I Don't Want your Dollars. Reverse Speculative Attacks and the Collapse of Bretton Woods. *

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Abstract

We reinterpret the collapse of the Bretton Woods system as a sequence of speculative attacks on dollar parities between 1971 and 1973, driven by the fundamental incompatibility of asymmetric monetary policies and capital mobility with fixed exchange rates. A permanent increase in US domestic credit growth in the 1960s, combined with increasingly integrated international capital markets, rendered the dollar parities unsustainable in the sense of the classic trilemma. In a two-country extension of Krugman (1979) in which the US rate of domestic credit growth exceeds that of its partner, we show that when the anchor country does not defend its parities through foreign exchange intervention, the burden of sustaining the peg falls entirely on partner central banks' willingness to absorb reserves. The existence of an upper bound on partner dollar holdings is sufficient to trigger an endogenous collapse through a "reverse" speculative attack, in which reserves accumulate at partner central banks rather than run down at the anchor. The model accounts for the timing of crises, the dynamics of reserve accumulation and capital flows, stable trade balances, and the evolution of inflation under the peg. We support this interpretation with new evidence from central bank balance sheets and policy deliberations drawn from archival sources.

Keywords: International Monetary System, Speculative attacks, Bretton Woods, Geoeconomics.

1 Introduction

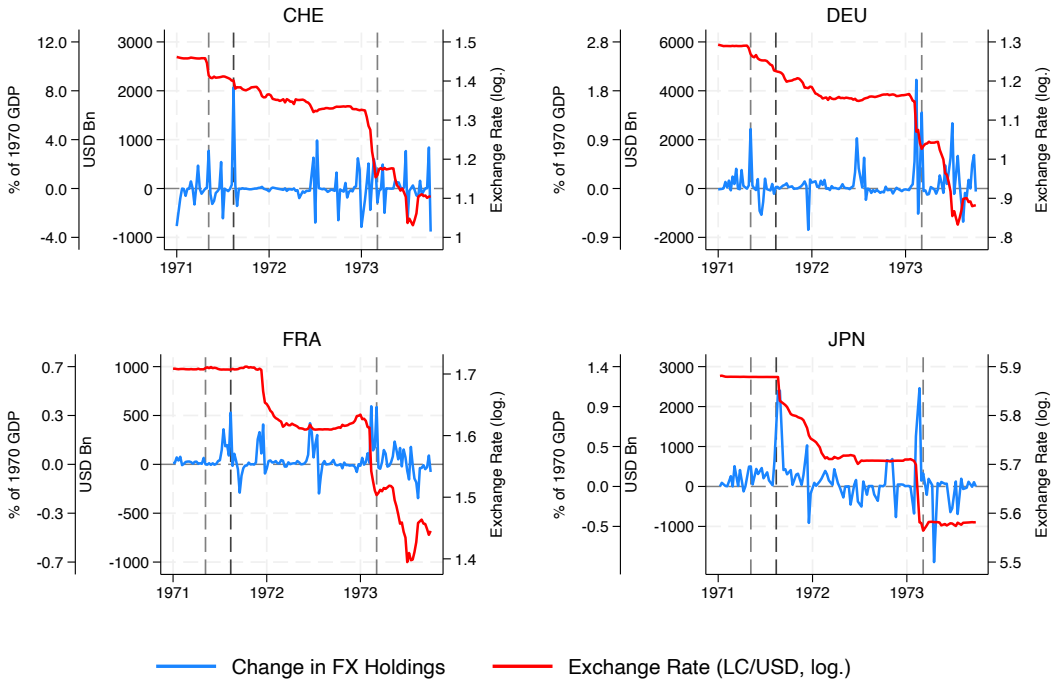
In the spring of 1971, the collapse of the Bretton Woods system did not come through a formal declaration but through a sudden breakdown. In the first three months of the year, the Deutsche Bundesbank purchased roughly 2 billion US dollars to defend the mark's parity; in April, it

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added another 1 billion.[1] Pressure then intensified sharply: another billion was added to the Bundesbank's balance sheet on May 3 and 4 alone, and in the first 40 minutes of trading on May 5, the Bundesbank was compelled to purchase an additional billion dollars. At that point, foreign-exchange operations were suspended, and the mark peg was abandoned (Bordo et al., 2015b). On the same day, the central banks of Belgium, the Netherlands, and Switzerland also ceased interventions and ended their parities.

