WORKING paper

BANQUE DE FRANCE
EUROSYSTÈME

# World Cycles Revisited: Diverging Trends in Prices and Quantities

**Antoine Camous, Eric Monnet, Damien Puy**[1]

September 2025, WP #592

## ABSTRACT

We revisit evidence on world cycles using a new quarterly macro-financial dataset covering a broad set of countries from 1950 to the COVID-19 crisis. By filling historical data gaps, we show that previous studies overstated the influence of global factors on national GDP and credit fluctuations. Our central finding is a novel disconnect: asset prices have become increasingly synchronized under financial globalization, whereas output synchronization has remained low and stable. We propose a parsimonious model in which deeper financial integration raises risk-sharing and asset-price co-movement while encouraging riskier, less correlated production structures, thereby reconciling the observed patterns.

Keywords: World Cycles, Business Cycles, Financial Cycles, Financial Integration, Trade Integration, Globalization.

JEL classification: E32; F41; F42

[1] Camous: Banque de France, antoine.camous@banque-france.fr; Monnet: Paris School of Economics, EHESS & CEPR, eric.monnet@psemail.eu; Puy: IMF, Dpuy@imf.org. We are especially grateful to Hilde Bjørnland, Luca Dedola, Giovanni Dell'Ariccia, Linda Goldberg, Deniz Igan, Sebnem Kalemli-Ozcan, Anton Korinek, Soledad Martinez Peria, Maurice Obstfeld, Alessandro Rebucci, Hélène Rey,Stephanie Schmitt-Grohe, Carlos Vegh and Egon Zakrajsek for useful discussions. We also thank seminar participants at various institutions and conferences. Antoine Malfroy-Camine and Do Lee provided excellent research assistance.

# NON-TECHNICAL SUMMARY

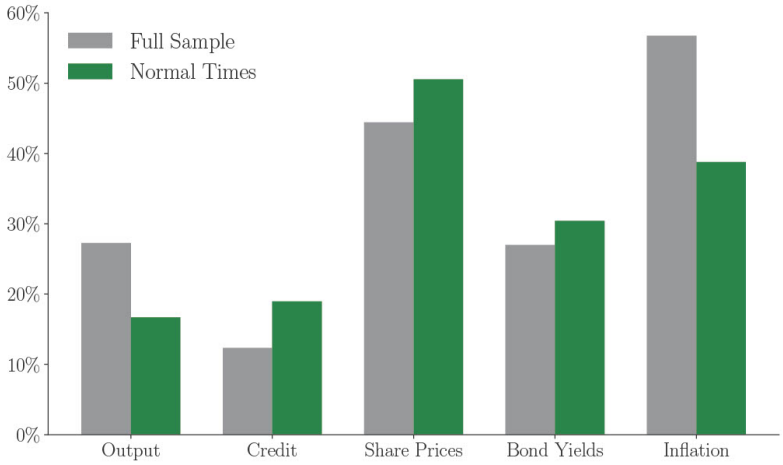
Do national economies move together in a globalized world? And how much of that co-movement is truly global, rather than driven by regional or dominant-country dynamics? These questions are central to debates about macroeconomic interdependence and policy autonomy.

Over the past two decades, research has suggested that world cycles — common movements in macroeconomic and financial variables across countries — are increasingly influential. According to this view, globalization has led to tighter synchronization of GDP, credit, inflation, and asset prices, particularly since the 1980s. This has reinforced the notion that open economies face limited control over domestic conditions.

In this paper, we revisit these narratives using a new, large-scale quarterly dataset covering output, prices, credit, interest rates, and stock prices for a broad set of advanced and emerging economies from 1950 to 2019. To build it, we exploit archival publications of the IMF's *International Financial Statistics*, recovering historical series that had never been made available in digital form. The result is an extensive macro-financial dataset — global in scope, with quarterly observations, and spanning nearly 70 years.

Our data allow for a more systematic analysis of global co-movements over time, and help distinguish between cycles that are truly global and those that reflect narrow geographical areas or more recent patterns. Using standard dynamic factor models, we estimate world cycles for our dataset's variables, and assess their explanatory power across countries and time (see Figure 1). Our results challenge key elements of the conventional view.

**Figure 1. Contribution of World Cycles to the Variance of Domestic Variables**




Note: the figure shows the share of variance in domestic variables explained by each corresponding world cycle over the full sample period (1950–2019) and for normal times only, i.e., after excluding the oil crisis (1973-1983) and the GFC (2007-2010) from our sample. Results are reported for the median country.

First, global factors matter more for prices (especially asset prices and inflation) than for quantities (GDP and credit). Second, while asset price synchronization increased steadily from the 1950s to the early 2000s — from around 40% to over 60% of variance explained — output and credit synchronization did not follow the same path. They were already substantial under Bretton Woods (1950–1971) and did not rise with globalization. In fact, output and credit synchronization declined after the Global Financial Crisis, and the global component currently explains less than 20% of GDP variation in normal times. Third, we show that trade and financial integration have different effects: while trade openness tends to raise output synchronization, greater financial openness is associated with stronger co-movement of asset prices but weaker co-movement of output.

To explain this disconnect, we propose a simple model where countries choose both their asset portfolios and production technologies. Financial integration expands risk-sharing opportunities, which raises cross-border asset price correlations. But it also encourages countries to adopt riskier, higher-return technologies, increasing idiosyncratic output volatility and reducing output synchronization. In other words, more synchronized markets can coexist with more desynchronized real economies — a pattern consistent with the data.

These findings have several policy implications. First, world cycles do not require deep financial integration: significant global co-movements existed under Bretton Woods despite strict capital controls. Second, the modest role of global factors in driving GDP and credit suggests that countries may retain more policy autonomy than often assumed — especially outside crisis episodes. Third, the divergence between synchronized prices and desynchronized quantities complicates the task of central banks, whose policy instruments often target both.

# Nouveau regard sur les cycles mondiaux : des trajectoires divergentes entre prix et quantités

## RÉSUMÉ

Dans un monde globalisé, les économies nationales évoluent-elles véritablement de manière synchronisée ? Pour répondre à cette question, nous exploitons les archives du FMI et proposons un nouveau jeu de données macro-financières trimestrielles, couvrant un large échantillon de pays entre 1950 et 2019. Il s'agit de la première base de données de cette ampleur combinant une fréquence élevée et une couverture historique étendue.

Notre analyse empirique révèle une évolution contrastée de la synchronisation mondiale : elle s'est nettement intensifiée pour les prix d'actifs et l'inflation, mais est restée faible et stable pour les quantités réelles (PIB, crédit).

Pour expliquer cette divergence entre prix et quantités, nous proposons un modèle dans lequel l'intégration financière renforce le co-mouvement des prix des actifs via le partage du risque, tout en incitant les pays à adopter des technologies plus risquées, ce qui réduit le co-mouvement de l'activité réelle. Ces résultats remettent en cause certaines idées courantes sur la mondialisation : une forte intégration financière ne conduit pas nécessairement à une plus grande convergence économique réelle.

Mots-clés : cycles mondiaux, conjoncturels et financiers, Intégration financière et commerciale

# 1. Introduction

Do world cycles really exist? And if so, how strong are they? Over the last two decades, empirical evidence on world cycles—both real and financial—has been accumulating.[1] Although this question has been approached from various angles, a consensus has emerged around two important facts. First, world cycles exist and are quantitatively strong.[2] They affect both real and financial variables—quantities and prices alike. Isolating an economy from them is, at best, a challenging task (Rey, 2015). Second, their strength has increased over time, mainly because of the intense globalization process that began in the mid-1980s.[3]. Taken together, these two facts have portrayed world cycles as a dominant force and have shaped important policy debates. They have reinforced the view that integration—both real and financial—comes at the cost of increased economic synchronization, even in normal times. They also suggest that the degree of control over domestic variables (or policy autonomy) is limited, especially in small open economies and emerging markets that have chosen to integrate into global markets.

We revisit this conventional wisdom using a new quarterly dataset of output, consumer prices (CPI), credit, government bond yields and asset prices (stock prices) for a large sample of advanced and emerging countries from 1950Q1 to 2019Q4. Building on the unique role of the International Monetary Fund (IMF) as a hub for international statistics, we construct new long macro-financial series from the historical printed publications of the IMF's *International Financial Statistics* (IFS). By extracting information that had never been digitized, we reconstruct the real and financial statistical profiles of major emerging and advanced economies over the entire postwar period at a quarterly frequency. To our knowledge, this is the first quarterly dataset with such extensive time and country coverage. More importantly, we correct several shortcomings of existing macro-financial databases—particularly in coverage, frequency, and quality—that have ultimately biased perceptions of world cycles.

Using this new dataset and standard techniques, the paper re-examines key findings from the empirical literature on world cycles. We extract a common component—interpreted as a world cycle—in output, credit, inflation, and asset prices over the entire postwar period using dynamic factor models. We then assess the quantitative importance of these world cycles in synchronizing economies over time through variance decompositions. More specifically, we measure the share of

[1] See Kose, Otrok, and Whiteman (2003) on the existence of a world business cycle, Miranda-Agrippino and Rey (2020) on a global financial cycle, and Ciccarelli and Mojon (2010); Fernández, Schmitt-Grohé, and Uribe (2017); Auer, Levchenko, and Sauré (2019); Ha, Kose, and Ohnsorge (2019) on a world inflation cycle. In what follows, we use "global" and "world" interchangeably.

[2] Although estimates for the postwar period vary across variables and studies, they all point to a sizeable impact. The share of variance in domestic variables explained by a world factor usually ranges between 20 and 30 percent for output and asset prices, and rises to around 50 percent for inflation (Auer, Levchenko, and Sauré, 2019). Recent evidence also shows how U.S. monetary policy and global risk factors affect real and financial variables around the world (Dedola, Rivolta, and Stracca, 2017; Kalemli-Ozcan, 2019; Miranda-Agrippino and Rey, 2020).

[3] Studies that emphasize a rise in global output co-movement includes, inter alia, Lumsdaine and Prasad (2003); Kose, Otrok, and Whiteman (2008); Ductor and Leiva-Leon (2016). On the financial side, see Cesa-Bianchi, Martin, and Thwaites (2019); Jordà, Schularick, Taylor, and Ward (2019). Ha, Kose, and Ohnsorge (2019) and references therein also report a rise in inflation synchronization.

variance in country-specific macro-financial dynamics accounted for by the extracted world cycles. Finally, we examine the role of trade and financial integration in explaining the distribution of variance decompositions across countries and over time using panel regressions.

Our empirical analysis establishes three new facts. First, while world cycles account for a non-trivial share of the volatility in all domestic variables over the postwar period (1950–2019), they affect prices (consumer goods and asset prices) much more than quantities (output and credit). Second, while globalization has intensified over time, synchronization has not increased uniformly across variables. Although price synchronization has risen steadily over the past 70 years, this is not the case for output and credit. Global output and credit cycles were as strong during the Bretton Woods era (1950–1971)—a period of limited trade and financial integration—as during the globalization period (1984–2006). Following the Global Financial Crisis (GFC), synchronization in both output and credit declined to relatively low historical levels. The variance of output and credit driven by the global cycle remains below 20 percent in normal times (i.e., outside of the GFC). In contrast, asset price synchronization has increased steadily since Bretton Woods—from 40 percent to 60 percent for the median country—and has remained close to this level even after the GFC. In other words, while greater asset price synchronization is a robust feature of the current global economy, we find no consistent evidence of a similar trend in output and credit. The striking disconnect between asset prices and real quantities proves robust across a wide range of specifications, including alternative measures of growth rates, definitions of global factors, country samples, and time spans. Third, panel regressions reveal that while trade integration is generally associated with a higher contribution of world cycles to output and asset price fluctuations, financial integration has contrasting effects: greater financial openness is, on average, associated with a lower contribution of world cycles to output synchronization, but a higher contribution to asset price synchronization. In other words, countries that have become more financially open have experienced higher synchronization of their asset markets with the global financial cycle, but lower synchronization of output with the world business cycle.

We rationalize these findings in the second part of the paper. We show that a simple model with international portfolio diversification and endogenous technological choice can reproduce the puzzling disconnect between the rising synchronization of asset prices and the stable (or even declining) synchronization of output. The model combines the classic endogenous technological choice mechanisms of Saint-Paul (1992) and Obstfeld (1994) with imperfect international financial integration. In this setting, greater financial integration expands risk-sharing opportunities and encourages countries to diversify their asset holdings. The resulting increase in foreign demand for domestic assets raises the international co-movement of asset prices. At the same time, improved risk-sharing incentivizes countries to specialize in higher-return, riskier technologies, leading to greater idiosyncratic output fluctuations and lower output synchronization across countries. In other words, greater financial integration can simultaneously produce more synchronized asset markets and more desynchronized real economies—a mechanism consistent with our empirical

findings.[4]

This paper makes several important contributions. The first is a substantial increase in the macro-financial data available to researchers. Our dataset increases the frequency of historical macro-financial series, which are typically available only at annual frequency (e.g., Jordà, Schularick, and Taylor, 2017; Müller and Verner, 2024). Using annual data not only washes out short-lived cycles, but also prevents meaningful time comparisons because the number of observations is insufficient to estimate dynamic factor models on sub-samples. We also address a long-standing issue of country coverage. Existing evidence on world cycles is usually neither truly "long" (i.e., typically limited to the post-1990s) nor truly "world" (i.e., often limited to advanced economies).[5] By significantly improving coverage for both advanced and emerging markets before the early 1990s, we can, for the first time, compare the macro-financial behavior of most countries both before *and* after their integration into world markets. This extended coverage also allows us to identify truly "world" cycles, as opposed to regional cycles or cycles affecting only advanced economies. A final contribution is the addition of long credit series, especially for emerging markets, which provides a much more accurate picture of the global financial cycle.[6]

Second, we contribute to the large empirical literature on world cycles by showing that part of the conventional wisdom on this topic stems from data gaps. Using a more complete statistical picture, we confirm that the global synchronization of consumer and asset prices has increased steadily and significantly over the last 70 years. However, we challenge the view that output and credit synchronization has risen in the same way. In doing so, we are the first, to our knowledge, to highlight the divergent trajectories of real quantities and financial prices over the long run. We also provide new evidence on how financial and trade linkages connect domestic economies to the global economy over the long run. The synchronizing effect of trade is consistent with the literature documenting the positive impact of trade integration on bilateral output correlations (Duval, Li, Saraf, and Seneviratne, 2016) and on asset prices (Forbes and Chinn, 2004). Similarly, the negative correlation (within a country over time) between financial integration and output synchronization that we identify echoes the recent literature examining the effect of finance on bilateral co-movement of economic variables. Kalemli-Ozcan, Papaioannou, and Peydró (2013) identify a strong negative effect of banking integration on output synchronization, conditional on global shocks and country-pair heterogeneity. Kalemli-Ozcan, Papaioannou, and Perri (2013a) also find that in periods without financial crises, increases in bilateral banking linkages are associated

[4]Note that the model predicts consumption-smoothing gains from greater financial risk-sharing outweigh the costs of increased idiosyncratic output volatility caused by endogenous technological specialization.

