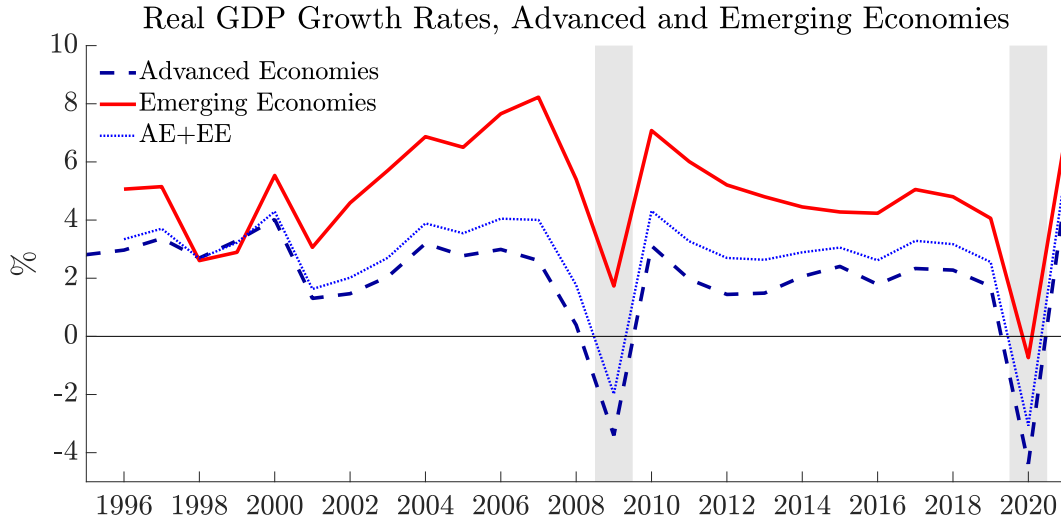
**Mean Output Growth in Advanced and Emerging Economies.** Output growth rates have differed markedly between advanced and emerging economies between 1997 and 2021, in line with the heterogeneity across these two groups also observed for current account balances. Figure 5 presents data for the average growth rate of real real gross domestic product in advanced and emerging economies. Figure 6 presents average growth rates excluding the United States and China from advanced and emerging economies, respectively.

First, emerging economies, whose per-capita income levels are lower, have consistently experienced faster growth than advanced economies, but the difference between the two groups has become smaller in the later part of the sample. At its peak in 2007, average output growth in emerging economies was equal to 8.2%. In the same year, output grew by 2.6% on average in advanced economies. In 2018, average growth equalled 4.8% and 2.3% in emerging and advanced economies, respectively.

Second, China accounts for a large fraction of overall growth among emerging economies. The United States also typically contribute positively to the average growth rate of advanced economies, but to a much smaller extent than China. In 2007, the exclusion of China reduces average growth of emerging economies by 2.1 percentage points, to 6.1%. The effect is similar in 2018, as average growth falls by 1.9 points to 4.8%. In 2004, the exclusion of the United States reduces average growth of advanced economies by 0.4 percentage points, but it increases it by 0.3 points in 2007. In 2018, the contribution of the United States is again positive, by 0.4 percentage points.

Third, sharp declines in growth took place in advanced and emerging economies alike in 2009 and 2020. In 2009, output growth fell to -3.4% in advanced economies and to 1.7% in emerging ones. In 2020, both groups of countries experienced negative growth, of -4.3% and -0.7% for advanced and emerging economies, respectively. A growth decline in 2008 also preceded the low growth of 2009. A slowdown did not occur instead prior to the 2020 crisis, given the sudden nature of the widespread health crisis that caused the economic recession.

Finally, the average output growth rate in emerging economies trended upwards from the



**Figure 5.** Average growth rate of real gross domestic product in advanced and emerging economies. The dashed, blue line represents the average current account balance among advanced economies. The solid, red line represents the same figure among emerging economies. The thin, blue, dotted line represents the average for the consolidated group of advanced and emerging economies. All averages are weighted by individual countries' nominal gross domestic product. The grey shaded areas highlight the periods of global crisis of 2009 and 2020.



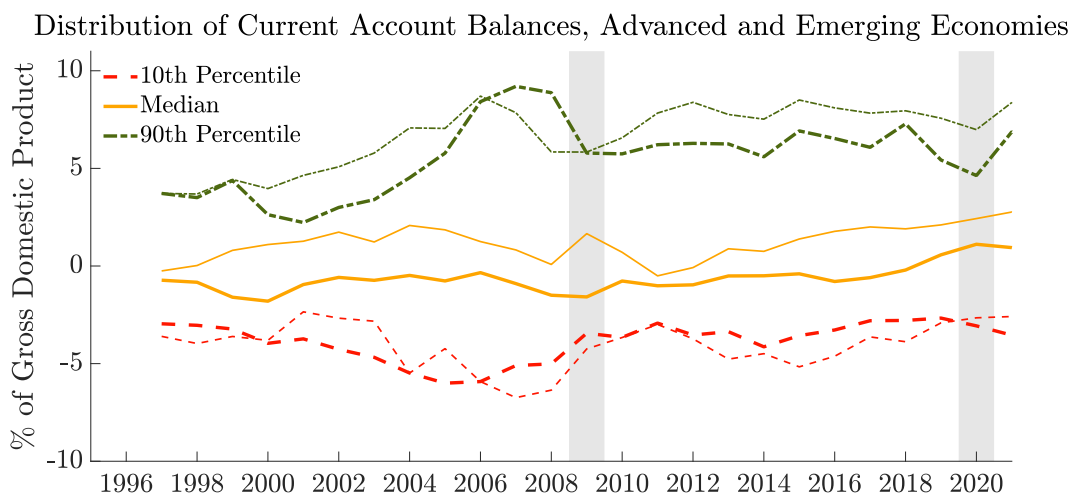
**Figure 6.** Average growth rate of real gross domestic product in advanced and emerging economies, excluding the largest economies. The dashed, blue line represents the average current account balance among advanced economies, excluding the United States. The solid, red line represents the same figure among emerging economies, excluding China. The thin blue dotted line represents the average for the consolidated group of advanced and emerging economies, excluding China and the United States. All averages are weighted by individual countries' nominal gross domestic product. The grey shaded areas highlight the periods of global crisis of 2009 and 2020.

late 1990s until the GFC, and it declined in the period between the two global crises, converging towards the growth rate in advanced economies. Average output growth rose by 5.5 percentage points between 1998 and 2007 in emerging economies, and it fell by 2 percentage points between 2011 and 2019. In advanced economies, growth rates were largely stable in these two periods of global output expansion.

## 4.2 Time-Varying Heterogeneity in Cross-Sectional Distributions

**Current Account Balances.** The distribution over current account balances of countries in the global economy has changed dramatically between 1997 and 2021. This subsection presents data about trends in this distribution, also evaluating the specific contribution of the United States and China to these trends.<sup>6</sup> First, figure 7 presents data on the location of the tails and the center of the cross-sectional distribution distribution, displaying its 10th, median and 90th percentile. Second, the discussion will focus on trends in the dispersion in this distribution. Figure 8 graphically presents a measure of such dispersion, by displaying the difference between the 90th and the 10th percentile of the distribution (the interpercentile range), both for the full sample of advanced and emerging economies and for the sample excluding China and the United States.