A few months later, Japan experienced a similar dynamic. Between January and July 1971, the Bank of Japan accumulated roughly four billion USD in foreign reserves. Following the Nixon Shock, which formally suspended dollar convertibility into gold on August 15, speculative inflows intensified sharply: in the next two weeks, the Bank of Japan absorbed an additional 4 billion, including 1.3 billion in the two days following the announcement (James, 1996). By the end of the month, Japan had also abandoned its peg.

Figure 1: Central Banks Weekly Foreign Exchange Holdings



Sources: Schweizerische Nationalbank, *Ausweise der Schweizerischen Nationalbank* (weekly *Devisenbestände* - "foreign-exchange holdings"); Deutsche Bundesbank, *Monatsbericht*, "Aktiva und Passiva der Deutschen Bundesbank" (weekly *Guthaben bei ausländischen Banken und Geldmarktanlagen im Ausland* - "deposits with foreign banks and money-market investments abroad"); Baubeau (2018) (Banque de France: weekly *Disponibilités à vue à l'étranger* - "cash on demand abroad" - and *Avances au Fonds de stabilisation des changes / Autres opérations* - "advances to the Exchange Equalization Fund / other operations"); Bank of Japan, 営業毎旬報告 - Ten-day balance sheet report (海外資産勘定 - "foreign asset account"); Bank of International Settlements (exchange rates); World Bank World Development Indicators (GDP). Dashed lines represent the May 1971 DEM float, August 1971 Nixon Shock and March 1973 G-10 float. The figure combines weekly changes in foreign-exchange assets drawn from central bank balance sheets with reported intervention (purchase) data when available. Balance-sheet changes reflect movements in foreign currency asset positions, while reported intervention series measure net foreign exchange purchases. Exchange rates are quoted as local currency units per USD; a fall denotes a revaluation of the local currency.

[1]Both Germany and Japan's GDP in 1970 was approximately USD 217 billion, so every billion dollars purchased by their respective central banks represented 0.5% of GDP.

The end of the Bretton Woods system is one of the most consequential episodes in 20th-century international monetary history. In this paper, we interpret its collapse as a sequence of speculative attacks on the USD that took place between May 1971 and March 1973. During these attacks, investors sold their USD positions to non-US major central banks at the pegged exchange rate. We argue that the massive scale of USD purchases and the resulting accumulation of currency risk on central bank balance sheets triggered the abandonment of the fixed exchange rate system, which had sustained monetary stability in the postwar era. Figure 1 documents this directly: each panel shows weekly changes in central bank foreign exchange holdings alongside the log exchange rate for major partner economies. Large spikes in reserve accumulation coincide precisely with the May and August 1971 crisis episodes and again in March 1973.[2]

The counterpart of these reserve movements was private capital flows, not current account imbalances. Between 1960 and 1973 the United States ran a current account surplus in every year save a brief window in 1971-1973, during which quarterly deficits never exceeded 0.5% of GDP. The dollar balances absorbed by partner central banks therefore reflected portfolio reallocation by private agents rather than a trade-driven supply of dollars, increasingly intermediated through the rapidly expanding Eurodollar market, which had made offshore dollar claims highly substitutable with partner-currency deposits. This reallocation was made possible by a sharp rise in de facto capital mobility through the 1960s, despite the formal persistence of capital controls (Obstfeld and Taylor, 2004). On our reading, the dollar pressures that brought down the system flowed through the capital account, not the trade balance.