[5]For instance, long historical comparisons based on quarterly data are almost exclusively focused on G7 countries (Kose, Otrok, and Whiteman, 2008; Doyle and Faust, 2005). Studies with broader geographical coverage are generally constrained to the post-1990s due to data limitations for emerging markets and smaller advanced economies. Our dataset alleviates this trade-off.

[6]Existing credit series are usually annual and limited to advanced economies (Jordà, Schularick, and Taylor, 2017), and are often not corrected for breaks. Long quarterly credit statistics with break adjustments are provided by the *Bank for International Settlements* (BIS), but their coverage is uneven across countries and time. The lack of clean and balanced credit series helps explain the scarcity of research on credit cycles compared to asset prices. We extend the BIS approach to new archival data, allowing us to fill the remaining gaps in cross-country credit statistics.

with diverging output cycles. However, this relationship is significantly weaker during financial turmoil, suggesting that financial crises induce co-movement among more financially integrated countries.[7] Our findings thus show that financial and trade integration affect not only bilateral co-movement patterns, but also the way countries co-move with the rest of the world over the long run.

We also contribute to the macro-financial literature from a theoretical perspective. To date, theoretical and empirical studies have largely examined the synchronization of output and asset prices in isolation. On the one hand, seminal theoretical models have focused on how financial integration can lead to diverging output cycles.[8] On the other hand, a more recent strand of literature attempts to explain how financial imperfections can give rise to a global financial cycle (e.g., Bruno and Shin, 2014; Miranda-Agrippino and Rey, 2020). As noted in Miranda-Agrippino and Rey (2022), "one should recognize how challenging it is for the finance literature to model quantities and prices jointly." Our conceptual framework provides a mechanism for analyzing the synchronization of output and asset prices together.

Our findings also have three important policy implications. First, a low level of financial integration does not imply, *per se*, a lower level of international economic co-movement. Contrary to conventional wisdom (Williamson, 1985; Kose, Otrok, and Whiteman, 2008), the Bretton Woods period was also affected by world cycles, even though capital controls were the norm and financial systems were highly regulated. Conversely, a high level of international financial integration does not always imply stronger output co-movement. In fact, in the long run and absent major global financial crises, we find that international financial integration has reduced global output co-movement in a given country.[9] Although contagion effects can dominate (as exemplified by the GFC), the focus on the most recent financial crisis has painted a biased picture and overlooked some of the de-synchronizing effects finance had during the 20 years leading up to the GFC. Second, the modest impact of world cycles on domestic output and credit provides perspective on the degree—or lack—of policy autonomy. Outside periods of extreme global (real or financial) shocks, world cycles have had a limited impact on key policy targets, namely output and credit. In particular, local credit conditions for the private sector appear, at least quantitatively, to remain relatively insulated from the external environment. Third, the striking decoupling between the high (and rising) global synchronization of consumer prices, on the one hand, and the low (and stable) synchronization of output and credit, on the other, raises difficult issues for the conduct of monetary policy. As suggested by Auer, Borio, and Filardo (2017), the reaction functions of central banks for both

[7] Duval, Li, Saraf, and Seneviratne (2016); Cesa-Bianchi, Imbs, and Saleheen (2019) find similar results.

[8] For instance, Backus, Kehoe, and Kydland (1992) develops a DSGE economy with complete markets, where capital mobility generates negative co-movements of output across countries. Kalemli-Ozcan, Papaioannou, and Perri (2013b) finds that, in periods without financial crises, increases in bilateral banking linkages are associated with more divergent output cycles.

[9] Kalemli-Ozcan, Papaioannou, and Peydró (2013) also present a model where the relationship between integration and synchronization depends on the type of shocks hitting the world economy. Acemoglu, Ozdaglar, and Tahbaz-Salehi (2015) show that beyond a certain point, dense interconnections serve as a mechanism for the propagation of financial shocks, leading to a more fragile financial system.

monetary and macroprudential policies include variables with very different degrees of autonomy from world cycles. The issue would become all the more complex with "leaning against the wind" policies responding to movement in asset prices (see, for example, discussions in Svensson (2017)).

The remainder of the paper is organized as follows. Section 2. presents the key features of the new macro-financial database. Section 3. details the empirical analysis and main results. Section 4. develops a model to explain the diverging synchronization of output and asset prices. The final section concludes.

## 2. The Macro-Finance Dataset

We assemble an original and extensive macro-financial dataset covering a wide range of advanced and emerging countries over the entire post-war period (from 1950:Q1 onward) at quarterly frequency. Our main source is the *International Financial Statistics* (IFS) publications, which contain the complete historical record of statistical information available at the IMF. Since 1944, as part of the original Bretton Woods agreement, the IMF has required member countries to report standardized macro-financial statistics at high frequency, particularly on industrial production, prices, trade, foreign reserves and credit aggregates. As a result, the IMF has become a leading institution for data collection and dissemination among international organizations, and the principal provider of macro-financial data to academic researchers, through the online IFS database.[10] However, for institutional and historical reasons, only a small share of the information compiled in the IFS has been made available through its online portal. Our main contribution is to use the IFS paper volumes from the IMF archives to extend the availability of statistical information over the past 75 years.

### 2.A. Variables and Coverage

**Definitions of variable.** Our quarterly database includes five variables: (i) real GDP (ii) domestic credit (iii) consumer prices (iv) stock prices and (v) sovereign bond yields. Although specifics apply, we generally follow a uniform procedure to assemble the series. We begin by collecting official quarterly statistics provided online from national statistical institutes or international organizations. We then use the IFS historical publications to extend all series backward, after verifying that definitions of variables align.[11]

For consumer prices, stock prices, and bond yields, this procedure is relatively straightforward and generally involves collecting data directly from older printed vintages of the IFS. Changes in definitions and collection methods over time have been minimal for these variables. Consumer

[10] The OECD, created in 1961, is the only other institution with a similar mandate, but its geographical, temporal and financial coverage is much more limited than the that of the IMF.

[11] To be more precise, we verify that definitions match *de jure* and that data series report the same variations *de facto* (i.e., IFS and official statistics match when both are available). A companion excel file, downloadable from the authors' website, reports the dates for which we use IFS archives to extend each official series.

prices are reconstructed using the "cost of living" index (line 66 in IFS), which is consistent with the standard definition of the Consumer Price Index (CPI). Stock prices are based on the "share price index" (line 61 or above in the IFS), which reflects the prices of shares traded on the main stock exchange. When this index is unavailable, we use the "industrial share price" as a proxy. Bond yields refer to average yields on national government bonds with at least seven years of remaining maturity (line 62 in the IFS).

Data for domestic credit are based on "claims on the private sector from domestic banks" (IFS line 32d). This definition is equivalent to the "bank credit to the private non-financial sector" as provided by the BIS, and excludes foreign lending as well as credit from other institutional sectors (e.g., the government or non-bank financial institution).[12] Unlike other variables in the dataset, credit aggregates are subject to a significant number of definition adjustments over time. However, these changes are documented in the IFS paper volumes, and, at least for several quarters, values are reported under both the old and the new definitions in different IFS vintages. This overlap allows us to link successive series and construct long-run credit data without breaks, in line with Dembiermont, Drehmann, Muksakunratana, et al. (2013), which is currently the most comprehensive dataset of long quarterly credit statistics. When definitional and data adjustments were too substantial, credit data series were not extended.

The construction of long quarterly real GDP series relies on historical quarterly Industrial Production (IP) data from the IFS volumes (line 67), combined with official annual real GDP data series from the *Penn World Tables* (Feenstra, Inklaar, and Timmer, 2015). The extension of existing official quarterly GDP series is carried out using temporal disaggregation methods (Chow and Lin, 1971). These methods are widely applied in countries where collecting quarterly data (or surveys) is too costly, and where IP is the most reliable high-frequency indicator of output fluctuations.[13] In practice, this method distributes annual GDP across quarters using quarterly IP growth as a proxy, while ensuring that quarterly growth rates are consistent, on average, with annual GDP series. To illustrate this methodology, Figure 1 compares our synthetic quarterly GDP series with official quarterly GDP series for the US and France – the only two countries that publish such data since 1950. The synthetic GDP series very accurately tracks the official quarterly series for both countries. Similar level of comparability holds for other countries available in the dataset, though over shorter time period. Note that real GDP series are adjusted for seasonality.[14]

**Overall coverage.** The dataset provides comprehensive coverage of the postwar period (1950-2019) for (i) 37 countries for real GDP, (ii) 45 countries for credit, (iii) 48 countries for CPI, (iv)

[12] This definition is also consistent with that used in prominent academic research on credit cycles, e.g., Claessens, Kose, and Terrones (2012); Jordà, Schularick, and Taylor (2017).

[13] Temporal disaggregation methods are recommended in the IMF *Quarterly National Accounts Manual* [URL:https://www.imf.org/external/pubs/ft/qna/]. They are a standard tool used by international organizations (e.g., the OECD) to generate long quarterly GDP data when official quarterly data are unavailable.

[14] The official quarterly real GDP data we collect from national statistical institutions is seasonally adjusted. The historical extension of these series relies on seasonally adjusted industrial production data from the IFS archives.

**Figure 1.** Real GDP Growth - Synthetic vs. Official Statistics

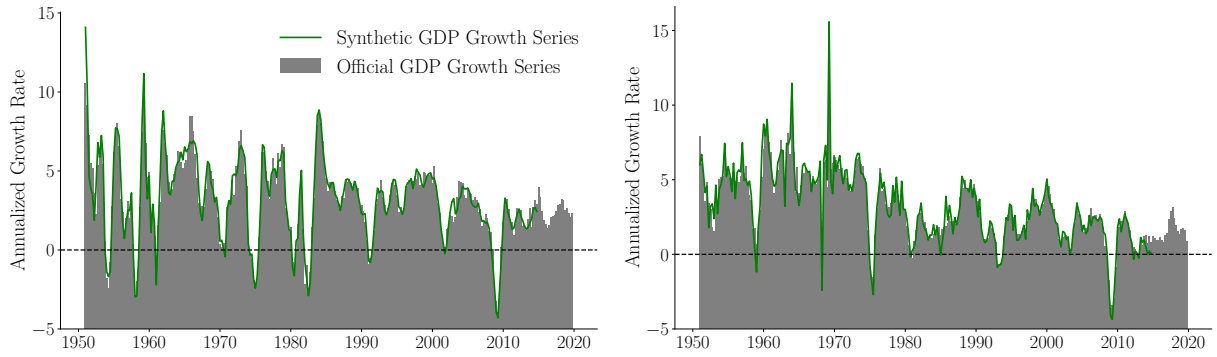



Figure 1.A. United States

Figure 1.B. France

*Notes.* Grey bars show year-on-year real GDP growth rates calculated from official quarterly GDP data. Data for the US come from the BEA, and data for France from INSEE. The green (solid) lines show growth rates derived from our synthetic quarterly GDP series, which combines annual GDP data from the Penn World Tables with historical quarterly Industrial Production (IP) data from the IFS volumes.

27 countries for stock prices and (v) 17 countries for bond yields. Table A1 in the Appendix lists the countries covered.

## 2.B. Comparison with Existing Macro-Financial Datasets

**Consistency and Coverage.** To assess the consistency of our dataset, we compare it to alternative macro-financial datasets. We first find that the new data series co-move strongly with comparable variables reported at annual frequency, implying that our dataset provides reliable information, albeit at a higher frequency and for a much broader set of countries. To illustrate this consistency, Figure 2 compares real credit and stock price growth from our quarterly dataset to the corresponding annual series provided by the dataset presented in Jordà, Schularick, and Taylor (2017) – only available at annual frequency and for a smaller set of countries. In the case of Norway and Denmark, for instance, our dataset provides an additional thirty-five years of quarterly stock price data - between 1950 and 1985 - beyond what is currently available from online official sources. Over the common period, our data closely aligns with annual stock price growth series from Jordà, Schularick, and Taylor (2017). We reach similar conclusions when comparing our assembled series for private credit growth, in Spain and Italy for instance, with both official BIS releases and the annual data from Jordà, Schularick, and Taylor (2017).[15]

Compared with popular sources of historical macro-financial data at quarterly frequency —particularly the OECD and BIS—our dataset expands coverage for advanced economies by 20 to 30 percent, depending on the variable considered. These additional series, concentrated between 1950 and 1980, are essential for contrasting the behavior of macroeconomic variables during decades of

[15]We also find a close correlation between our quarterly series and annual data for bond yields and inflation from common institutional sources. By construction, GDP growth derived from our dataset is aligned with annual GDP growth derived from official sources.