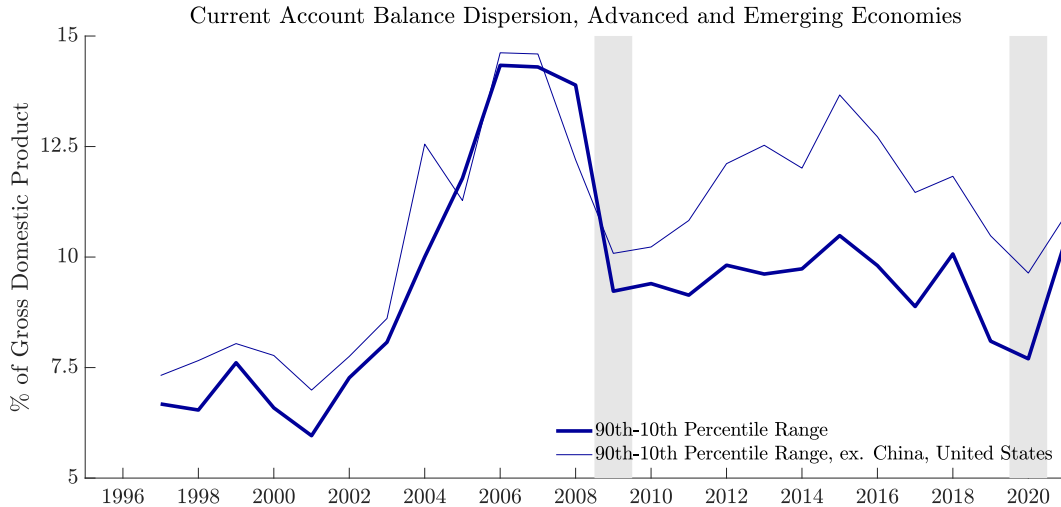
The cross-sectional distribution of current account balances went through four distinctive phases of fluctuations, with the GFC and the COVID crisis acting as crucial watersheds.



**Figure 7.** Distribution of current account balances, among advanced and emerging economies. The red, dashed line; yellow, solid; and green, dashed-dotted lines represent the 10th, median and 90th percentile, respectively. Thick lines refer to the distribution from the entire sample of countries, thin lines refer to the distribution excluding China and the United States. The grey shaded areas highlight the periods of global crisis of 2009 and 2020.

First, the distribution of current account balances widened between the late 1990s and

<sup>6</sup>Appendix A.3 presents detailed data for the separate groups of advanced and emerging economies.



**Figure 8.** Interpercentile range of current account balances. The thick blue line represents the 90th-10th percentile range in the sample of advanced and emerging economies. The thin line represents again the 90th-10th percentile range, in the sample excluding the United States and China. The two shaded areas highlight the periods of the Global Financial Crisis in 2008-09 and of the COVID crisis in 2020-21.

2008. This period witnessed an increase in the absolute magnitude of both current account deficits and surpluses, captured by the two tails of the distribution, the 10th and 90th percentile. Between 1997 and 2008, the 10th and 90th percentiles fell and rose by 2 and 5 percentage points of GDP, respectively. This widening of the tails of distribution captures the phenomenon of global imbalances observed in this period, and it is robust to the exclusion of the United States and China from the sample. Excluding the two largest economies, the widening is the largest between 1997 and 2006, with the 10th and 90th percentiles falling and rising by 3 and 5 percent of GDP, respectively.

Second, a sharp contraction in the distribution of current account balances took place during the GFC. Between 2008 and 2009 absolute values of both the 90th percentiles of the distribution contracted towards zero, both including and excluding large economies from the sample. The 90th percentile fell by 3% of GDP, while the 10th percentile rose by 1.5% of GDP.

Third, the distribution of current account balances remained stable in the period of global recovery between the GFC and the COVID crises. Excluding China and the United States from the sample, both 90th and 10th percentile rose in magnitude between 2011 and 2015, and contracted thereafter.

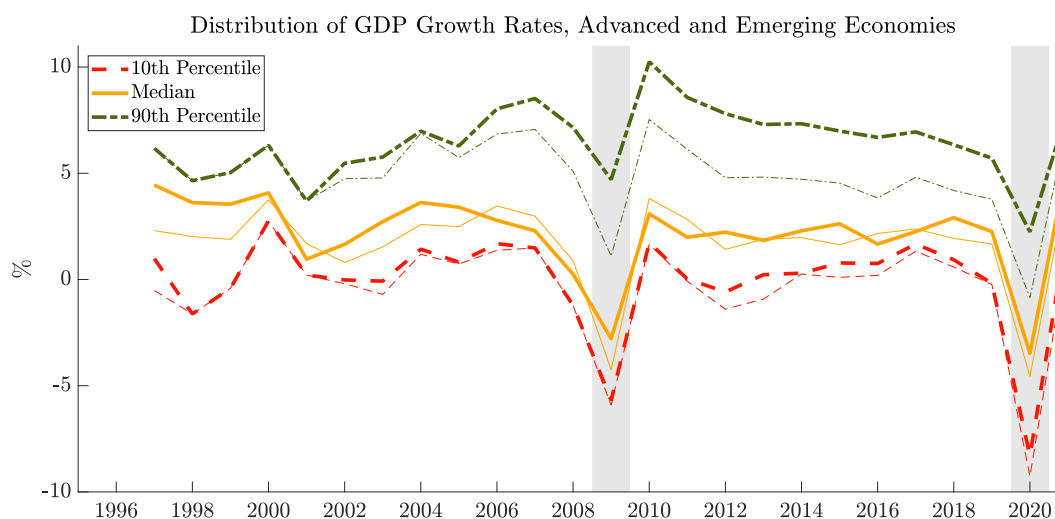
Finally, during the COVID crisis, the right tail of the distribution of countries, capturing countries running current account surpluses, first contracted towards zero in 2020 and then widened substantially in 2021. The 90th percentile of the distribution fell by 0.8% of GDP in 2020, and it rose by 2.2% of GDP in 2021. Milder fluctuations took place in the left tail of the distribution among countries running deficits.



The interpercentile range confirms the critical message from the analysis of the whole distribution: the dispersion of current account balances rose very substantially prior to the GFC, and it fell sharply between 2007 and 2009. The interpercentile range rose by 9 percentage points of GDP between 2001 and 2006, and it contracted by 5 percentage points of GDP between 2008 and 2009, when including all economies in the sample. After the GFC, the interpercentile range rose by 3 percentage points between 2009 and 2015, excluding China and the United States from the sample, and by 1 point if including them. This measure of dispersion contracted between 2015 and 2020, by 4 or 3 percentage points if including or excluding the largest economies, respectively. 2021, the year after the COVID crisis, was instead associated with a very sharp increase in the dispersion of current account balances, especially if including China and the United States, with an increase in the interpercentile range of 3 percentage points.