Our narrative is guided by a two-country model of speculative attacks that extends Krugman (1979)'s seminal contribution. Divergent rates of domestic credit expansion across countries generate persistent pressures on central bank balance sheets, which eventually trigger a speculative attack that ends the exchange rate peg. We depart from Krugman's model by considering reverse speculative attacks; that is, attacks in which the strong-currency country is the target. We assume that a tight-money, strong-currency country can temporarily defend the peg through reserve accumulation, while a loose-money, weak-currency country does not intervene in the foreign exchange market. An upper bound on the reserve stock of the weak currency held by the strong-currency central bank drives speculators' incentives to run on the currency peg. The model characterizes monetary and price dynamics before, during, and after a reverse speculative attack. Consistent with our empirical framing, monetary policy is neutral with respect to the real allocation: the trade balance is constant and independent of monetary policy and the current account is constant up to a small seigniorage transfer; the entire mechanism operates through the capital account. We support this interpretation with historical evidence from central bank balance sheets and foreign exchange interventions.

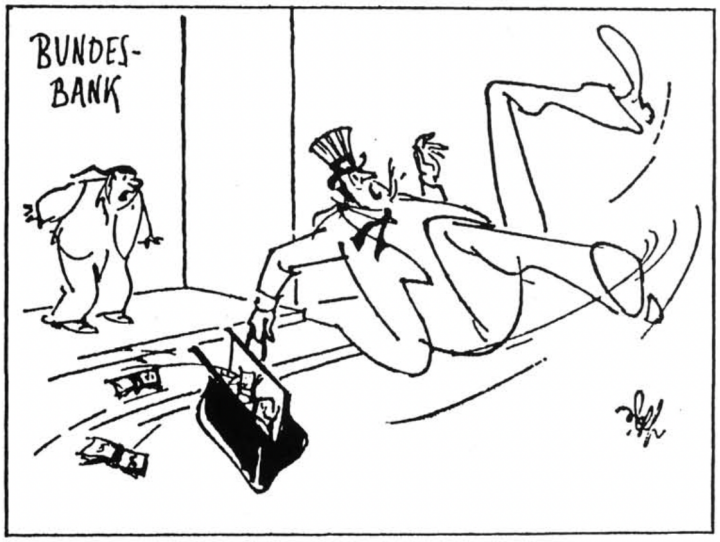
This interpretation closely mirrors how policymakers themselves understood the events. In his memoirs, Otmar Emminger, then Vice President of the Deutsche Bundesbank, argued that control over the German money supply effectively shifted from domestic monetary authorities to internationally mobile and speculative dollar flows: "It was no longer the German monetary authorities, but rather the liquidity-policy oscillations originating in American credit policy, as well as the speculative back-and-forth of the wandering dollar masses, that during this period largely determined the money supply of the German economy and thereby also the success or failure of German stabilization policy."[3] As Paul Volcker later emphasized in his retrospective account of the Bretton

[2]The same pattern extends to the other advanced economies, as documented in Appendix Figure A8.

[3]"Nicht mehr die deutschen Währungsbehörden, sondern die von der amerikanischen Kreditpolitik ausgehenden liquiditätspolitischen Wechselbäder sowie das spekulative Hin und Her der vagabundierenden Dollar-Massen

Woods collapse, the move to generalized floating reflected not a positive assessment of flexible exchange rates, but rather the practical recognition that persistent speculative capital movements had rendered the defense of parities increasingly untenable.[4] From Volcker's perspective, the collapse of Bretton Woods reflected an increasing incompatibility between US monetary objectives and those of its major economic partners, and stabilizing the dollar under fixed exchange rates would have required a decisive tightening of US monetary policy, an option the United States was unwilling to pursue, while partner economies increasingly refused to subordinate domestic stabilization to the defense of parities.[5] The appetite of European and Japanese central banks for US Dollar reserves had a limit, discussed by James (1996), and illustrated in the cartoon in Figure 2.

Figure 2: I don't want your Dollars



Source: Drawing by Fritz Wolf, originally published in *Neue Osnabrücker Zeitung* (1971); reproduced from James (1996).