**Figure 2.** Examples of Increases in Coverage and Comparison with Annual Data (Jordà, Schularick, and Taylor, 2017) for Stock Prices and Credit Growth in Advanced Economies.

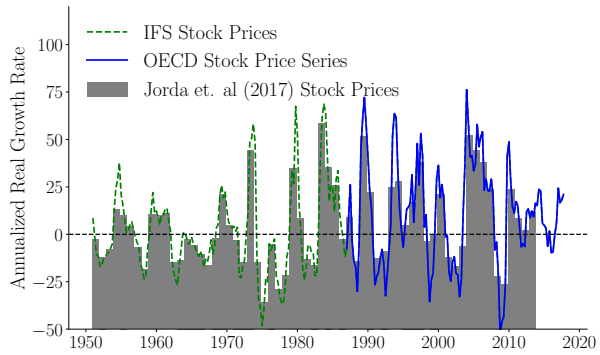



Figure 2.A. Stock Price - Norway

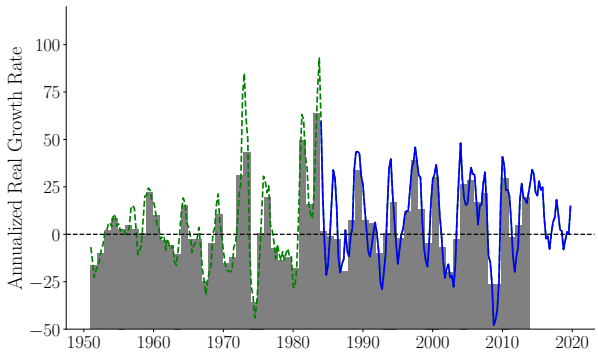



Figure 2.B. Stock Price - Denmark

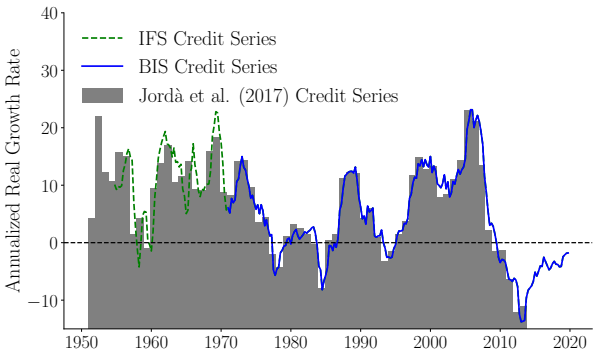



Figure 2.C. Credit growth - Spain

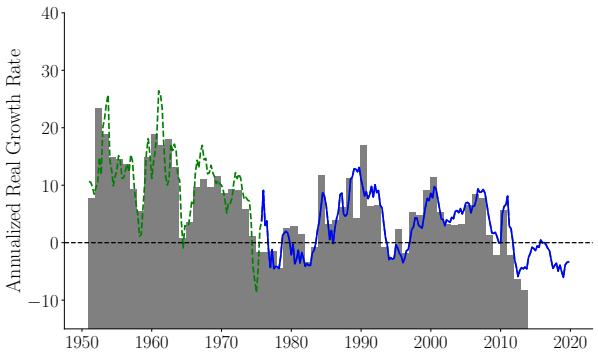



Figure 2.D. Credit growth - Italy

*Notes.* Grey bars show year-on-year growth rates of real stock prices and real credit based on annual data from Jordà, Schularick, and Taylor (2017). Green (dashed) lines, labeled "IFS Series," show growth rates derived from our quarterly data constructed from the IFS archives. To illustrate how our data extend existing coverage in the literature, the blue (solid) lines show growth rates based on already available OECD data for stock prices and BIS data for credit.

"low" economic integration (Bretton Woods era) with the post-1980 "high" integration era.

Coverage gains are even higher for emerging markets. The dataset roughly doubles the quarterly coverage of GDP and credit in emerging markets relative to the OECD and BIS datasets. For stock prices, coverage increases by approximately 50 percent relative to the OECD. In the case of GDP, our dataset is particularly valuable for large emerging markets that are not OECD members, or for those that are part of the OECD but lack publicly available historical data. For example, our data set provides an additional 45 years of quarterly GDP statistics for both Chile and India (Figure 3, upper panels). Similarly, we significantly expand the coverage of BIS credit statistics for major emerging markets, particularly for countries where BIS series end in the late 1990's or are altogether unavailable due to non-membership. This is illustrated in Figure 3 for Colombia and Brazil (lower panels).

Finally, we enhance the joint coverage across data series, resulting in a more balanced panel than is currently available. For example, while long and high-quality credit statistics are available from the BIS for some large emerging markets, corresponding data on prices or output are often missing. Conversely, some countries with strong coverage for real variables (e.g. GDP, CPI) lack information on the financial side (e.g. credit and asset prices). This broader coverage across variables makes it possible to study financial and real economic cycles in a larger number of countries. It is especially valuable for studying these cycles in developing countries, where such information has traditionally been missing.

**Data Quality.** In addition to extending the country and time coverage of existing datasets, our methodology also improves the quality of historical GDP and credit series. To date, official quarterly GDP data before 1990 are available for only seven OECD countries. As a result, international organizations commonly rely on interpolation methods to generate long quarterly GDP statistics. However, these interpolations are not always based on actual output indicators such as industrial or manufacturing production and deviate from official statistics when these are available.[16] Directly using historical IP data from IFS archives therefore improves GDP series relative to interpolated alternatives provided by widely used international macroeconomic databases.[17]

Similarly, we address several issues related to the compilation of credit data. In particular, historical discontinuities in credit series often result from changes in the definition and scope of the banking sector or from changes in accounting standards. These breaks are typically not addressed

[16]The OECD provides real quarterly GDP data for 20 countries starting in 1960, but approximately half of these series are based on linear or quadratic interpolations. Some examples, along with the solutions offered by our database, are discussed in Appendix AB.

[17]Concerns about the quality of long quarterly real GDP data have been raised in recent papers. For example, Romer and Romer (2017) consider OECD's quarterly real GDP data since 1967 and emphasize that such series are "less consistent in both quality and methodology across countries". For this reason, they rely on IP series, which is more directly measured and a more reliable indicator for assessing the effects of crises on business cycles. Similarly, the influential literature on US monetary policy often relies on IP series (e.g. Romer and Romer, 2004). Our GDP series, constructed using temporal disaggregation methods, combine annual GDP data and quarterly IP data, to provide consistent and high-quality quarterly GDP series.

**Figure 3.** Examples of Increases in Coverage and Comparison with Annual PWT Data for GDP and Credit Growth in Emerging Economies.

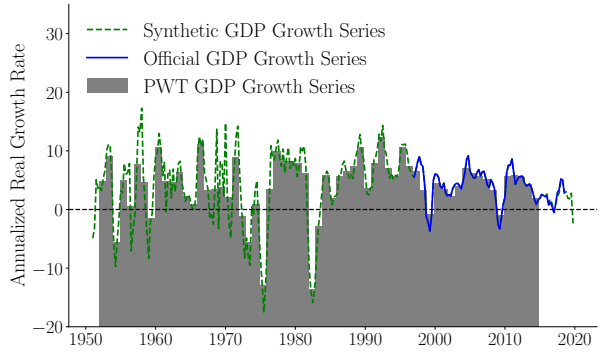



Figure 3.A. GDP Growth - Chile

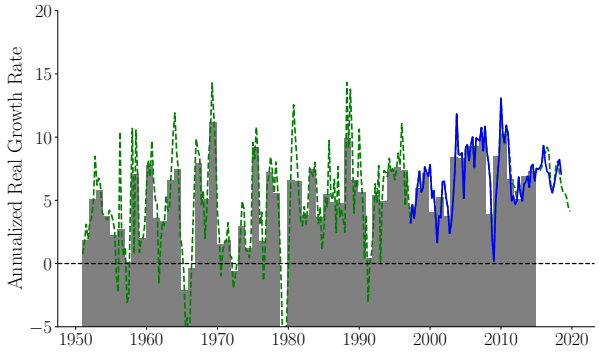



Figure 3.B. GDP Growth - India

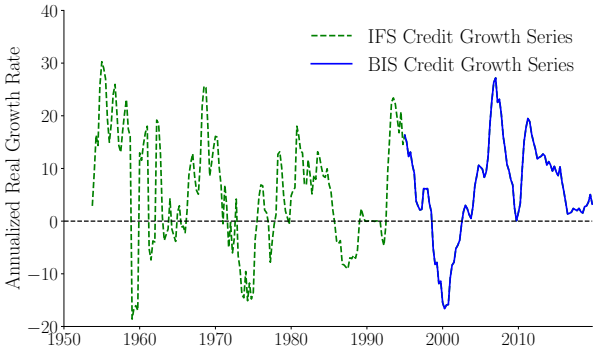



Figure 3.C. Credit growth - Colombia

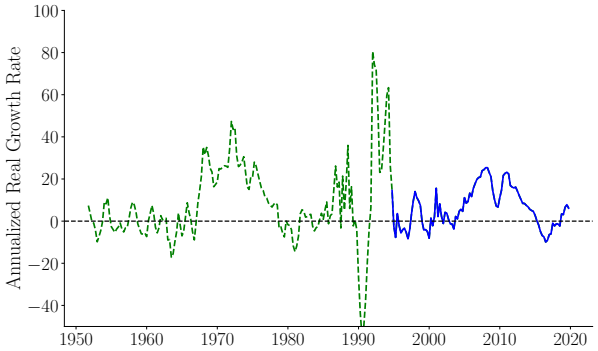



Figure 3.D. Credit growth - Brazil

*Notes.* Grey bars show year-on-year real GDP growth rates derived from annual data from the *Penn World Tables*. In the upper panels, the blue (solid) lines show GDP growth calculated using data currently available from official quarterly sources. In the lower panels, the blue lines show credit growth as provided by the BIS. The green (dashed) lines, labeled "IFS data," show the growth rates derived from our data based on the IFS archives.

in commonly used datasets. In line with the BIS long credit dataset (Dembiermont, Drehmann, Muksakunratana, et al., 2013), we use different vintages of the same source to address these discontinuities. The use of the IMF IFS paper archives allows us to extend the BIS series and fill remaining gaps in historical credit statistics. In addition, relying on the IFS as a single source ensures that definitions of variables are consistent and continuous across time and countries – a possible issue that arises when merging datasets from different organizations.[18]

To conclude this section, we highlight three important characteristics of our dataset. First, while we use historical data from the IFS paper archives to extend the coverage of official statistics, the data contained in the IFS archives was originally provided by national authorities, and therefore constitutes official data as well. In other words, it was not produced by the IMF to fill potential gaps in official statistics. Second, although relying on IMF archives helps to reconstruct the statistical history of advanced economies in the earlier decades (e.g, the 1950s and the 1960s), the dataset also fills important gaps in the 1980s, the 1990s and even the early 2000s, for both emerging and advanced countries. Finally, the methods we employ to assemble long-run GDP and credit statistics are not novel. They are standard practices used by major providers of quarterly statistics such as the OECD and the BIS, but applied here to a new body of data that was previously unavailable.

## 3. Empirical Evidences on World Cycles

A "world cycle" refers to the common, synchronized fluctuations in macroeconomic or financial variables across countries that are driven by global forces. We begin by estimating dynamic factor models to identify the global component of each variable. We then report the share of volatility in country-specific aggregates explained by world cycles, both across countries and over time. Our results highlight a pronounced disconnect between quantities and prices over the postwar period. In particular, while the global synchronization of asset prices has always been high and has increased steadily with globalization, global output and credit synchronization have remained relatively low and stable (outside of the GFC). We conclude by formally examining the role of trade and financial integration in explaining these findings using panel estimations. In particular, we find that financial integration is associated with lower output synchronization but higher asset price synchronization.

### 3.A. Estimating World Cycles

In line with most of the empirical literature, we use a dynamic factor model to estimate world cycles and quantify their contribution to the variance of individual series in each country. Since we focus exclusively on co-movement at the world level, we restrict attention to a single-factor model,

[18]This explains why IMF archives (and original publications more broadly) have been widely used by economic historians to study the history of exchange rate arrangements or financial liberalization (Quinn and Toyoda, 2008; Ilzetzki, Reinhart, and Rogoff, 2019). The IMF Direction of Trade Statistics, for instance, has provided annual data since 1948, that have formed the basis for the trade literature to develop and estimate gravity models. To some extent, we extend this practice to macroeconomic and financial data.

following Stock and Watson (1989, 2011):

$$Y_{i,t} = P_i F_t + u_{i,t},$$
$$F_t = A_1 F_{t-1} + A_2 F_{t-2} + \cdots + v_t,$$
$$u_{i,t} = C_1 u_{i,t-1} + C_2 u_{i,t-2} + \cdots + e_{i,t},$$

where $Y_{i,t}$ denotes the variable of interest (e.g., output or credit) in country $i$ at time $t$, and $F_t$ is the world factor at time $t$. In practice, we use an AR(1) specification for both the factor and the error term, and estimate the model using Maximum Likelihood. All variables are expressed in year-on-year growth rates, except for bond yields, which are measured in yearly absolute differences (since they are already in basis points). Using year-on-year growth rates for both credit and prices helps control for potential seasonality in these series. Real GDP data are already seasonally adjusted.