**Output Growth Rates** Having documented substantial variation in countries' output growth rates over time, this section turns to analyze the dispersion in output growth across countries. The key finding from this analysis is that as mean output growth fluctuates in periods of global crisis and recovery, the shape of the distribution of output growth rates also experiences substantial fluctuations, with important changes in the dispersion and in the asymmetry of the distribution.

Figure 9 presents the whole distribution of output growth rates in advanced and emerging economies, displaying the 10th, median and 90th percentile of the cross section, with and without the inclusion of China and the United States.



**Figure 9.** Distribution of real GDP growth rates, among advanced and emerging economies. The red, dashed line; yellow, solid; and green, dashed-dotted lines represent the 10th, median and 90th percentile, respectively. Thick lines refer to the distribution from the entire sample of countries, thin lines refer to the distribution excluding China and the United States. The grey shaded areas highlight the periods of global crisis of 2009 and 2020.

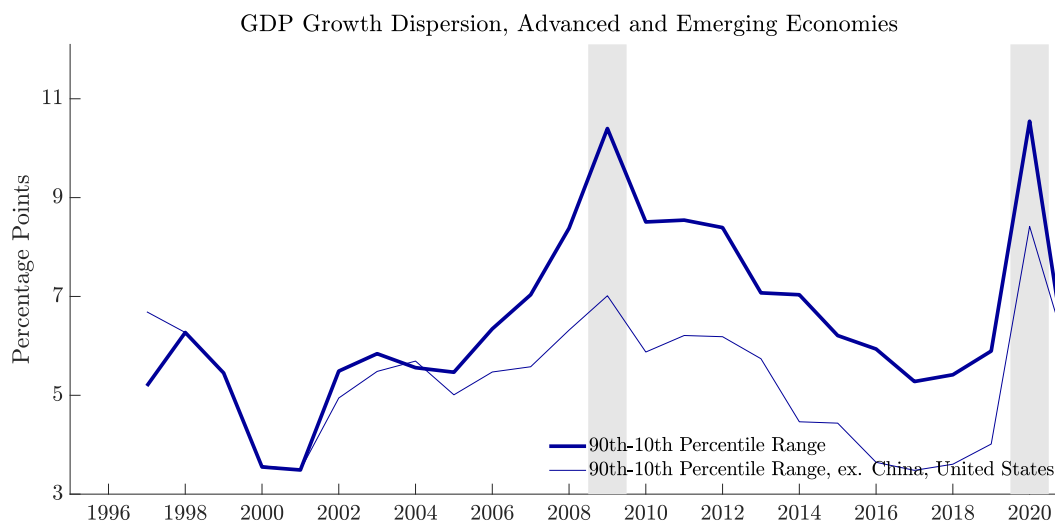
First, the right tail of output growth rates has been trending upwards from the late 1990's

until 2007, especially when including big economies in the distribution, and downwards in the period between the Global Financial Crisis and the COVID crisis. No corresponding trend is visible instead in the left tail of the output growth distribution. When excluding big countries from the sample, the 90th percentile of the distribution falls sharply, highlighting the relatively fast output growth experienced by China and the United States in the period considered.

Second, both the 90th and the 10th percentile contract sharply along with the median in periods of global crisis, in 2009 and in 2020. In both instances, however, the fall in the 10th percentile is larger than that in the 90th percentile, leading to a widening of the dispersion of output growth rates.

Third, the distribution of output growth rates is asymmetric and right-skewed, as the distance between the median and the 10th percentile is significantly smaller than the distance between the 90th percentile and the median. This asymmetry is particularly significant in the early part of the sample and when including big economies in the sample.

Figure 10 presents data on the dispersion in output growth rates, displaying graphically the difference between the 90th and the 10th percentile in the distribution of output growth rates, both including and excluding the United States and China from the sample.



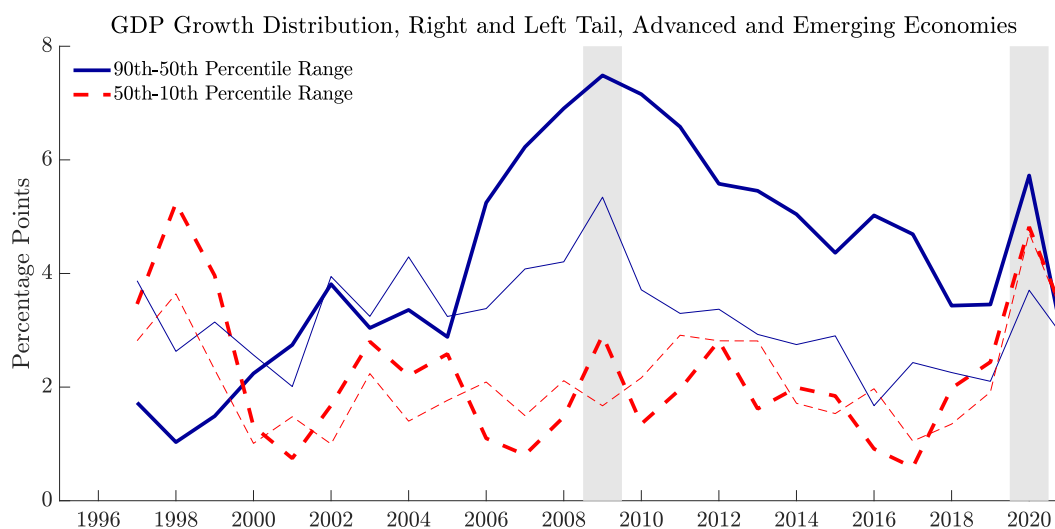
**Figure 10.** Interpercentile range of output growth rates. The thick blue line represents the 90th-10th percentile range in the sample of advanced and emerging economies. The thin line represents again the 90th-10th percentile range, in the sample excluding the United States and China. The two shaded areas highlight the periods of the Global Financial Crisis in 2008-09 and of the COVID crisis in 2020-21.

The dispersion in output growth rates, measured by the interpercentile range has been trending steadily upwards between the year 2000 and 2009, reaching its peak in correspondence of the Global Financial Crisis. As discussed above, this period of rising dispersion in output growth rates also coincided with a rise in the dispersion in countries' current account balances.

The dispersion in output growth rates also rose sharply in correspondence of the 2020 COVID crisis, highlighting the great heterogeneity across countries in the severity of the global recession.

In the period between the two global recessions, the dispersion in output growth rates has generally been trending downwards, reflecting the reduction in growth rates of the fastest-growing countries.

To analyze the asymmetry in the distribution of output growth rates, Figure 11 presents data for the difference between the 90th percentile and the median of the distribution as well as between the median and the 10th percentile. A difference between the 90th and 50th percentile that is higher than the one between the 50th and the 10th percentile indicates that the distribution is rightly skewed, characterized by a long tail of high growth rates and by a large mass of countries concentrated in a narrow range of relatively low growth rates.



**Figure 11.** Asymmetry in the distribution of output growth rates. The thick, blue, solid line represents the 90th-50th percentile range in the sample of advanced and emerging economies. The thick, red, dashed line represents the 50th-10th percentile range in the same sample. The thin lines represent the corresponding interpercentile ranges in the sample excluding the United States and China. The two shaded areas highlight the periods of the Global Financial Crisis in 2009 and of the COVID crisis in 2020.