The conventional interpretation frames the end of Bretton Woods through three classic problems: an adjustment problem (who bears the burden of correcting balance-of-payments imbalances –changes in official net reserve holdings– and the correction mechanism), a liquidity problem (whether the system supplies enough reserves to finance world output growth), and a confidence problem (whether the United States could credibly honor the convertibility of outstanding dollar liabilities into gold), as synthesized by Bordo (1993). Our interpretation is closest in spirit to

entschieden in diesem Zeitraum weitgehend über die Geldversorgung der deutschen Volkswirtschaft und damit auch über Erfolg oder Mißerfolg der deutschen Stabilitätspolitik." (Emminger, 1986, p. 175)

[4] "The resort to floating in early 1973 was not taken out of any general conviction that it was a preferred system. It was simply a last resort when, by general assent, the effort to maintain par values or central rates seemed too difficult in the face of speculative movements of capital across the world's exchanges." (Gyohten and Volcker, 1992, p. 124)

[5] "The Germans were in effect saying that they could no longer reconcile their traditions of autonomy in domestic monetary policy and freedom for capital movements with the demands made by fixed exchange rates. While no such sweeping interpretation was made at the time, the implication was that the world's second-largest economy had decided to opt out of the system." (Gyohten and Volcker, 1992, p. 74) "Arthur Burns pleaded with George Shultz once again to work toward restoring a fixed exchange rate for the dollar. My instinctive comment, given that the dollar couldn't possibly be stabilized unless we tackled our inflation problem, was "Then, you'd better get back to Washington and tighten money." (Volcker and Harper, 2018).

the monetary imbalance view articulated by Bordo (2020), which emphasizes US inflation and monetary expansion as the fundamental source of growing international pressures. We depart from standard liquidity and confidence narratives for a specific reason: after March 1968, the dollar's gold convertibility was effectively moot, as we document in the body of the paper. The confidence problem was thereby rendered immaterial for the 1971–73 crises, and the liquidity problem, once detached from gold, reduces to the question of partner central banks' willingness to hold dollar reserves — which is precisely the margin our analysis emphasizes. Bordo (1993) and Obstfeld (1993) point out that the Bretton Woods system of fixed exchange rates was structurally prone to speculative attacks because its main adjustment mechanisms for "fundamental" imbalances were peg adjustments and capital controls. Our paper models the mechanics and the inevitability of the speculative attacks that brought down the dollar parities. Under a peg, persistent US monetary expansion transmitted inflation abroad; as surplus countries (which we define throughout as those experiencing sustained official reserve accumulation, irrespective of the trade balance) absorbed dollars, reserve inflows exposed central banks to large unhedged dollar positions and forced a choice between, on the one hand, importing US inflation while accumulating currency risk on their balance sheets and, on the other, abandoning the parity. The combination of heterogeneous monetary policies and the unwillingness of partner economies to continue absorbing dollars at the required scale rendered the system nonviable. In our interpretation, real variables and rigidities played no role in the system's demise.

This paper contributes to the theoretical literature on speculative attacks by extending it to a two-country setting and characterizing equilibria with reverse speculative attacks. Our point of departure is the canonical first-generation framework of Krugman (1979), recast by Calvo (1987) as a modern dynamic general equilibrium model with optimizing agents; it is Calvo's formulation that we extend to two countries. Within the same lineage, work that allows for reverse speculative attacks—in which the strong-currency country is the target—begins with the 'selling attacks' of Grilli (1986) and continues with Amador et al. (2016). A precedent for applying this framework to Bretton Woods is Garber (1993), who, citing Grilli (1986), advocated the use of speculative attack models to interpret the transition to floating in the early 1970s. Garber's paper was not without controversy: in the published discussion, Krugman argued that speculative attack models were parables for capital flight in Latin America and were not useful for analyzing Bretton Woods, which he saw as driven by the adjustment problem rather than liquidity issues. Garber disagreed, contending that the two are not mutually exclusive: "What leads to a speculative attack is that there is a limit on the amount of financing that the monetary authority is willing to use to maintain the fixed exchange rate system". Our analysis vindicates Garber's position by supplying the formal two-country apparatus his intuition called for, in a setting in which only the strong-currency central bank intervenes in the foreign exchange market while the weak-currency country does not—an asymmetry that mirrors the institutional architecture of Bretton Woods. Beyond the theory, we bring to bear empirical evidence on the asymmetric rates of domestic credit growth across Bretton Woods participants and high-frequency central bank balance sheet data documenting the attacks.