This empirical framework is adopted for its simplicity and low computational cost. However, the results are robust to alternative specifications. Our findings are not sensitive to the number of AR lags or to the choice of factor extraction method, including Bayesian estimation or the inclusion of additional factors (e.g., regional factors). For instance, using a model in the spirit of Kose, Otrok, and Whiteman (2003) yields identical results. The use of a single world factor is also well supported by the data: the first eigenvalue explains a large share of the variance in all variables, while subsequent eigenvalues contribute only marginally. Test statistics from Onatski (2009) likewise confirm the appropriateness of a single-factor model for all variables (see Table A2 in the appendix). Finally, although we use year-on-year growth rates (or differences) in our benchmark estimations, the conclusions are unchanged when quarterly growth rates (or differences) are used instead, as reported in Appendix AC.3..

Building on our dataset's extended coverage, we first estimate the factor model and variance decompositions separately for each series (e.g., GDP, asset prices, etc.) over the full sample. We then estimate factors and variance decompositions for four distinct sub-periods: the Bretton Woods period (1951Q1–1971Q4), the oil shock period (1972Q1–1983Q4), the globalization period (1984Q1–2006Q4), and the GFC period (2007Q1–2019Q4). This historical breakdown is chosen for several reasons. First, it isolates periods of major global shocks to assess the sensitivity of results to outliers or episodes of extreme co-movement.[19] Second, debates on the role of globalization—whether trade or financial—often focus on comparing world synchronization before and after the sharp acceleration in globalization, typically dated to around 1985 (Jordà, Schularick, Taylor, and Ward, 2019). For the first time, we can directly compare the intensity of macro-financial co-movement during "normal" macroeconomic fluctuations in a low-integration period (1951–1971)

[19]These exceptional periods are important to consider but also heavily influence the results. The decade from 1973 to 1983 featured the collapse of the Bretton Woods system, two inflationary oil shocks, and widespread use of contractionary monetary policy in almost all advanced economies. Similarly, 2007–2019 was marked by the GFC and its aftermath. Including these outliers in a sub-period can substantially affect the findings. For example, including the oil shocks in the "globalization" period generally drives the conclusion that output synchronization increased over time.

with its counterpart in a high-integration period (1985–2006). The Bretton Woods period is notable for its steady growth and stable business cycle dynamics, whereas the globalization period (1984–2006) encompasses most of the Great Moderation. In addition, both periods are roughly equal in length. This decomposition is also consistent with Kose, Otrok, and Whiteman (2008), which facilitates comparison of our results with theirs.

Figure 4 reports the world cycles extracted for each variable: (i) real GDP (output), (ii) credit, (iii) stock prices, (iv) bond yields, and (v) inflation, along with 5th and 95th percentile confidence intervals. All variables are expressed as year-on-year growth rates—except for bond yields, which are expressed as yearly absolute changes—and are stated in real terms. Values are shown as deviations from the long-run sample mean and can therefore remain negative for extended periods. For example, average global growth and inflation were not negative in the post-1990s; they were simply below their long-run averages. Overall, the factors are precisely estimated over the whole period. Peaks and troughs align with major real and financial expansions and crises.[20] The factors are also consistent with existing studies that estimate them using annual data (e.g., Kose, Otrok, and Whiteman, 2003; Ha, Kose, and Ohnsorge, 2019; Auer, Levchenko, and Sauré, 2019). Finally, we find that the global output and credit cycles are strongly correlated (Table 1), whereas the correlation is much lower for all other pairs of cycles.

**Table 1.** World Cycles - Correlations

| | Output | Credit | Stocks Prices | Bond Yields |
|---|---|---|---|---|
| Credit | 0.82 | | | |
| Stock Prices | 0.23 | 0.12 | | |
| Bond Yields | -0.07 | -0.04 | 0.17 | |
| Inflation | -0.02 | -0.12 | -0.28 | -0.01 |

### 3.B. The Diverging Fates of Prices and Quantities

We now turn to the strength of world cycles and their evolution over time. Formally, for each country $i$ in our sample and each variable $y$ (e.g., GDP), we compute the share of historical variance explained by the corresponding world cycle $F_t^W$:

$$\theta_{y_i}^W = (P_i)^2 var(F_t^W)/var(y_{i,t}).$$

**Differential Patterns of Synchronization.** Figure 5 reports the results for the median country in our sample (i) over the full postwar period (1950–2019) and (ii) for "normal times," defined as the postwar sample excluding the oil crisis (1973–1983) and the GFC (2007–2010). In line with other

[20] In an earlier version of this paper focused solely on output (Monnet and Puy, 2016), we conducted a narrative analysis of the world output cycle based on IMF Annual Reports published between 1950 and 2014 and found that the world cycles described in the reports closely match the turning points and phases identified by our estimation procedure.

**Figure 4.** Estimated World Cycles

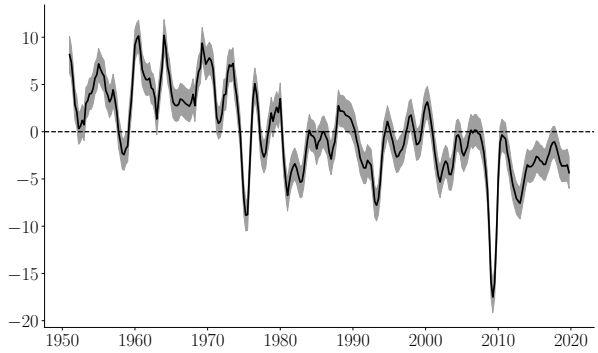



Figure 4.A. Real GDP Growth

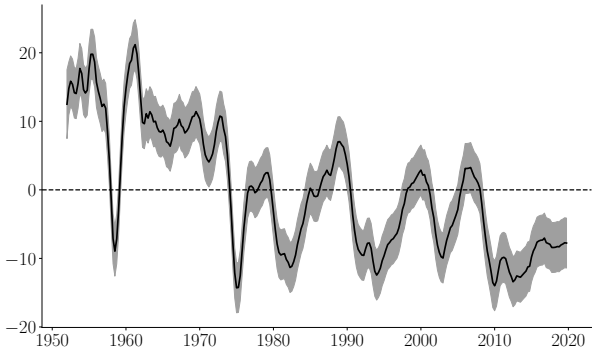



Figure 4.B. Real Credit Growth

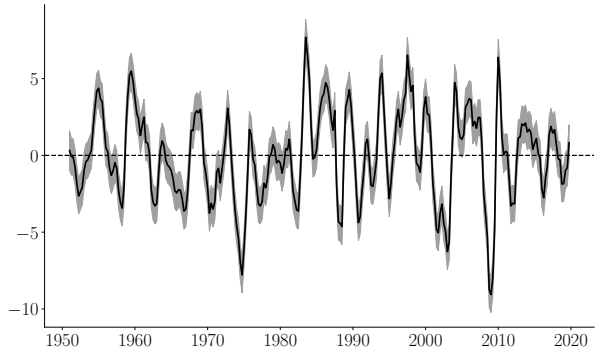



Figure 4.C. Stock Price Growth

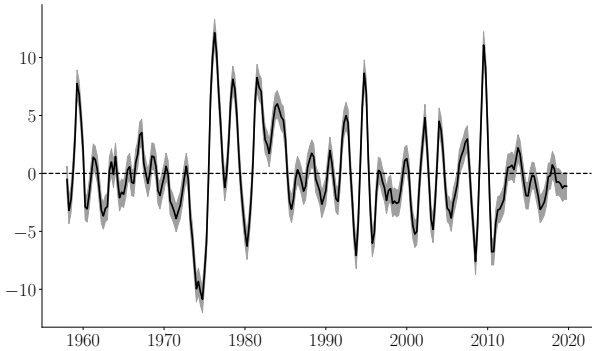



Figure 4.D. Real Bond Yields Change

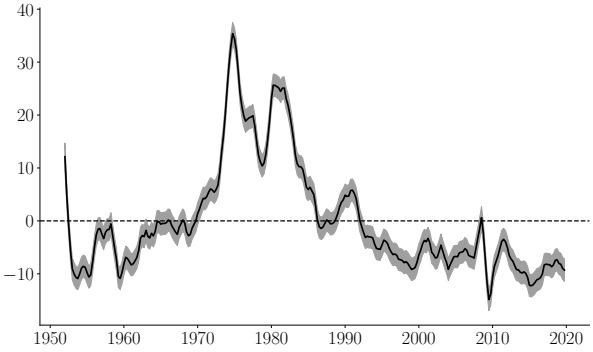


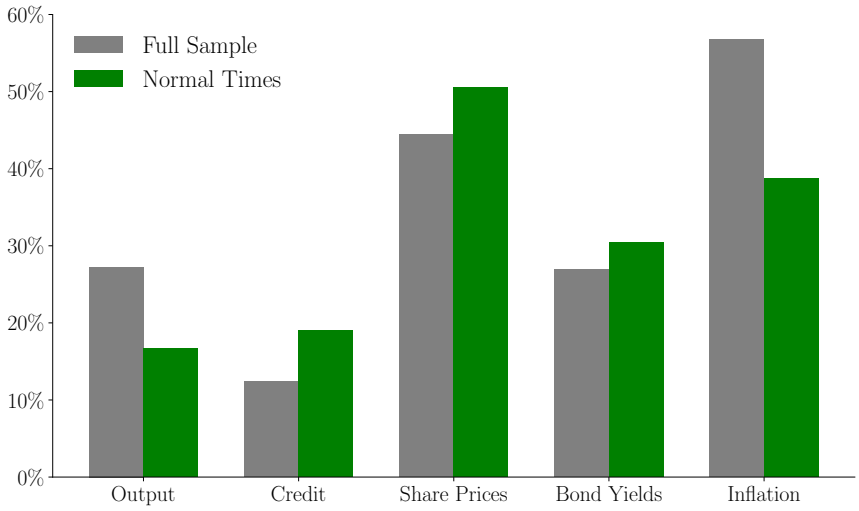

Figure 4.E. Inflation

*Notes.* The figure shows world cycles for each variable. Shaded areas indicate the 5th and 95th percentile confidence intervals. All variables are expressed in real terms and as year-on-year growth rates, except for bond yields, which are expressed as yearly absolute changes. Values are reported as deviations from the long-run sample mean and can therefore remain negative for extended periods.

contributions using annual data (e.g., Kose, Otrok, and Whiteman, 2003; Ha, Kose, and Ohnsorge, 2019; Auer, Levchenko, and Sauré, 2019), we find that world cycles account for a significant share of the variance in domestic variables between 1950 and 2019. For example, the world business cycle explains nearly 30 percent of domestic output fluctuations in the median country and about 60 percent of inflation fluctuations. However, we also highlight several new findings.

First, world synchronization is significantly higher for prices (assets and goods) than for quantities (output and credit). This difference is particularly pronounced in "normal times": after excluding outliers, the share of variance explained by world cycles for credit and output dynamics in the median country is around 17 percent, whereas it ranges between 40 and 60 percent for asset (stock) prices. Among financial variables, the contrast between asset prices and credit is especially stark, with synchronization in asset prices far exceeding that in credit volumes.

**Figure 5.** Variance Decompositions - Median Country

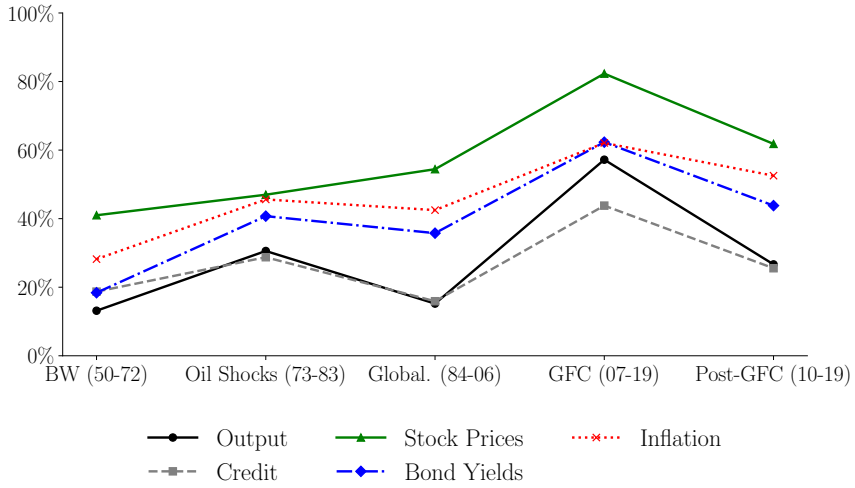



*Notes.* The figure shows the share of variance in domestic variables explained by each corresponding world cycle over the full sample period (1950–2019) and for normal times only, i.e., after excluding the oil crisis (1973-1983) and the GFC (2007-2010) from our sample. Results are reported for the median country.

Second, world synchronization has not increased uniformly across all variables over the past 75 years. Figure 6 reports the median share of variance explained by each world cycle in our sample, distinguishing across subperiods. We find that the global synchronization of quantities has remained relatively stable: world output and credit cycles were as strong during Bretton Woods (1950–1971), a low point of financial and trade integration, as during the globalization period (1984–2006). After the GFC, both output and credit synchronization nearly reverted to these relatively low historical levels. By contrast, price synchronization (for both assets and goods) has roughly doubled since Bretton Woods and has remained at these elevated pre-crisis levels. This pronounced decoupling between prices and quantities over the long run is confirmed when using alternative cutoff dates and when reestimating cycles and variance decompositions with 15-year rolling windows (Figure A2). While output and credit synchronization have remained relatively low and stable over the

entire sample, we observe a slow but steady rise in asset price synchronization beginning in the early 1990s for all countries in our sample. This key result is also robust to the use of a balanced country sample across all variables, the use of quarter-on-quarter growth rates and rolling window estimations (see Appendix, AC.2., AC.3., AC.1.).