In the distribution of output growth rates, the difference between the 90th and 50th percentile tends to be larger than the one between the 50th and 10th percentile, indicating the presence positive skewness in the distribution. Such skewness is particularly significant in the sample including the United States and China.

During times of global output expansion, the positive skewness in the distribution of output growth has fluctuated largely in line with the dispersion of the distribution, rising between 2005 and 2009 and contracting in the period between the two global crisis.

In times of crisis, however, while the dispersion in output growth rates has risen sharply

in both 2009 and 2020, the skewness of the dispersion has contracted in 2009 and it has remained stable in 2020, relative to the previous year.

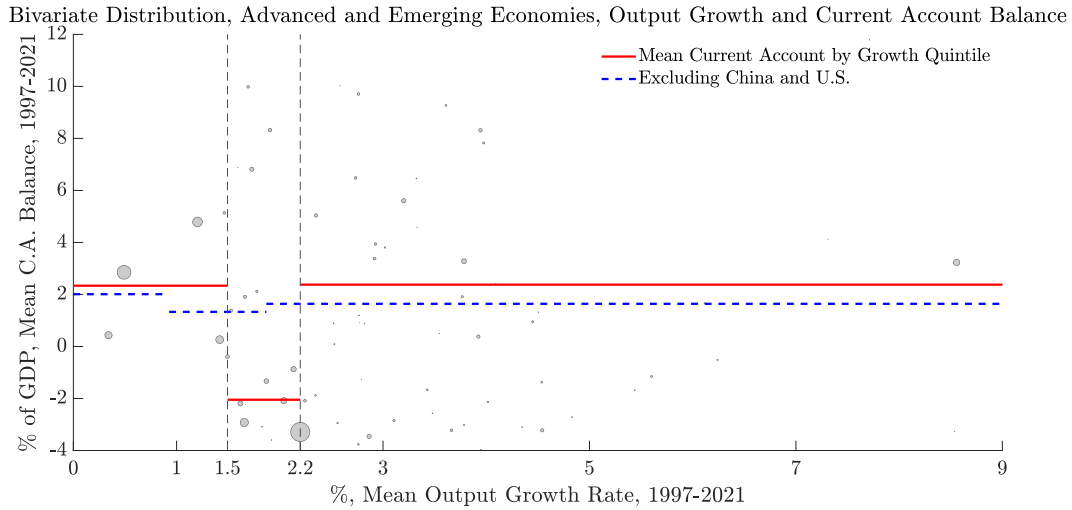
## 5 Bivariate Distribution

Output growth rates and current account balances differ sharply across countries, both in the cross section and over time. Is there a systematic relationship between these two variables in the cross-section? Do faster-growing countries also typically experience large current account surpluses? Figures 12, 13 and 14 present the bivariate distribution over average output growth rates and current account balances in the period between 1997 and 2021, for the whole sample of advanced and emerging economies, emerging economies only, and advanced economies only, respectively.

First, when considering both advanced and emerging economies, a clear monotonically increasing or decreasing relationship between mean output growth and the current account balance is not present in this period. This is neither the case when one considers the full sample of advanced and emerging economies, nor when excluding the United States and China. When considering the sample including the largest economies, the relationship appears to be non-linear, as the average current account balance for countries in the second tercile of output growth is substantially lower than for countries in the first and third tercile. Average current account balances in the three groups equal 2.3%, -2% and 2.4% of GDP, respectively. The United States are an important driver of this non-linear relationship, as this large economy with a current account deficit accounts for a large share of the economies in the second tercile. If excluding the United States and China, the U-shaped relationship between the current account balance and growth is substantially milder. Average current account balances in the three tercile groups excluding United States and China equal, 2%, 1.3% and 1.6% of GDP, respectively.

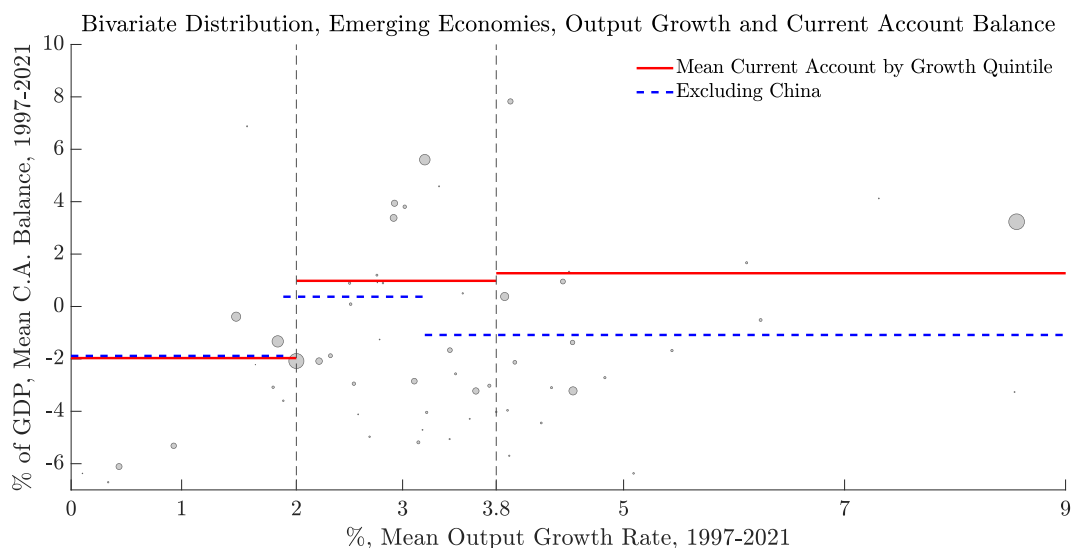
Second, in emerging economies the relationship between output growth and the current account balance appears to be a strongly positive one, but this result is strongly dependent on China, which is a large country that has grown substantially faster than average and that has run a large current account surplus. Average current account balances in the three groups equal -1.9%, 1% and 1.3% of GDP, respectively. Excluding China from the sample of emerging economies, the relationship between output growth and the current account balance is an inverse-U shaped one. Average current account balances in the three groups excluding China equal -1.9%, 0.4% and -1% of GDP, respectively.

Third, also in advanced economies the sign of the relationship between output growth and the current account balance depends on the inclusion of the biggest economy, the United States. The relationship is clearly negative when the United States are part of the sample, but it is flat when they are excluded. Considering the full sample, average current account balances in the three groups equal 3%, 0.5% and -1.6% of GDP, respectively. Excluding



**Figure 12.** Bivariate distribution of advanced and emerging over mean growth rates of real, gross domestic product and current account balances over the period between 1997 and 2021. Each dot in the scatter plot represent one economy, with the size of each dot being proportional to the GDP of each country at the beginning of the sample, in 1997. The solid red lines represent the mean current account in each tercile for the distribution of growth rates. The blue, dashed lines represent again mean current accounts by growth terciles, when excluding the United States and China from the distribution. The vertical, dashed lines represent the 33rd and 67th percentile of the growth distribution from the full sample of advanced and emerging economies.