The paper also contributes to the long historical literature on the end of the Bretton Woods regime. A natural starting point is Bordo (1993), followed by a large body of work analyzing the system's internal inconsistencies, adjustment failures, and political economy dimensions (Angel, 1991; James, 1996; Bordo and Eichengreen, 2013; Bordo et al., 2015a,b; Bordo, 2020; Schenk, 2010; Naef, 2022; Garten, 2021). This paper adds to that literature by elucidating through a theoretical model the role of reverse speculative attacks in the critical episodes of 1971-73 and by providing direct balance-sheet evidence consistent with this mechanism. The analysis complements contemporaneous policy accounts and retrospective memoirs that document the constraints faced by policymakers

during the system's final years (Emminger, 1986; Volcker and Harper, 2018; Silber, 2012).

Finally, the paper is related to the literature on the endogenous selection of the international monetary system. In contrast to existing work that places the determination of regime outcomes primarily on the hegemon (Farhi and Maggiori, 2018; Gourinchas et al., 2019), this paper emphasizes a setting in which the binding constraints governing regime continuation originate in partner economies, shifting effective control over regime outcomes away from the anchor country.

2 Monetary and Exchange Rate Policy: 1961-1973

The collapse of Bretton Woods's fixed exchange rate system was not a single event but the endpoint of a decade-long accumulation of monetary imbalances and increasing capital mobility. It proceeded in two stages. First, there was a run on the dollar-gold exchange rate, followed by a sequence of runs on the cross-currency exchange rate pegs. This section briefly documents the run on the gold pool and then focuses on the 1968-73 period. The description of the 1968-73 trends motivates the model in section 3, which we use to interpret the final breakdown of Bretton Woods.

On December 27th, 1958, the core Bretton Woods countries made their currencies "convertible". Currency convertibility had indeed been one of the Marshall Plan's founding conditionalities, and its restoration marked the Bretton Woods system's transition from postwar reconstruction to full operation. Under the system, the dollar was pegged to gold at $35 per ounce and each partner currency to the dollar. The parallel-market premia on major European currencies and the yen narrowed sharply and effectively disappeared by the early 1960s (see Appendix Figure A1). Capital controls were progressively liberalized over the course of the decade, as documented by Obstfeld and Taylor (2004), and de facto capital mobility rose well ahead of the formal removal of restrictions. Against this background, the Eurodollar market emerged and expanded rapidly in the 1960s, intermediating offshore dollar claims that circumvented the residual capital controls and interest-rate restrictions. The market provided a low-friction channel for private agents to shift between dollar and partner-currency positions: a holder of Eurodollar deposits could move into Euro-DM deposits, the counterparty bank would sell dollars for marks in the spot market, and the Bundesbank, committed to the parity, would stand on the other side of the trade.[6] By 1971, the external US-dollar liabilities of banks in eight European countries had climbed to 71 billion dollars (McKinnon, 1977).