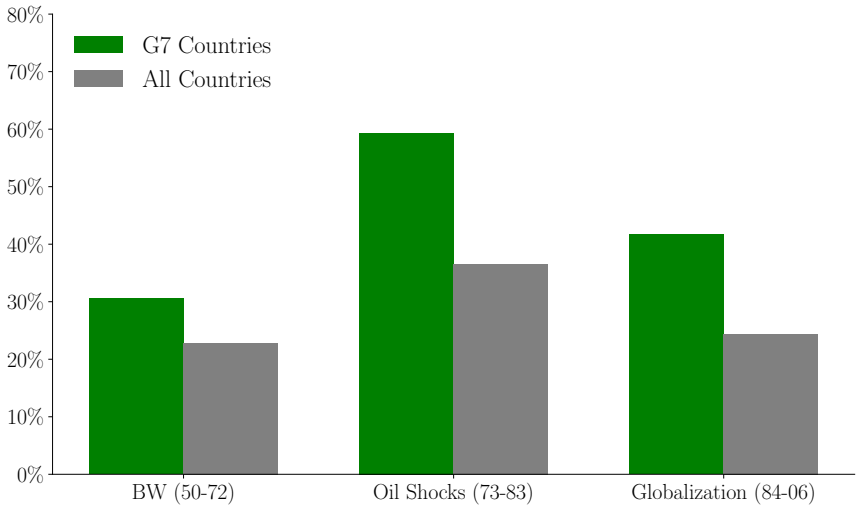
**Figure 6.** Variance Decompositions - Time Variation




*Notes.* The figure shows the share of variance in domestic variables explained by each corresponding world cycle over each sub-sample period. Results are reported for the median country.

**Discussion of New Findings.** Our results confirm the robustness of some findings in the existing literature—most notably, the secular rise in global synchronization of consumer prices documented in Ciccarelli and Mojon (2010) and Auer, Borio, and Filardo (2017). They also nuance or contradict other influential contributions. First, our results highlight the long-run, secular increase in stock price synchronization. This trend begins well before the financial globalization period emphasized in the studies by Rey (2015) and Miranda-Agrippino and Rey (2022). Also, the fact that global GDP synchronization has not increased over time challenges the conclusions of Kose, Otrok, and Whiteman (2008), that finds that a common factor explained, on average, a larger fraction of output volatility in the globalization period (1986:Q3–2003:Q4) than in the Bretton Woods period (1960:Q1–1972:Q2) using quarterly real output data for the G7 countries. Comparing our results to theirs, we find that their key conclusion—the rise in output synchronization—relies on two data limitations, namely time and country coverage. Indeed, the absence of output data for the first ten years of Bretton Woods mechanically underestimates the co-movement of G7 economies. Also, when the analysis is extended to a larger set of countries, the rise in output synchronization disappears entirely, as highlighted in Figure 7.

**Figure 7.** World Business Cycle - Sensitivity to Country Coverage




*Notes.* The figure shows the average share of variance explained by the world factor over time for all countries and for G7 countries. This is the same statistic reported in Kose, Otrok, and Whiteman (2008).The same patterns hold if we use the median, as shown in Figure 6.

The low and stable synchronization of credit at the world level also contrasts with the sharp rise in the synchronization of asset prices and contradicts some earlier studies. Using correlation and concordance analysis, Claessens, Kose, and Terrones (2011) found evidence that the synchronization of financial cycles across countries had increased over time, particularly for credit and equity cycles. While we confirm this pattern for equity markets, their finding for credit does not hold when more complete data are used. This divergence can be explained by several economic and institutional factors. Local securities markets are far more integrated internationally than their credit counterparts (e.g., Cetorelli and Goldberg, 2012a; International Monetary Fund, 2007; Arslanalp and Tsuda, 2014). Foreign bank participation in domestic credit markets remains limited in most countries, whereas foreign participation in equity and bond markets is around 50 percent. The borrower profiles in each market also differ substantially: large borrowers (e.g., multinationals and exporters) raise funds on capital markets, whereas local credit markets primarily serve smaller borrowers (firms and households) whose demand is more closely tied to local economic conditions. A sizeable part of bank credit is made of housing loans to households which, in most countries, have little access to international markets (Müller and Verner, 2024). Finally, domestic credit is structurally more exposed to idiosyncratic political forces than capital markets. This may occur through the influence of public or semi-public banks (e.g., national development banks in emerging markets), which can be used to pursue country-specific objectives, or through the presence of local political credit cycles (Kern and Amri, 2020).

We also note that this result is not inconsistent with recent literature emphasizing the synchronization of global credit and banking flows (Cetorelli and Goldberg, 2012b; Bräuning and Ivashina, 2020; Miranda-Agrippino and Rey, 2020). That literature generally focuses on direct cross-border

lending provided by global banks—a type of credit that is not included in the domestic bank credit aggregates we use.[21] This form of funding, which is overwhelmingly denominated in USD and typically extended to large firms, is naturally more closely connected to global funding conditions than to local credit markets.[22] It has also been shown that domestic credit in local currency can offset the shocks to foreign currency loans (Avdjiev, Burger, and Hardy, 2025).

### 3.C. Globalization and Synchronization: Evidence from Panel Regressions

While trade and financial integration have expanded markedly across countries since 1950, our results reveal a striking asymmetry: asset prices have become increasingly synchronized at the global level, whereas output synchronization has remained broadly stable. This divergence—both in levels and in long-run trends—is one of the paper's most novel empirical findings, that cannot be explained by institutional factors alone (as discussed in the previous section with respect to credit). In what follows, we formally test the hypothesis that trade and financial integration affect the synchronization of output and asset prices in fundamentally different ways. These elements raise important theoretical challenges, which we address in Section 4.

In practice, we estimate the following panel regressions:

$$\theta^W_{i,t} = \beta_1 \cdot Trade_{i,t} + \beta_2 \cdot Finance_{i,t} + \beta_3 \cdot Controls_{i,t} + \alpha_i + \delta_t + \epsilon_{i,t},$$

where $\theta^W_{i,t}$ denotes the share of variance explained by the world cycle in country $i$'s fluctuations during sub-period $t$; $Trade_{i,t}$ measures the degree of trade integration; $Finance_{i,t}$ measures the degree of financial integration; and $Controls_{i,t}$ is a vector including a measure of foreign exchange flexibility and a crisis indicator that equals one if the country experiences a financial crisis in the sub-period. $\alpha_i$ represents country-fixed effects, and $\delta_t$ captures time-fixed effects. We compute $\theta^W_{i,t}$ over non-overlapping five-year panels starting in 1950. Standard errors are clustered at the country level in all estimations.

We measure trade integration as the average ratio of exports plus imports to GDP for each country in each sub-period, and financial integration using the de jure Chinn-Ito index (Chinn and Ito, 2006), where higher index values indicate greater financial integration.[23] Trade data are

[21] Domestic bank credit aggregates include funding provided by the local affiliates of foreign banks incorporated in the country, but they exclude direct cross-border lending from global banks to the private sector.

[22] For example, Bräuning and Ivashina (2020) examine international syndicated corporate loans denominated in USD and extended to large corporate borrowers in emerging markets, while Miranda-Agrippino and Rey (2020) use an "aggregate" of global inflows defined as direct cross-border credit flows provided by global banks.

[23] Given our interest in the risk-sharing implications of financial integration, we favor a de jure measure—specifically the Chinn-Ito index—as it better captures the policy environment that governs cross-border financial transactions. By contrast, de facto measures (such as gross foreign assets and liabilities) may be heavily influenced by factors unrelated to actual risk-sharing among households and firms. These include the disproportionate role of financial centers in global capital flows (e.g., London) or the status of certain jurisdictions as tax havens (e.g., Luxembourg, Ireland). For example, according to de facto indicators, Luxembourg appears more than 100 times (and Ireland, 10 times) more financially open than the United States—an implausible comparison that does not reflect firms' actual access to international capital markets.

sourced from the IMF Direction of Trade Statistics. We control for the exchange rate regime using the updated exchange rate classification from Ilzetzki, Reinhart, and Rogoff (2019). For each country, we average the detailed classification (ranging from 1 to 14) over each sub-period. By construction, higher index values correspond to greater exchange rate flexibility during that period. The crisis variable is taken from the Laeven and Valencia (2018) database and equals 1 if a country experiences a banking crisis, sovereign debt crisis, or currency crisis during the sub-period.

Tables 2 and 3 report the results using, respectively, the share of variance explained by the world business cycle in country $i$'s output fluctuations and by the world equity cycle in country $i$'s domestic equity price fluctuations. Column 1 in both tables reports results without fixed effects. Columns 2 and 3 include country and time fixed effects. Column 4 includes all controls together with fixed effects. The inclusion of time-fixed effects helps control for common trends or shocks affecting all countries simultaneously, while country-fixed effects capture invariant country characteristics that may explain why some countries consistently co-move less (or more) than others with the global cycle. These fixed effects allow us to estimate more rigorously how changes in trade or financial integration within a country over time affect its synchronization with the world cycle. To date, influential contributions (following Kose, Prasad, and Terrones (2003)) have generally relied on cross-sectional analysis or panel estimations without fixed effects, potentially leading to significant omitted variable bias, as we emphasize in our empirical analysis.

**Table 2.** Output Synchronization and Globalization

| | (1) GDP VD | (2) GDP VD | (3) GDP VD | (4) GDP VD |
|---|---|---|---|---|
| Trade Openness | 0.280*** | 0.549*** | 0.431*** | 0.410*** |
| | (0.0824) | (0.0678) | (0.0803) | (0.0862) |
| Financial Openness | 3.116** | -0.911 | -2.588* | -2.843* |
| | (1.144) | (1.251) | (1.461) | (1.443) |
| Crisis | | | | -2.291 |
| | | | | (1.535) |
| FX Flexibility | | | | 0.287 |
| | | | | (0.388) |
| Country | No | Yes | Yes | Yes |
| Year | No | No | Yes | Yes |
| N | 363 | 363 | 363 | 363 |
| r2 | 0.113 | 0.0829 | 0.360 | 0.364 |

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables 2 and 3 show that greater trade openness increases the influence of the world factor on local variables. Financial integration is associated with a reduction in the synchronization of domestic output with the world business cycle, but only when fixed effects are appropriately

**Table 3.** Stock Price Synchronization and Globalization

| | (1) Equity VD | (2) Equity VD | (3) Equity VD | (4) Equity VD |
|---|---|---|---|---|
| Trade Openness | 0.267*** | 0.417*** | 0.0496 | 0.0363 |
| | (0.0631) | (0.111) | (0.145) | (0.152) |
| Financial Openness | 7.891*** | 6.522*** | 2.598* | 2.597* |
| | (1.461) | (1.319) | (1.357) | (1.386) |
| Crisis | | | | -2.585 |
| | | | | (2.430) |
| FX Flexibility | | | | 0.589 |
| | | | | (0.620) |
| Country | No | Yes | Yes | Yes |
| Year | No | No | Yes | Yes |
| N | 264 | 264 | 264 | 264 |
| r2 | 0.281 | 0.227 | 0.460 | 0.467 |

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

included (Columns 3 and 4).[24] Quantitatively, we estimate that moving from a financially closed economy to a fully open one reduces the synchronization of a country's GDP with the world cycle by roughly 12 percent. In sharp contrast, Table 3 shows that financial integration is associated with a greater influence of world equity cycles on domestic asset prices. These results are robust to the inclusion of country-fixed effects and controls but become quantitatively and statistically weaker once time-fixed effects are introduced. This attenuation primarily reflects the smaller sample sizes for equity regressions and the over-representation of advanced economies. Advanced economies have followed a common trajectory toward greater financial integration over the sample period (e.g., all countries became more open during globalization). Once time-fixed effects are included, these common time trends in trade and financial integration are absorbed, leaving less within-country variation to exploit in the estimations reported in Columns 3 and 4.

Although our results are not intended to be interpreted causally, they suggest that trade and financial integration have distinct effects on how local output and asset prices are connected to global economic cycles. Trade integration is generally associated with a higher contribution of world cycles to both local output and asset prices. By contrast, financial integration has contrasting effects: greater financial openness is, on average, linked to a lower contribution of world cycles to local output synchronization, but a higher contribution to local asset price synchronization.

[24]The first two columns in Table 2 illustrate the omitted variable bias by excluding both time and country-fixed effects from the estimations. In this case, both trade openness and financial openness have positive coefficients, implying that both increase co-movement with the rest of the world. However, the effect of financial integration becomes insignificant after including country-fixed effects and turns negative after including time-fixed effects.

# 4. A Model of Diverging Asset Prices and Output Synchronization

A priori, the facts established above are puzzling: if asset prices are claims on output, how can these variables become decoupled as financial integration increases? The purpose of this section is to provide a framework that rationalizes these findings.

We develop a general equilibrium model with two countries and imperfect financial market integration. The framework has two central components: an initial endogenous technology choice, as in Saint-Paul (1992) and Obstfeld (1994), combined with imperfect asset market integration and international portfolio choices, as is standard in the international macro-finance literature (e.g., Pavlova and Rigobon (2010) and Coeurdacier and Gourinchas (2016)).[25] The analysis emphasizes how increased financial integration and risk-sharing opportunities lead to greater co-movement in asset prices but possibly reduced synchronization in output.

The mechanisms operate as follows. As financial integration increases, each country expands its participation in foreign asset markets to benefit from risk-sharing opportunities. A more globalized demand for assets reduces the sensitivity of asset prices to domestic income shocks, thereby increasing the international co-movement of asset prices. In turn, improved risk-sharing incentivizes countries to adopt higher-return, higher-risk production technologies, even at the cost of greater idiosyncratic volatility and lower output co-movement. The consumption-smoothing gains from increased financial risk-sharing outweigh the costs of higher output volatility resulting from endogenous technological specialization.