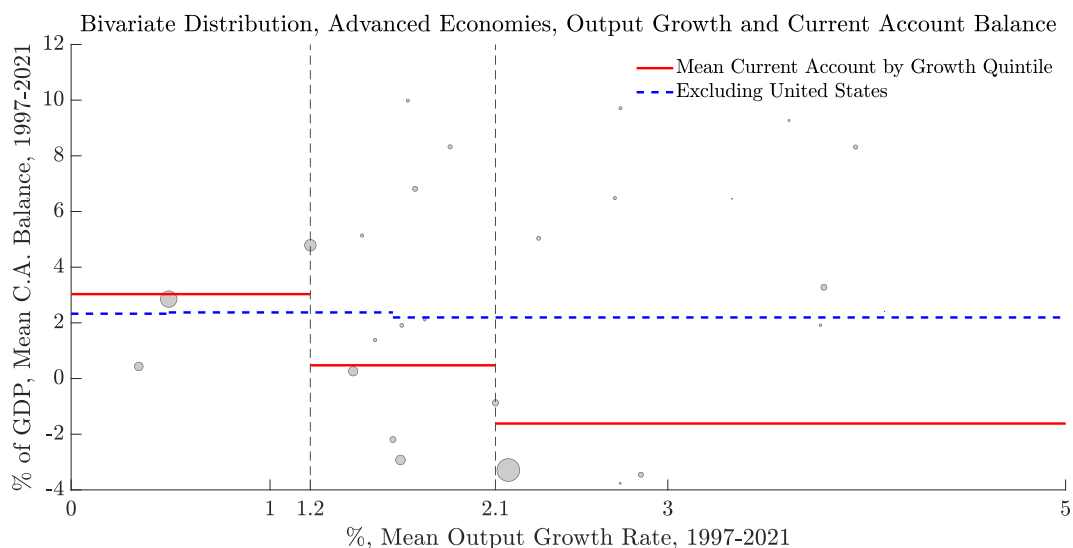
the United States, the three average current account balances are all very similar, equalling 2.3%, 2.4%, 2.2% of GDP, respectively.



**Figure 13.** Bivariate distribution of emerging over mean growth rates of real, gross domestic product and current account balances over the period between 1997 and 2021. Each dot in the scatter plot represent one economy, with the size of each dot being proportional to the GDP of each country at the beginning of the sample, in 1997. The solid red lines represent the mean current account in each tercile for the distribution of growth rates. The blue, dashed lines represent again mean current accounts by growth terciles, when excluding China from the distribution. The vertical, dashed lines represent the 33rd and 67th percentile of the growth distribution from the sample of emerging economies.

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**Figure 14.** Bivariate distribution of advanced over mean growth rates of real, gross domestic product and current account balances over the period between 1997 and 2021. Each dot in the scatter plot represent one economy, with the size of each dot being proportional to the GDP of each country at the beginning of the sample, in 1997. The solid red lines represent the mean current account in each tercile for the distribution of growth rates. The blue, dashed lines represent again mean current accounts by growth terciles, when excluding the United States from the distribution. The vertical, dashed lines represent the 33rd and 67th percentile of the growth distribution from the sample of advanced economies.

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# A Appendix

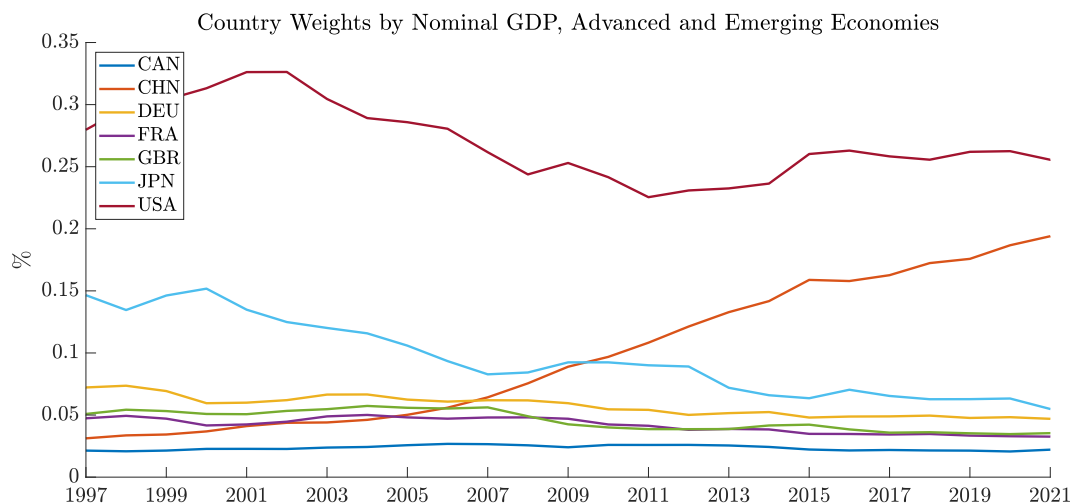
## A.1 Data

### Country Lists

**Advanced Economies:** United Arab Emirates, Australia, Austria, Belgium, Bahrain, Brunei, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Hong Kong, Republic of Ireland, Iceland, Israel, Italy, Japan, South Korea, Kuwait, Luxembourg, Netherlands, Norway, New Zealand, Qatar, Saudi Arabia, Singapore, Sweden, Taiwan, United States of America.

**Emerging economies:** Angola, Albania, Argentina, Armenia, Azerbaijan, Bahamas, Belarus, Belize, Bolivia, Brazil, Barbados, Bhutan, Botswana, Chile, China, Colombia, Cape Verde, Costa Rica, Cyprus, Czech Republic, Dominican Republic, Algeria, Ecuador, Egypt, Estonia, Fiji, Gabon, Georgia, Equatorial Guinea, Greece, Guatemala, Guyana, Croatia, Hungary, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Laos, Libya, Sri Lanka, Lithuania, Latvia, Morocco, Moldova, Maldives, Mexico, Macedonia, Mongolia, Mauritius, Malaysia, Namibia, Oman, Panama, Peru, The Philippines, Poland, Portugal, Paraguay, Romania, Russia, El Salvador, Suriname, Slovakia, Slovenia, Swaziland, Seychelles, Thailand, Turkmenistan, Trinidad and Tobago, Turkey, Uzbekistan, Vietnam, South Africa.