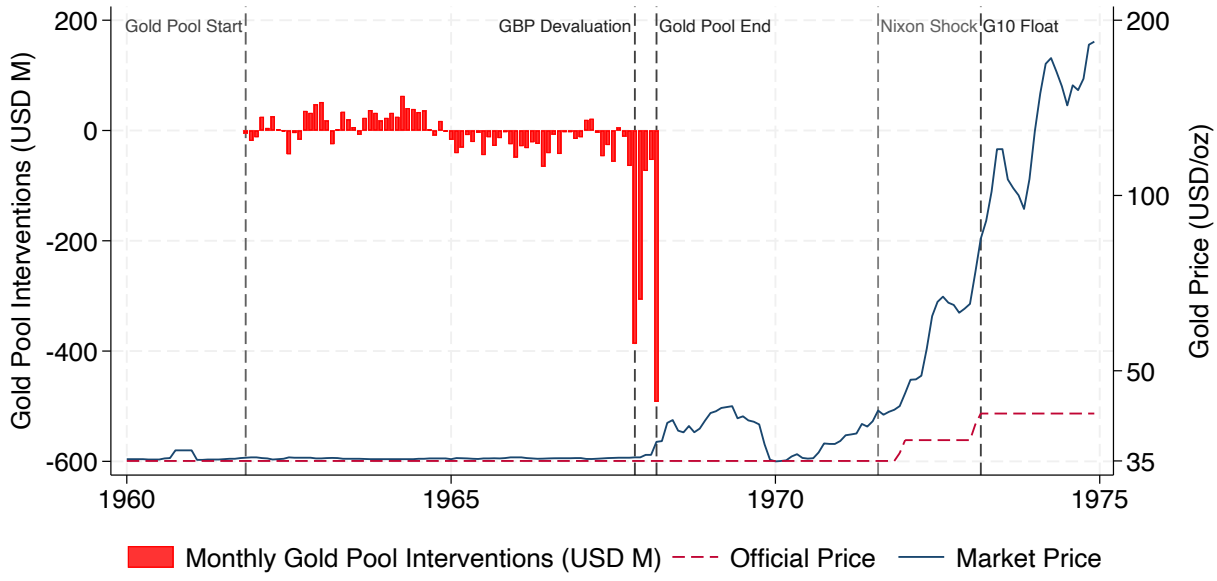
The gold market at the time was anchored in London, where the Bank of England intervened to defend the gold peg. To stabilize the private market price of gold, the central banks of the United States, Germany, the United Kingdom, France, Italy, Belgium, the Netherlands, and Switzerland established the London Gold Pool in 1961, committing to coordinated gold sales and purchases to absorb imbalances (Schenk, 2010, 2013; Naef, 2022). The Bank of England acted as the sole operating agent, transacting daily on behalf of all members and settling with them monthly in proportion to their quotas. The Pool itself foreshadowed the tensions that came to a head between 1968 and 1973: had the United States been unconditionally committed to converting dollars at

[6] 'Consequently, wide interest-arbitrage incentives opened in favor of domestic European markets over both the United States money market and the Euro-dollar market, and large amounts of dollars were taken up by European borrowers - banks and non banks—for conversion into local currencies. German business firms in particular were heavy borrowers, but there were sizable flows of other countries as well. With many currencies at or near their upper intervention points, European central banks were obliged to absorb the dollars offered on the exchanges, which added to their international reserves while simultaneously expanding domestic liquidity and thereby tending to negate their policies of restraint' (Coombs, 1971).

$35/oz on demand, there would have been no need for it, since any central bank intervening to defend its parity could have presented its dollar accumulation at the U.S. Treasury and obtained gold automatically. The Pool's role in stabilizing the London market price at $35 thus reveals an implicit second-tier commitment by member central banks to *hold* dollars rather than convert them, and to share the cost of defending the parity by selling member-state gold into the private market when needed. Gavin (2004) reads this arrangement as central to the Cold War bargain: European financial support for the dollar was the quid pro quo for U.S. military support for European security.

Tensions surfaced whenever "surplus" central banks sought to step out of this implicit commitment, whether by selling dollars for gold in the London market—forcing the Pool to defend $35 by selling member-state gold—or by presenting dollars at the U.S. Treasury for direct conversion (Naef, 2022). The two leading European cases of the late 1960s illustrate sharply asymmetric responses. France added roughly USD 1.5 billion of gold to its reserves between 1965 and 1966 and withdrew from the Pool in June 1967 (Bordo et al., 2019), in step with its 1966 withdrawal from NATO's integrated military command. Germany, by contrast, formalized its acceptance of the implicit constraint. In a letter to Federal Reserve Chairman William McChesney Martin Jr. of 30 March 1967, Bundesbank President Karl Blessing wrote: "By refraining from converting U.S. dollars into gold from the U.S. Treasury, the Bundesbank has always intended to contribute to international monetary cooperation and to avoid disruptive influences on the foreign exchange and gold markets. You can be assured that the Bundesbank will continue to adhere to this policy in the future and will fully play its part in international monetary cooperation" (Blessing, 1967)[7]. Together with the Gold Pool itself, these episodes show that the U.S. gold window for official transactions was never automatic — it was the object of continuous political negotiation.