**Presentation of the model.** Consider a two-country economy, each populated by overlapping generations of agents and a unit mass of stochastic Lucas' trees, whose fruits are the sole source of output. Each generation lives for two periods. Young agents receive a share $\alpha \in (0,1)$ of domestic output as wage income and form a portfolio consisting of domestic trees, foreign trees and international bonds. In old age, tree holders receive a share $1-\alpha$ of output as capital income in proportion to their financial holdings. Foreign capital income is subject to a proportional iceberg tax $\tau \in (0,1)$, whereby a lower $\tau$ reflects a higher degree of international financial integration.

**Country portfolio choice.** Given a level of financial integration $\tau$, a realization of output $y_{i,t}$, asset prices $p_t = (p_{i,t}, p_{j,t})$ and international bond price $q_t$, young agents in country $i$ choose a portfolio comprising $\mu_{ii,t}$ units of domestic tree, $\mu_{ij,t}$ units of foreign tree and a bond position $b_{i,t}$

[25] Endogenous technology choice, motivated by risk-sharing opportunities, can be linked to simultaneous trade liberalization and Ricardian specialization, or to international production integration with increased exposure of individual countries to sector-specific shocks. As Imbs (2004) notes: "Similarly, financial liberalizations may induce specialization, as access to an increasing range of state-contingent securities unhinges domestic consumption patterns from domestic production, which then becomes free to specialize according to comparative advantage." Kalemli-Ozcan, Sørensen, and Yosha (2003) provide empirical evidence that risk-sharing and industrial specialization are positively related.

to maximize lifetime utility:

$$\max_{\mu_{ii,t},\mu_{ij,t},b_{i,t}} u(c^y_{i,t}) + \beta \mathbb{E}\left(u\left(c^o_{i,t+1}\right)\right),$$

subject to young and old age budget constraints:

$$c^y_{i,t} + p_{i,t}\mu_{ii,t} + p_{j,t}\mu_{ij,t} = \alpha y_{i,t} + q_t b_{i,t},$$

$$c^o_{i,t+1} = \mu_{ii,t}\left[(1-\alpha)y_{i,t+1} + p_{i,t+1}\right] + (1-\tau)\mu_{ij,t}\left[(1-\alpha)y_{j,t+1} + p_{j,t+1}\right] - b_{it}.$$

Additionally, asset positions are subject to no short-sale constraints: $\mu_{ii,t} \geq 0$ and $\mu_{ij,t} \geq 0$. In young age, agents in country $i$ receive wage income $\alpha y_{i,t}$, consume $c^y_{i,t}$ and form a portfolio of assets $(\mu_{ii,t}, \mu_{ij,t}, b_{i,t})$. Old agents receive the proceeds of their financial investments - composed of dividends and resale price of the assets net of the international financial tax $\tau$, and consume their total wealth net of the bond position.

Let $\xi_{ii,t}$ and $\xi_{ij,t}$ be the Lagrange multipliers associated to the no short-sale restrictions. Substituting the constraints into the objective function, the program yields three first-order conditions:

$$\begin{aligned}
&\mu_{ii,t} && p_{i,t}u'(c^y_{i,t}) - \beta\mathbb{E}\left(\left((1-\alpha)y_{i,t+1} + p_{i,t+1}\right)u'(c^o_{i,t+1})\right) - \xi_{ii,t} = 0,\\
&\mu_{ij,t} && p_{j,t}u'(c^y_{i,t}) - \beta\mathbb{E}\left((1-\tau)\left((1-\alpha)y_{j,t+1} + p_{j,t+1}\right)u'(c^o_{i,t+1})\right) - \xi_{ij,t} = 0,\\
&b_{i,t} && q_t u'(c^y_{i,t}) - \beta\mathbb{E}\left(u'(c^o_{i,t+1})\right) = 0,
\end{aligned}$$

which together with the conditions that enforce the no-short constraints ($\xi_{ii,t}\mu_{ii,t} = 0$ and $\xi_{ij,t}\mu_{ij,t} = 0$) characterize the optimal portfolio choice $\{\mu_{ii,t}, \mu_{ij,t}, b_{i,t}\}$ of country $i$.[26]

**Output process.** Output from a Lucas tree $y_{i,t}$ is generated by an independent and identically distributed stochastic process $Y(\eta)$ with binary support $\{y_l, y_h\}$, each occurring with probability $\frac{1}{2}$. The parameter $\eta \geq 0$ represents the technological characteristics of the output process. Specifically, the output levels can take on the values:

$$y_l = 1 + \kappa\eta \qquad\qquad y_h = 1 + \eta,$$

where $-1 < \kappa < 1$ governs the sensitivity of the mean and variance of output to changes in technology $\eta$:

$$\mathbb{E}(y_{i,t} \mid \eta) = 1 + \eta\frac{1+\kappa}{2}, \qquad\qquad \mathbb{V}(y_{i,t} \mid \eta) = \frac{\eta^2(1-\kappa)^2}{4}.$$

[26] The complementary slackness conditions $\xi_{ih,t}\mu_{ih,t} = 0$ for $h \in \{i, j\}$ capture the occasionally binding nature of the no-short sale constraints. When the optimal asset choice $\mu_{ih,t} > 0$ is interior, then $\xi_{ih,t} = 0$. If instead the constraint binds, $\mu_{ih,t} = 0$ and $\xi_{ih,t} > 0$. The numerical solution of the model considers these cases iteratively until the constraints are satisfied.

An increase in technology $\eta$ raises both the mean and variance of output. A higher value of $\kappa$ implies faster growth of the mean relative to the variance. Returns on trees across countries provide risk-sharing opportunities and exhibit a negative correlation $\rho(y_{it}, y_{jt}|\eta) = -\frac{1}{1+\lambda\eta} < 0$, where $\lambda \geq 0$ represents the sensitivity of the correlation to technology $\eta$.[27]

**Market clearing conditions.** Market clearing conditions for assets $i$ and $j$ and international bonds are:

$$\begin{aligned} &\text{asset } i && \mu_{ii,t} + \mu_{ji,t} = 1, \\ &\text{asset } j && \mu_{ij,t} + \mu_{jj,t} = 1, \\ &\text{bond} && b_{i,t} + b_{j,t} = 0. \end{aligned}$$

**Equilibrium definition.** An equilibrium in this economy is defined in two stages: a competitive equilibrium in good, asset and international bond markets, and an initial endogenous technology decision.

- Given technology $\eta$ and financial integration $\tau$, a competitive equilibrium consists of asset and bond positions, consumption functions, and asset and bond prices that satisfy optimal portfolio choices and the market clearing conditions.

  The lifetime welfare of a young agent, evaluated at the competitive equilibrium given an output realization $y_t = (y_{it}, y_{jt})$ is denoted $V(y_t, \tau, \eta)$.

- Given financial integration $\tau$, the optimal technology choice $\eta^*$ maximizes unconditional welfare. Formally, the unconditional welfare of young agents is given by $W(\eta, \tau) = \int_{y_t} V(y_t, \eta, \tau) dF(y_t)$. The optimal choice of technology is

$$\eta^*(\tau) = \text{argmax}_\eta W(\eta, \tau).$$

To illustrate the equilibrium numerically, we adopt the following standard specification. Preferences are given by $u(c) = \log(c)$ with a discount factor $\beta = 0.96$, a wage income share $\alpha = \frac{2}{3}$, and technological parameters $\kappa = -0.1$ and $\lambda = 0.1$.

Consistent with the empirical analysis conducted in Section 3., we focus on the sensitivity of the common components of asset prices $R_{sq}(p_i, p_j)$ and output $R_{sq}(y_i, y_j)$ to financial integration $\tau$, where

$$R_{sq}(x_i, x_j) = \frac{\text{cov}(x_i, x_j)^2}{V(x_i)V(x_j)} = (\rho(x_i, x_j))^2 .$$

[27] The assumption of negatively correlated output shocks highlights the benefits of risk-sharing in financially integrated economies. Even if outputs are imperfectly positively correlated, they can be decomposed into an aggregate component and an idiosyncratic component that is negatively correlated across countries. The idiosyncratic component is the source of risk-sharing opportunities.

Figure 8 shows the equilibrium common component of asset prices, output and the associated optimal technology choice $\eta^*$ as a function of financial integration $\tau$, ranging from low international asset market integration to full integration ($\tau = 0$). It shows that greater financial integration (a lower $\tau$) is associated with production technologies featuring higher $\eta$—that is, a higher mean, higher variance, and lower international diversification opportunities. It also corresponds to greater co-movement of asset prices and stable, if not declining, synchronization of output.

**Figure 8.** Financial Integration, Synchronization and Technology Choice

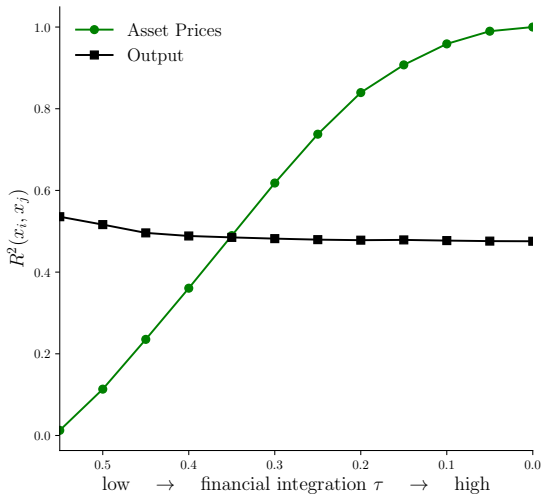



Figure 8.A. Asset price and output synchronization

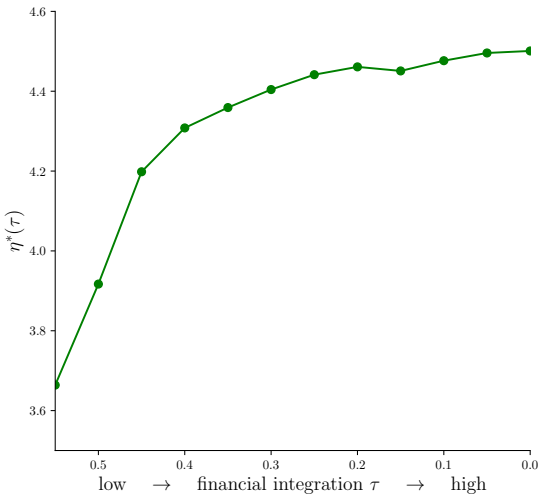



Figure 8.B. Technology choice

*Notes.* The figure represents equilibrium asset price and output synchronization (panel A) and the endogenous technology choice (panel B) as a function of the degree of financial integration. The numerical illustration relies on $u(c) = \log(c)$ with a discount factor $\beta = 0.96$, a wage income share $\alpha = \frac{2}{3}$, and technological parameters $\kappa = -0.1$ and $\lambda = 0.1$.

**Economic interpretation.** Consider first how financial integration influences asset price co-movements for a given technology level $\eta$. Under severe financial frictions (high $\tau$), countries do not trade real assets across borders. The price of asset $i$ is therefore driven by domestic demand, itself determined by domestic income $y_{it}$, and cross-country asset price correlations remain low.

As financial integration increases (lower $\tau$), cross-border asset trade enables consumption risk-sharing: asset prices become less sensitive to country-specific demand shocks, which increases their common component. In the limit of complete financial integration ($\tau = 0$), each country $h \in \{i, j\}$ holds a fully diversified portfolio of assets, $\mu_{hi,t} = \mu_{hj,t}$. This equality of portfolio shares implies equal asset prices $p_{it} = p_{jt}$, hence perfect asset price co-movement (Panel A). Notably, asset price synchronization itself contributes to risk-sharing, as resale prices no longer depend on idiosyncratic dividends and local output.

Turning to the initial technology choice, financial autarky forces the adoption of a safe, low-return technology. International asset trade and risk-sharing, by contrast, allow countries to adopt a higher-return, higher-volatility technology (Panel B)—potentially with lower international output

correlation (Panel A). Financial openness broadens risk-sharing opportunities, making investment in riskier technologies more attractive, while still preserving low consumption volatility through portfolio diversification.[28]

Overall, the model highlights a dual effect of financial integration—consistent with our empirical analysis. By opening cross-border asset markets, financial integration synchronizes asset prices and raises their common component. At the same time, it incentivizes countries to adopt higher-return, higher-volatility technologies that amplify idiosyncratic output fluctuations. Thus, enhanced risk-sharing opportunities dampen output co-movement through endogenous technology choice, while strengthening asset price co-movement.

## 5. Conclusion

This paper revisits the importance of global economic synchronization—or world cycles—using a newly assembled quarterly macro-financial dataset with unprecedented country and time coverage. We find that while asset price synchronization has risen steadily with globalization, output and credit synchronization have remained broadly stable over the long run. Trade integration generally strengthens synchronization for both real and financial variables, but financial integration has opposite effects: it increases asset price co-movement while reducing output synchronization. The most striking and robust empirical result is the disconnect between the global synchronization of real GDP and that of asset prices—observable in their levels, historical evolution, and relationship with financial integration We propose a simple theoretical model that explains this disconnect: greater financial integration enhances risk-sharing and asset market co-movement while allowing countries to adopt riskier, less correlated production structures. This mechanism reconciles the empirical pattern of more synchronized asset markets but less synchronized real economies.

Our findings have important policy implications. First, high financial integration does not necessarily reduce policy autonomy over output and credit in normal times. In particular, credit—a financial variable under more direct control of policymakers than asset prices—remains largely shaped by domestic conditions rather than the external environment. Second, the sustained increase in global price synchronization, particularly for consumer prices, poses challenges for monetary and macroprudential policy frameworks. Finally, the dataset developed in this paper provides a foundation for future research on global economic cycles, including regional dynamics, the interaction of real and financial shocks, and the evolving transmission of global shocks.

[28] The net effect of enhanced risk-sharing versus higher output volatility on consumption smoothing is unambiguous: as financial integration increases, consumption insurance improves.