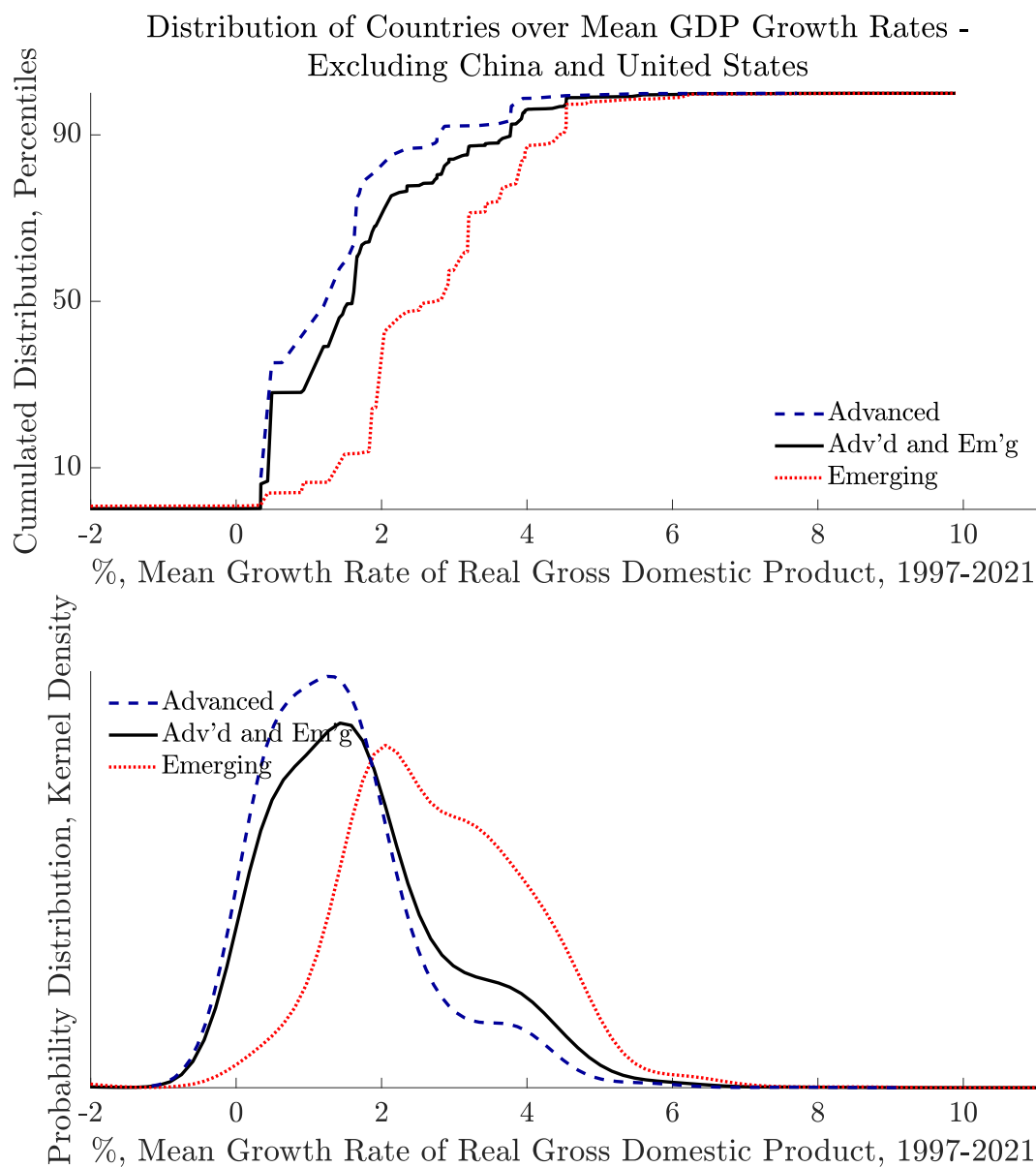
### Country Weights



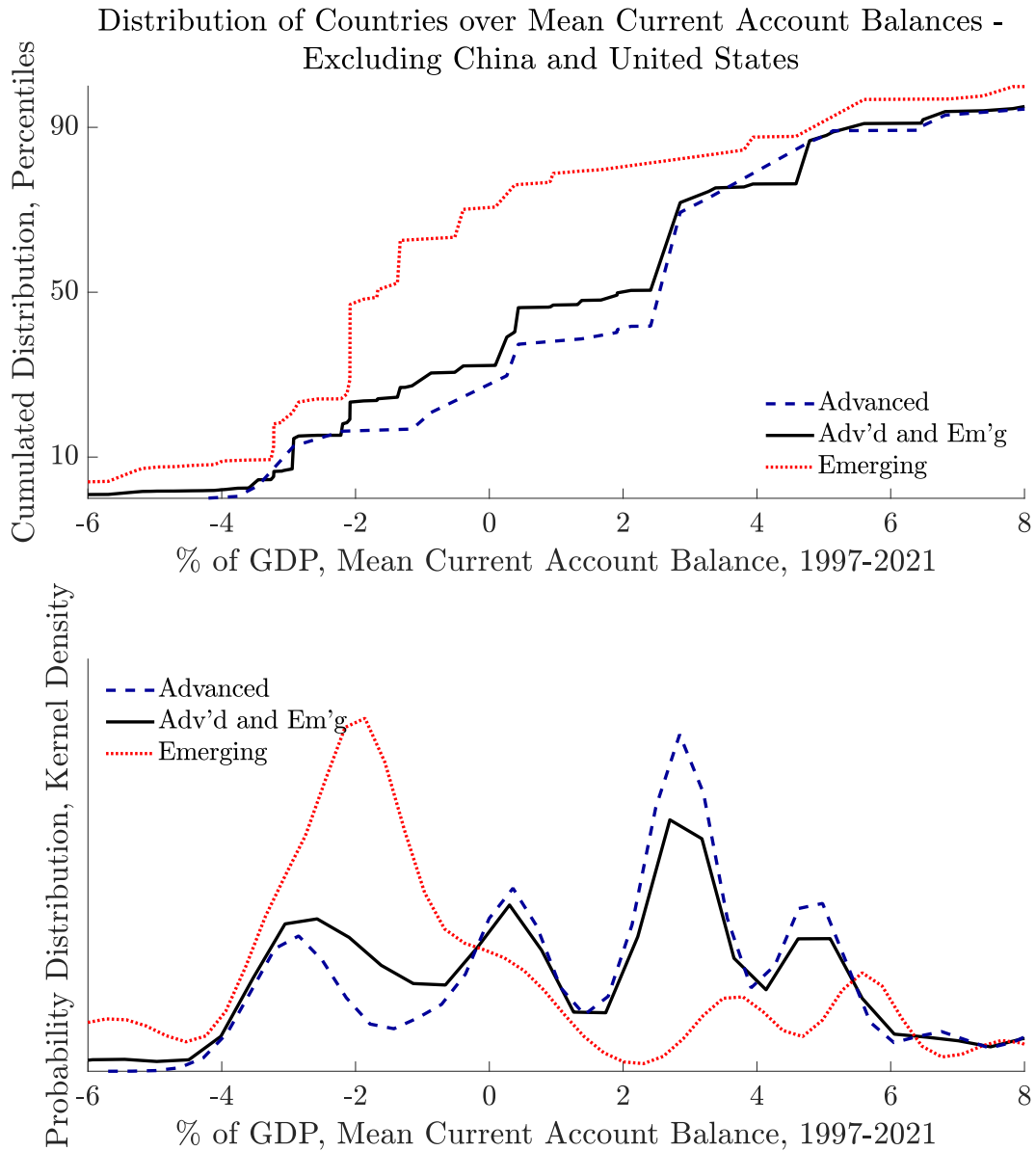
**Figure 15.** Nominal GDP weights associated with the economies in the sample. Countries whose weight at the end of the sample is smaller than 2% are omitted for clarity of presentation.