Figure 3: Gold Pool Interventions and the Market Price of Gold

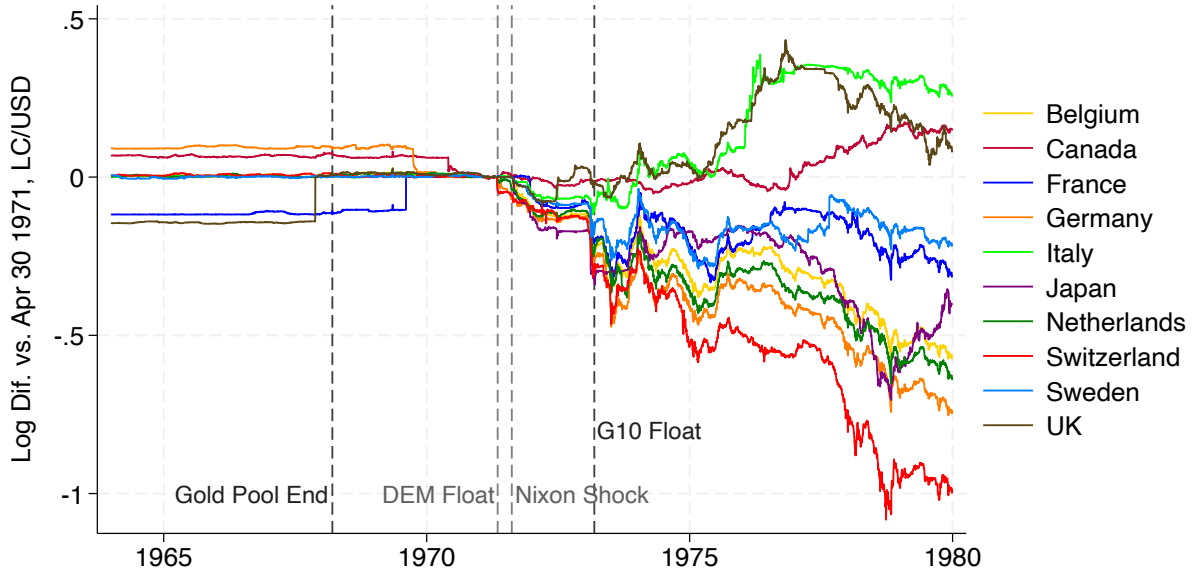


Sources: Naef (2022) and Bank of International Settlements.

[7] Zimmermann (2000) places the Blessing letter in the context of the trilateral offset negotiations between Germany, the United States, and the United Kingdom over the cost of Allied forces stationed on German soil.

The Gold Pool collapsed in March 1968 under a speculative attack of the kind later formalized by Krugman (1979), reflecting the interplay of the problems of adjustment, liquidity, and solvency identified by Bordo (1993). The high rate of domestic credit growth in the US created an excess supply of dollars, which the Pool absorbed through gold sales in the London market. This drain on the Pool's resources accelerated after sterling's devaluation in November 1967 and culminated in the run on the Pool's gold stock that forced its dissolution (Naef, 2022). Figure 3 illustrates these dynamics. In the aftermath of the crisis, a two-tier gold market arrangement formally separated the official and private gold prices, with a premium emerging in the private market. This effectively suspended dollar-gold convertibility in all but name: as shown in Appendix Figure A2, the US gold stock remained broadly frozen after 1968, reflecting the de facto end of gold as the system's anchor. The Nixon shock on August 15, 1971, merely formalized the regime that followed the 1968 run. From that point on, currency cross rates remained pegged, supported by foreign-exchange interventions by US partner central banks.

Figure 4: Nominal Exchange Rate (LC/USD), Daily (1964-1979)



Source: Bank for International Settlements. Missing daily observations are filled forward using the last available rate. A positive log change represents a nominal appreciation of the US dollar vis-à-vis the currency indicated in the legend.

We can now document four empirical patterns for the 1968–1973 period that discipline and motivate our two-country model of balance-of-payments crises. First, the United States experienced sustained monetary expansion, driven by the accumulation of net domestic assets, while net foreign assets remained broadly stable. Second, non-U.S. Group of Ten (G-10) economies pursued relatively restrictive domestic credit policies; under the exchange rate peg, their monetary base expanded endogenously through the accumulation of net foreign assets.[8] Third, repeated runs on the dollar—most prominently in May 1971 and February–March 1973—took the form of sudden, large, and accelerating reserve accumulation by foreign central banks, culminating in the