## References


Acemoglu, D., A. Ozdaglar, and A. Tahbaz-Salehi (2015): "Systemic risk and stability in financial networks," *American Economic Review*, 105(2), 564–608.

Arslanalp, S., and T. Tsuda (2014): "Tracking global demand for advanced economy sovereign debt," *IMF Economic Review*, 62(3), 430–464.

Auer, R. A., C. Borio, and A. Filardo (2017): "The Globalisation of Inflation: The Growing Importance of Global Value Chains," *CESifo Group Munich working paper*, (6387).

Auer, R. A., A. A. Levchenko, and P. Sauré (2019): "International inflation spillovers through input linkages," *Review of Economics and Statistics*, 101(3), 507–521.

Avdjiev, S., J. Burger, and B. Hardy (2025): "New spare tires: local currency credit as a global shock absorber," *Journal of International Money and Finance*, p. 103400.

Backus, D. K., P. J. Kehoe, and F. E. Kydland (1992): "International Real Business Cycles," *Journal of Political Economy*, 100(4), 745–775.

Bräuning, F., and V. Ivashina (2020): "US monetary policy and emerging market credit cycles," *Journal of Monetary Economics*, 112, 57–76.

Bruno, V., and H. S. Shin (2014): "Cross-Border Banking and Global Liquidity," *The Review of Economic Studies*, 82(2), 535–564.

Cesa-Bianchi, A., J. Imbs, and J. Saleheen (2019): "Finance and synchronization," *Journal of International Economics*, 116, 74–87.

Cesa-Bianchi, A., F. E. Martin, and G. Thwaites (2019): "Foreign booms, domestic busts: The global dimension of banking crises," *Journal of Financial Intermediation*, 37, 58–74.

Cetorelli, N., and L. S. Goldberg (2012a): "Banking Globalization and Monetary Transmission," *Journal of Finance*, 67(5), 1811–1843.

Cetorelli, N., and L. S. Goldberg (2012b): "Banking globalization and monetary transmission," *The Journal of Finance*, 67(5), 1811–1843.

Chinn, M. E., and H. Ito (2006): "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics*, 81(1), 163 – 192.

Chow, G., and A.-l. Lin (1971): "Best linear unbiased interpolation, distribution, and extrapolation of time series by related series," *The Review of Economics and Statistics*, pp. 372–375.

Ciccarelli, M., and B. Mojon (2010): "Global inflation," *The Review of Economics and Statistics*, 92(3), 524–535.

Claessens, S., M. A. Kose, and M. E. Terrones (2011): "Financial cycles: What? How? When?," in *NBER International Seminar on Macroeconomics*, vol. 7, pp. 303–344.

——— (2012): "How do business and financial cycles interact?," *Journal of International economics*, 87(1), 178–190.

Coeurdacier, N., and P.-O. Gourinchas (2016): "When bonds matter: Home bias in goods and assets," *Journal of Monetary Economics*, 82(C), 119–137.

Dedola, L., G. Rivolta, and L. Stracca (2017): "If the Fed sneezes, who catches a cold?," *Journal of International Economics*, 108, S23–S41.

Dembiermont, C., M. Drehmann, S. Muksakunratana, et al. (2013): "How much does the private sector really borrow-a new database for total credit to the private non-financial sector," *BIS Quarterly Review*.

Doyle, B. M., and J. Faust (2005): "Breaks in the variability and comovement of G-7 economic growth," *The Review of Economics and Statistics*, 87(4), 721–740.

Ductor, L., and D. Leiva-Leon (2016): "Dynamics of global business cycle interdependence," *Journal of International Economics*, 102, 110–127.

Duval, R., N. Li, R. Saraf, and D. Seneviratne (2016): "Value-added trade and business cycle synchronization," *Journal of International Economics*, 99, 251–262.

Feenstra, R. C., R. Inklaar, and M. P. Timmer (2015): "The next generation of the Penn World Table," *American Economic Review*, 105(10), 3150–82.

Fernández, A., S. Schmitt-Grohé, and M. Uribe (2017): "World shocks, world prices, and business cycles: An empirical investigation," *Journal of International Economics*, 108, S2–S14.

Forbes, K. J., and M. D. Chinn (2004): "A Decomposition of Global Linkages in Financial Markets over Time," *The Review of Economics and Statistics*, 86(3), 705–722.

Ha, J., A. Kose, and F. L. Ohnsorge (2019): *Global inflation synchronization*. The World Bank, Policy Research Working Papers.

Ilzetzki, E., C. M. Reinhart, and K. S. Rogoff (2019): "Exchange arrangements entering the twenty-first century: Which anchor will hold?," *The Quarterly Journal of Economics*, 134(2), 599–646.

Imbs, J. (2004): "Trade, Finance, Specialization, and Synchronization," *The Review of Economics and Statistics*, 86(3), 723–734.

International Monetary Fund (2007): "Financial Globalization: Beyond the Blame Game," World Economic Outlook, Chapter 3, April, Accessed: 2025-07-23.

Jordà, Ò., M. Schularick, A. Taylor, and F. Ward (2019): "Global Financial Cycles and Risk Premiums," *IMF Economic Review*, 67(1), 109–150.

Jordà, Ò., M. Schularick, and A. M. Taylor (2017): "Macrofinancial history and the new business cycle facts," *NBER macroeconomics annual*, 31(1), 213–263.

Kalemli-Ozcan, S. (2019): "US monetary policy and international risk spillovers," *National Bureau of Economic Research working paper*, (26297).

Kalemli-Ozcan, S., E. Papaioannou, and F. Perri (2013a): "Global banks and crisis transmission," *Journal of international Economics*, 89(2), 495–510.

——— (2013b): "Global banks and crisis transmission," *Journal of International Economics*, 89(2), 495–510.

Kalemli-Ozcan, S., E. Papaioannou, and J.-L. Peydró (2013): "Financial regulation, financial globalization, and the synchronization of economic activity," *The Journal of Finance*, 68(3), 1179–1228.

Kalemli-Ozcan, S., B. E. Sørensen, and O. Yosha (2003): "Risk Sharing and Industrial Specialization: Regional and International Evidence," *American Economic Review*, 93(3), 903–918.

Kern, A., and P. Amri (2020): "Political credit cycles," *Economics & Politics*.

Kose, M. A., C. Otrok, and C. H. Whiteman (2003): "International business cycles: World, region, and country-specific factors," *American Economic Review*, 93(4), 1216–1239.

——— (2008): "Understanding the evolution of world business cycles," *Journal of international Economics*, 75(1), 110–130.

Kose, M. A., E. S. Prasad, and M. E. Terrones (2003): "How does globalization affect the synchronization of business cycles?," *American Economic Review*, 93(2), 57–62.

Laeven, L., and F. Valencia (2018): "Systemic Banking Crises Revisited," IMF Working Papers 2018/206, International Monetary Fund.

Lumsdaine, R. L., and E. S. Prasad (2003): "Identifying the common component of international economic fluctuations: a new approach," *The Economic Journal*, 113(484), 101–127.

Miranda-Agrippino, S., and H. Rey (2020): "US monetary policy and the global financial cycle," *The Review of Economic Studies*, 87(6), 2754–2776.

Miranda-Agrippino, S., and H. Rey (2022): "Chapter 1 - The Global Financial Cycle," in *Handbook of International Economics: International Macroeconomics, Volume 6*, ed. by G. Gopinath, E. Helpman, and K. Rogoff. Elsevier.

Monnet, E., and D. Puy (2016): "Has Globalization Really Increased Business Cycle Synchronization?," *International Monetary Fund Working Papers*, (54).

Müller, K., and E. Verner (2024): "Credit allocation and macroeconomic fluctuations," *Review of Economic Studies*, 91(6), 3645–3676.

Obstfeld, M. (1994): "Risk-Taking, Global Diversification, and Growth," *The American Economic Review*, 84(5), 1310–1329.

Onatski, A. (2009): "Testing hypotheses about the number of factors in large factor models," *Econometrica*, 77(5), 1447–1479.

Pavlova, A., and R. Rigobon (2010): "International Macro-Finance," NBER Working Papers 16630, National Bureau of Economic Research, Inc.

Quinn, D. P., and A. M. Toyoda (2008): "Does capital account liberalization lead to growth?," *The Review of Financial Studies*, 21(3), 1403–1449.

Rey, H. (2015): "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence," NBER Working Papers 21162, National Bureau of Economic Research.

Romer, C. D., and D. H. Romer (2004): "A new measure of monetary shocks: Derivation and implications," *American Economic Review*, 94(4), 1055–1084.

——— (2017): "New evidence on the aftermath of financial crises in advanced countries," *American Economic Review*, 107(10), 3072–3118.

Saint-Paul, G. (1992): "Technological choice, financial markets and economic development," *European Economic Review*, 36(4), 763–781.

Stock, J. H., and M. W. Watson (1989): "New indexes of coincident and leading economic indicators," *NBER macroeconomics annual*, 4, 351–394.

——— (2011): *Dynamic Factor Models*Oxford University Press, Oxford.

Svensson, L. E. (2017): "Cost-benefit analysis of leaning against the wind," *Journal of Monetary Economics*, 90, 193–213.

Williamson, J. (1985): "On the system in Bretton Woods," *The American Economic Review*, 75(2), 74–79.

# A Appendix

## AA. Data Coverage

The table reports the country coverage for each variable. A cross indicates that data are available for that country over the entire sample period.

**Table A1.** Dataset Coverage

| Country | GDP | Credit | Stock Prices | Bond Yields | Prices |
|---|---|---|---|---|---|
| Argentina | X | X | | | X |
| Australia | X | X | X | X | X |
| Austria | X | X | X | | X |
| Belgium | X | X | X | X | X |
| Bolivia | | X | | | X |
| Brazil | X | X | | | X |
| Canada | X | X | X | X | X |
| Chile | X | X | X | | X |
| Colombia | | X | | | X |
| Costa Rica | | X | | | X |
| Cyprus | | X | | | X |
| Denmark | X | X | X | X | X |
| El Salvador | | | | | X |
| Finland | X | X | X | | X |
| France | X | X | X | X | X |
| Germany | X | X | X | X | X |
| Greece | X | X | | | X |
| Guatemala | | X | | | X |
| Honduras | | X | | | X |
| Iceland | X | X | | | X |
| India | X | X | X | | X |
| Ireland | X | X | X | X | X |
| Israel | X | X | X | | X |
| Italy | X | X | X | X | X |
| Japan | X | X | X | | X |
| Korea | X | X | | | X |
| Luxembourg | X | | | | X |
| Malaysia | | X | X | | X |
| Malta | | | | | X |
| Mexico | X | X | X | | X |
| Morocco | X | X | | | X |
| Netherlands | X | X | X | X | X |
| New Zealand | X | X | X | X | X |
| Norway | X | X | X | X | X |
| Pakistan | X | X | | | X |
| Peru | | X | X | | X |
| Philippines | X | X | X | | X |
| Portugal | X | X | | X | X |
| South Africa | X | X | X | X | X |
| Spain | X | X | X | | X |
| Sweden | X | X | X | X | X |
| Switzerland | X | X | X | X | X |
| Taiwan | X | X | | | X |
| Thailand | | X | | | X |
| Turkey | X | X | | | X |
| United Kingdom | X | X | X | X | X |
| United States | X | X | X | X | X |
| Uruguay | X | X | | | X |

## AB. Interpolation in Long Quarterly GDP Statistics

Except for a few countries (the US, France, and the UK), long official quarterly GDP series spanning the entire post-war period do not exist. These series generally start in the mid-1980s for some countries, and in the early 1990s for most others. As a result, international organizations typically rely on interpolation methods to produce long quarterly GDP statistics, which are in turn used by researchers. However, such interpolations are not always based on actual output data (e.g., industrial or manufacturing production). To address this issue, we use temporal disaggregation methods (Chow and Lin (1971)) to create "synthetic" quarterly GDP series based on (i) annual GDP data from the *Penn World Tables* and (ii) quarterly industrial (or manufacturing) production data taken from historical *IFS* volumes (IFS line 67). Figure A1 complements Figure 1 by illustrating the ability of these "synthetic" real GDP series to track growth rates based on official quarterly data published for Japan and Mexico. It also shows that, in the case of Mexico, historical quarterly GDP data from the OECD are not always based on actual output data. Our approach therefore improves available GDP series relative to those produced with simple linear interpolation methods.

**Figure A1.** Real GDP Growth - IFS, Interpolated and Official Statistics

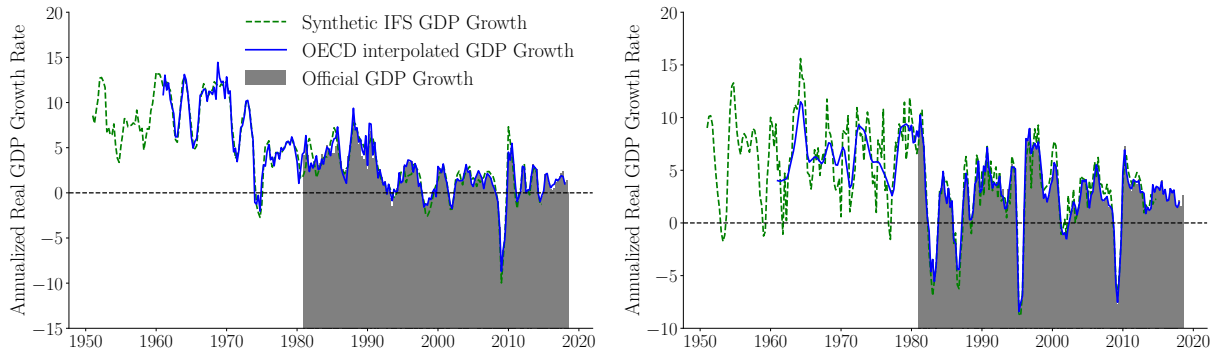



Figure A1.A. Japan

Figure A1.B. Mexico

*Notes.* Grey bars show year-on-year real GDP growth rates based on official quarterly GDP data published by national authorities. Blue lines show year-on-year real GDP growth based on OECD interpolated data. Green lines show the growth rates obtained using our synthetic quarterly GDP series, which combine annual GDP data from the *Penn World Tables* and historical quarterly industrial production (IP) data from *IFS* volumes.