## A.2 Long-Run Distributions of Output Growth Rates and Current Account Balances Excluding United States and China



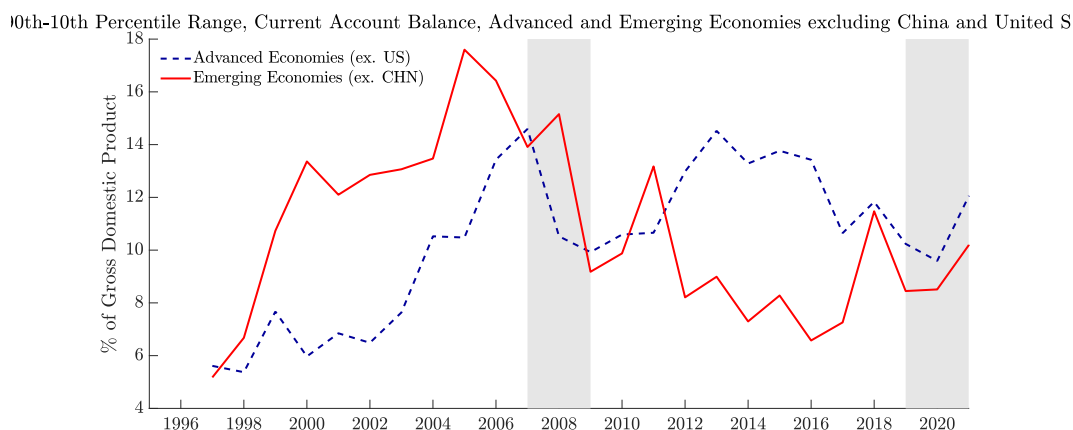
**Figure 16.** Distribution of countries (excluding China and the United States) over mean growth rates of real, gross domestic product over the period between 1997 and 2021. The top panel displays the cumulated distribution of countries. The bottom panel displays the probability density, obtained via a kernel density estimator. The dashed, blue line represents the distribution for advanced economies. The solid black line represents the joint distribution for advanced and emerging economies. The dotted, red line represents the distribution for emerging economies. The weight of each country in the distribution is given by its nominal GDP at the beginning of the sample, in 1997.



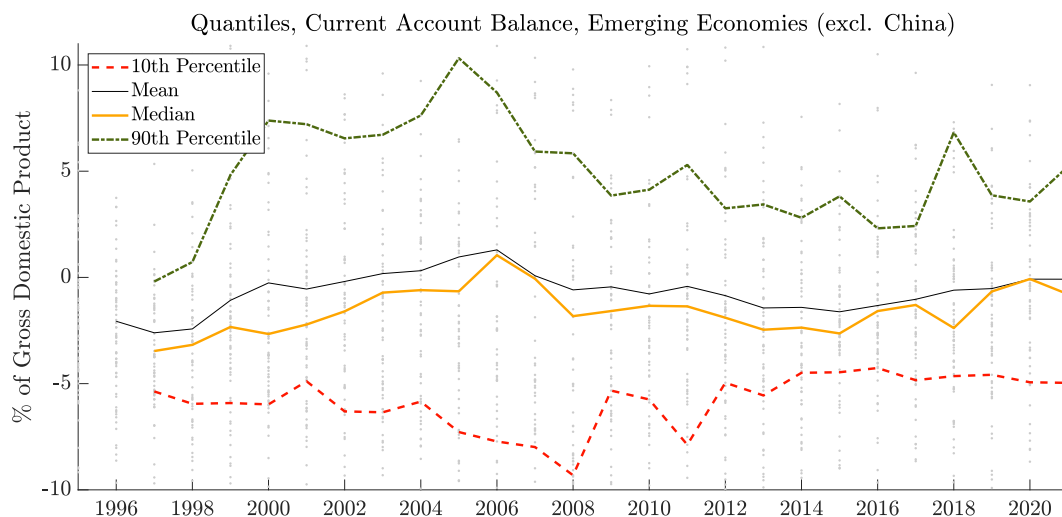
**Figure 17.** Distribution of countries (excluding China and the United States) over mean current account balances in the period between 1997 and 2021. The top panel displays the cumulated distribution of countries. The bottom panel displays the probability density, obtained via a kernel density estimator. The dashed, blue line represents the distribution for advanced economies. The solid black line represents the joint distribution for advanced and emerging economies. The dotted, red line represents the distribution for emerging economies. The weight of each country in the distribution is given by its nominal GDP at the beginning of the sample, in 1997.

### A.3 Distribution of Current Account Balances, Within Advanced and Emerging Economies

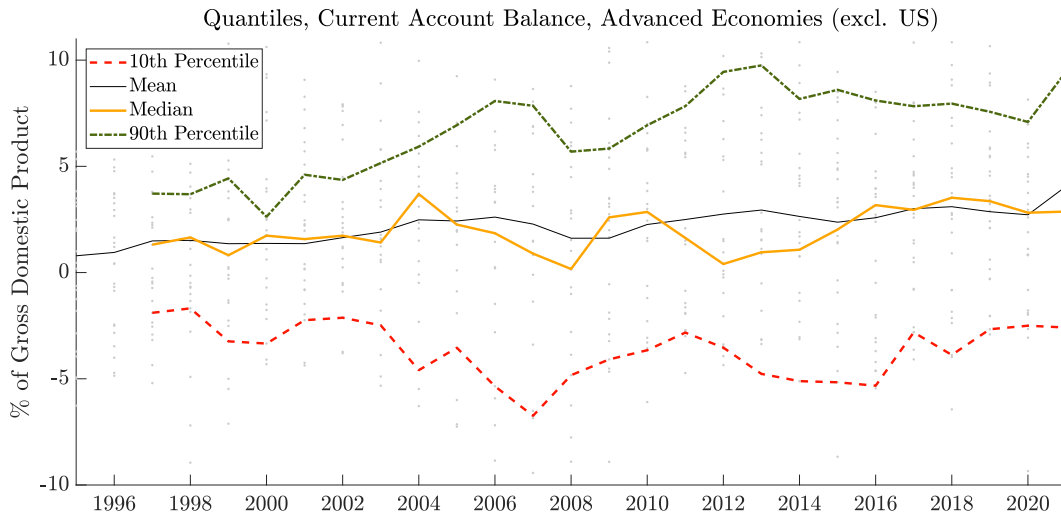
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**Figure 18.** Interpercentile range of current account balances. The dashed, blue line represents the 90th-10th percentile range among advanced economies, with the exclusion of the United States. The solid, red line represents the same figure among emerging economies, with the exclusion of China. The two shaded areas highlight the periods of the Global Financial Crisis in 2008-09 and of the COVID crisis in 2020-21.