## AC. Robustness

### AC.1. Rolling windows

We first test the robustness of our historical comparisons using different cut-off dates. We estimate world cycles and variance decompositions using 15-year rolling windows. Figure A2 reports the median share of variance explained by the different world cycles in these windows. The dates indicate the central year of each window, so that, for example, the year 2000 refers to the period from 1992 to 2008. We find that our key findings do not depend on specific cut-off dates. For example, for both output and credit, the relatively stable strength of the world cycles is not simply driven

**Figure A2.** Variance Decompositions - Rolling Windows

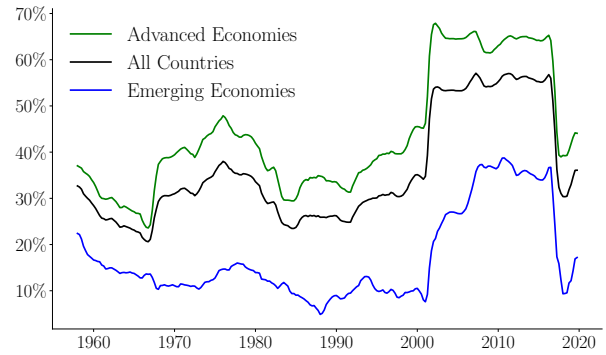



Figure A2.A. Real GDP

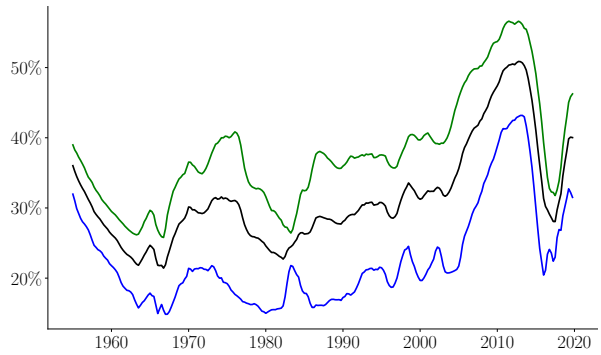



Figure A2.B. Real Credit

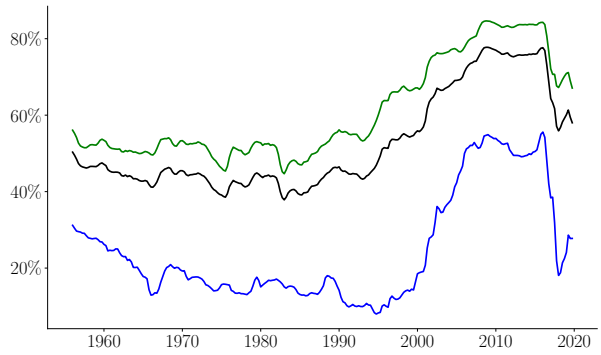



Figure A2.C. Real Share Price

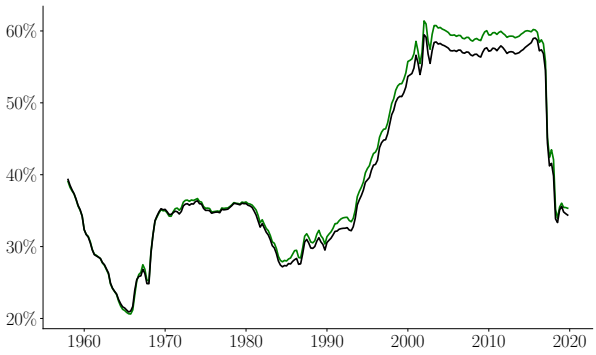



Figure A2.D. Real Bond Yields

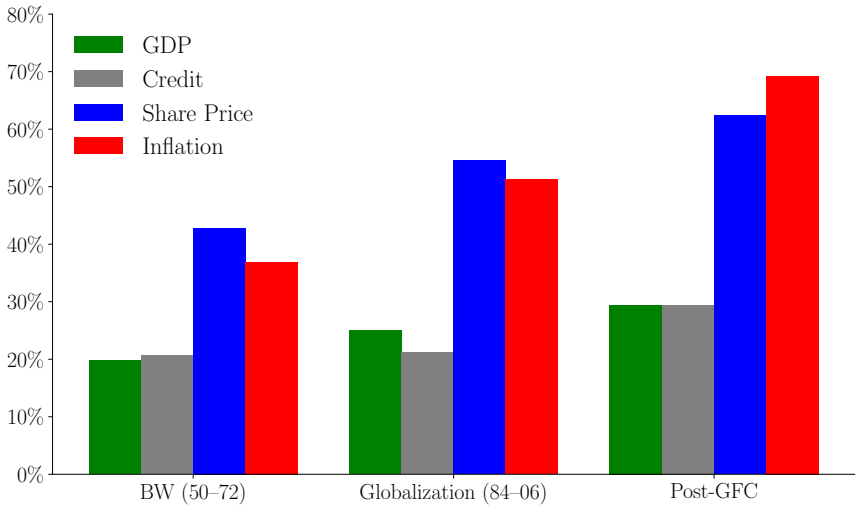
*Notes.* The figures show the evolution of variance decompositions for the median country (All, AE, or EM) using 15-year rolling windows. The date on the x-axis indicates the central year of each window; for example, the year 2000 refers to the period from 1992 to 2008. The last data point with a symmetric window is Q2 2012. After that, the windows become increasingly backward-looking, so the final data point we report is 2017, which uses an estimation window from 2010 to 2019.

by the low levels recorded in the early 1980s, a period when international economic integration was still low. However, the impact of the GFC on both measures is very pronounced: for both output and credit, the measures rise sharply when the 2007–2009 period enters the sample, creating the impression of a 'break' in the synchronization measures. This broad pattern holds for both advanced and emerging economies. By contrast, synchronization in asset prices shows a slow and steady increase, which began trending upward in the early 1990s for all countries in our sample.

### AC.2. Constant sample

We also show that the long-run decoupling between prices and quantities we identify does not depend on the sample of countries covered for each variable. Figure A3 reports the median strength of the world cycle for GDP, credit, and share prices using a restricted sample of 26 countries for which we have data on all variables, across the different sub-periods (i.e., an equivalent of Figure 6, but using a constant sample). We still find that both credit and GDP synchronization have

**Figure A3.** Variance Decompositions - Constant Sample




*Notes.* The bars show the share of variance in domestic variables explained by each corresponding world cycle for each sub-period. Results are reported for the median country. The sample is constant across variables and includes 26 advanced and emerging countries.

remained roughly unchanged since the Bretton Woods period, slightly above 20%. By contrast, equity synchronization has increased substantially over the same period.

### AC.3. Data Frequency

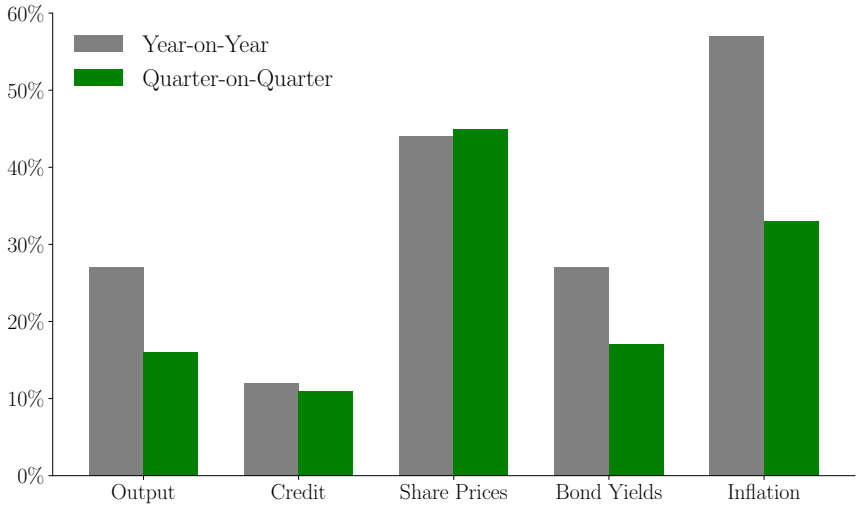
Using year-on-year (YoY) growth rates on quarterly data to extract common cycles controls for the remaining seasonality in the data and allows us to compare our result to the existing literature. However, it also implies that overlapping observations are used, which could inflate the importance of common factors across countries. Moreover, it might fail to get rid of trends in the data. However, we find that our results are not dependent on the use of YoY growth rates, and some become even more striking.

Figures A4 and A5 provide a comparison of YoY to quarter-on-quarter (QoQ) estimation of the variance decompositions reported in Figures 5 and 6. These figures confirm that (i) quantities (credit and output) are significantly less synchronized than prices and (ii) a strong and secular increase in price synchronization, especially in consumer and share prices.

### AC.4. Number of Factors

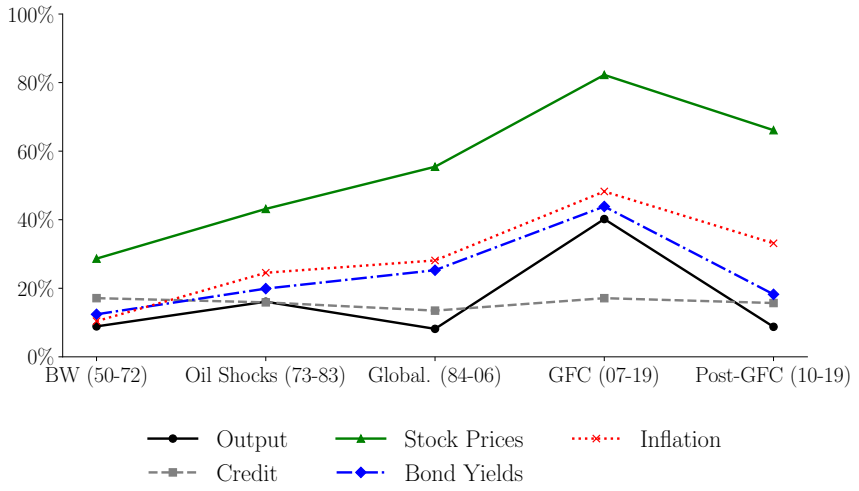
Columns 1 and 2 in Table A2 report the percentage of variance explained by the $i$-th eigenvalue (in decreasing order) of the covariance matrix and the spectral density matrix, respectively. Column 3 reports results for the Onatski (2009) test, where the null hypothesis of $r$–$1$ factors is tested against the alternative of $r$ common factors. Results are provided for eigenvalues explaining at least 5% of the variance and for the full sample (1950–2019), across all variables. Since the Onatski test statistics are sensitive to outliers, results for inflation are computed after excluding Latin American

**Figure A4.** Variance Decompositions - YoY vs. QoQ




*Notes.* The figure shows the share of variance in domestic variables explained by each corresponding world cycle over the full sample period (1950–2019) contrasting YoY and QoQ data frequency. Results are reported for the median country.

**Figure A5.** Variance Decompositions - Time Variation QoQ frequency




*Notes.* The figure shows the share of variance in domestic variables explained by each corresponding world cycle over each sub-sample period, using QoQ data frequency. Results are reported for the median country.

crisis countries with at least one hyperinflation episode (Argentina, Bolivia, Brazil, Chile, and Mexico). Overall, the results strongly support the use of a single-factor model, with the largest eigenvalue accounting for a significant portion of the variance in both the time and frequency domains for all variables (ranging from 20% to 58%). The decay for subsequent eigenvalues is steep. The p-values from the Onatski test also support the single-factor specification. Our findings are consistent with other contributions, such as Miranda-Agrippino and Rey (2020), who report similar results for asset prices.

**Table A2.** Share of Variance and Test Results

**Number of Global Factors: Output**

| r | % Covariance Matrix | % Spectral Density | Onatski (2009) |
|---|---|---|---|
| 1 | 0.339 | 0.263 | 0.079 |
| 2 | 0.058 | 0.104 | 0.125 |
| 3 | 0.056 | 0.077 | 0.629 |

**Number of Global Factors: Shares**

| r | % Covariance Matrix | % Spectral Density | Onatski (2009) |
|---|---|---|---|
| 1 | 0.477 | 0.403 | 0.039 |
| 2 | 0.070 | 0.143 | 0.297 |
| 3 | 0.065 | 0.094 | 0.293 |

**Number of Global Factors: Inflation**

| r | % Covariance Matrix | % Spectral Density | Onatski (2009) |
|---|---|---|---|
| 1 | 0.572 | 0.692 | 0.006 |
| 2 | 0.092 | 0.129 | 0.117 |
| 3 | 0.074 | 0.078 | 0.710 |

**Number of Global Factors: Credit**

| r | % Covariance Matrix | % Spectral Density | Onatski (2009) |
|---|---|---|---|
| 1 | 0.200 | 0.140 | 0.004 |
| 2 | 0.108 | 0.112 | 0.964 |
| 3 | 0.075 | 0.093 | 0.779 |

**Number of Global Factors: Bonds**

| r | % Covariance Matrix | % Spectral Density | Onatski (2009) |
|---|---|---|---|
| 1 | 0.530 | 0.526 | 0.001 |
| 2 | 0.146 | 0.171 | 0.374 |
| 3 | 0.049 | 0.070 | 0.407 |