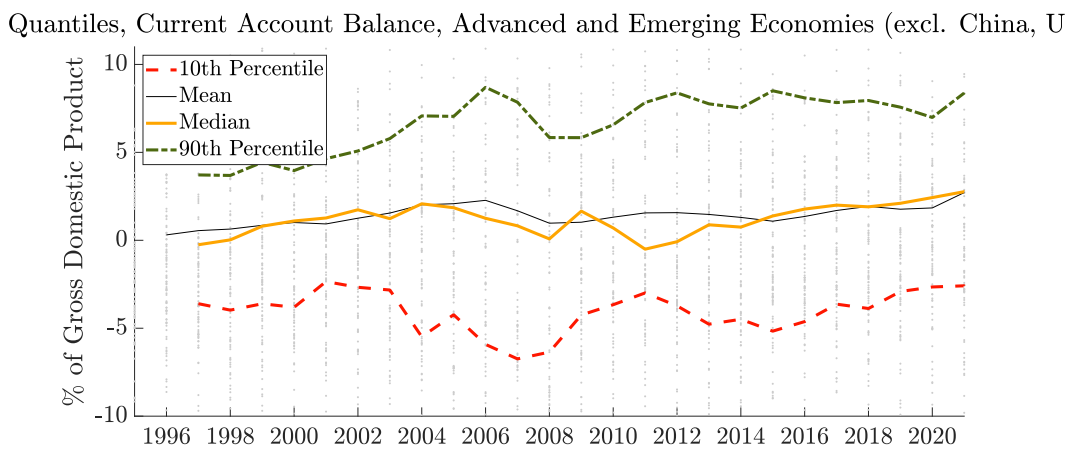
**Figure 19.** Percentiles of the distribution of current account balances, among emerging economies with the exclusion of China. The red, dashed line; yellow, solid; and green, dashed-dotted lines represent the 10th, median and 90th percentile, respectively. The thin, black, solid line represents the mean, also displayed in Figure 4. The grey dots in the background represent the individual data for each country.



**Figure 20.** Percentiles of the distribution of current account balances, among advanced economies with the exclusion of the United States. The red, dashed line; yellow, solid; and green, dashed-dotted lines represent the 10th, median and 90th percentile, respectively. The thin, black, solid line represents the mean, also displayed in Figure 4. The grey dots in the background represent the individual data for each country.

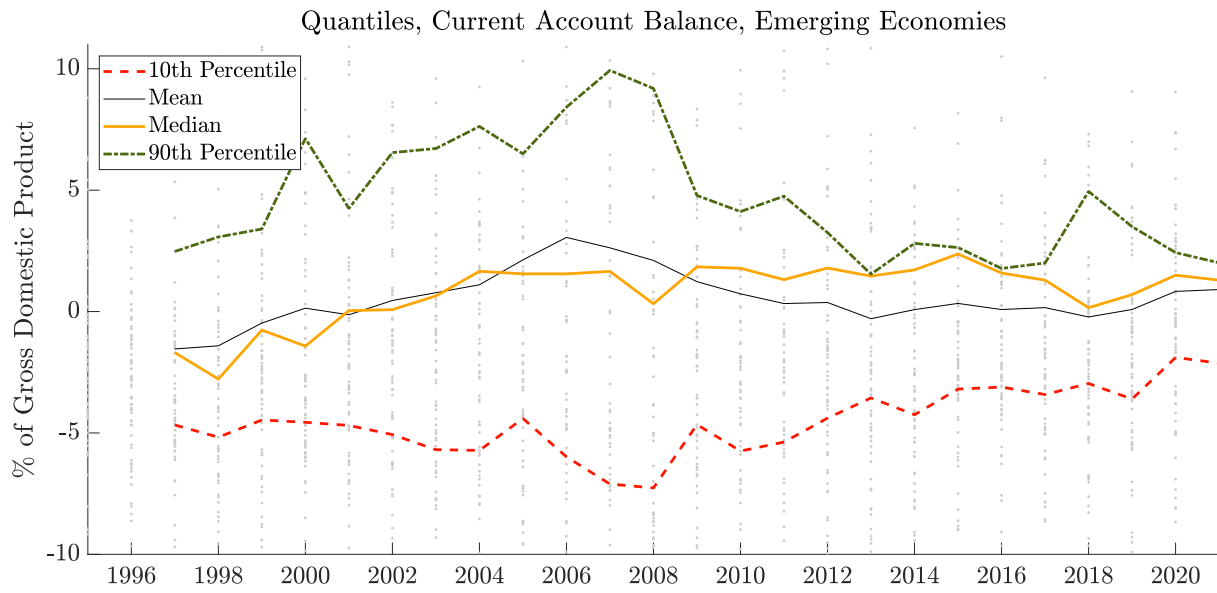
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**Figure 21.** Lorem Ipsum



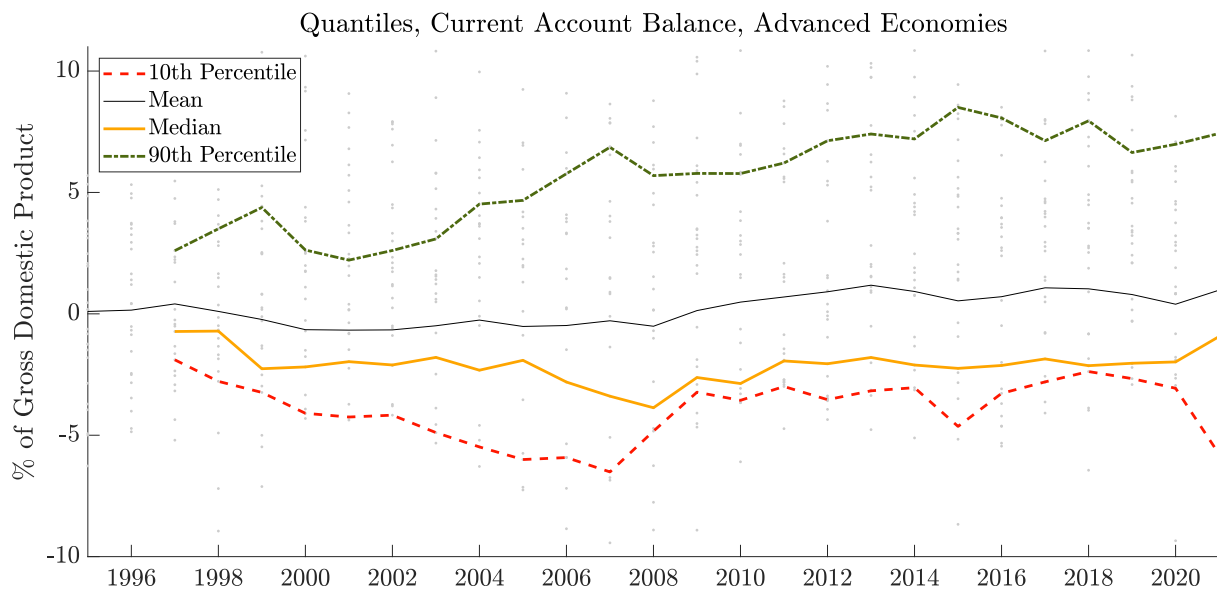
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**Figure 22.** Lorem Ipsum



Lorem Ipsum

**Figure 23.** Lorem Ipsum



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