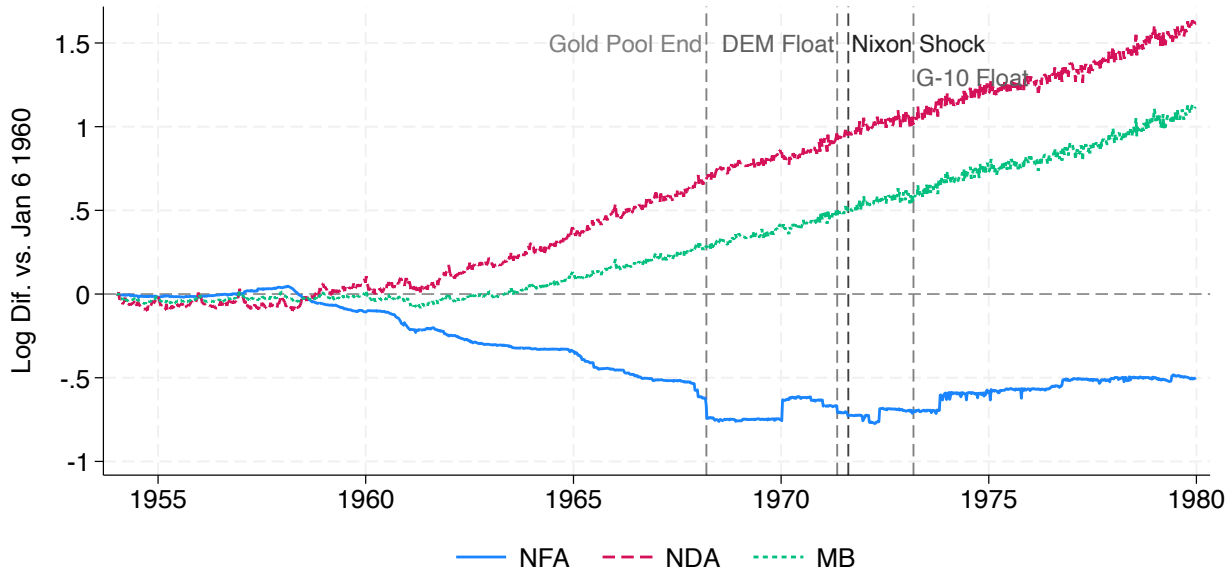
[8]The Group of Ten is a group of countries that participated since 1962 in the General Arrangements to Borrow, an agreement to provide liquidity to the International Monetary Fund (IMF), and included initially the United States, the United Kingdom, Belgium, Canada, France, Italy, Japan, the Netherlands, and the central banks of West Germany and Sweden. Switzerland joined the G-10 after 1964.

abandonment of the peg; that is, reverse speculative attacks. Fourth, following the transition to generalized floating, inflation rates and price levels diverged sharply across countries, marking the breakdown of the common price-level path implied by fixed exchange rates.

The end of Bretton Woods came as a sequence of disruptions between 1971 and 1973 that culminated in generalized floating. These events appear as sharp discontinuities in nominal exchange rates in Figure 4 (with key windows zoomed in Appendix Figure A4) and as corresponding real exchange-rate movements in Appendix Figure A5. Parity pressures intensified in 1969: the French franc was devalued by 8 percent in August, and the Deutsche Mark was revalued by 6 percent in September. After a brief period of calm, a new wave of speculative pressures brought the regime to a crisis. On May 5, 1971, Germany suspended foreign-exchange operations and allowed the mark to float; the Netherlands, Switzerland, and Belgium followed immediately. On August 15, 1971, the United States announced the Nixon Shock, officially suspending gold convertibility and introducing wage and price controls alongside a temporary import surcharge. A negotiated realignment followed in December 1971 under the Smithsonian Agreement, which "formalized what foreign exchange markets had already in large part delivered" (Irwin, 2013). The agreement devalued the dollar against gold (from $35 to $38 per ounce), reset central parities, and widened intervention bands. By this point, however, the gold parity was largely symbolic: with dollar-gold convertibility suspended, the Smithsonian realignment was less a restoration of the Bretton Woods architecture than a managed step toward floating exchange rates. The new pegs proved short-lived. Renewed capital inflows into major economies placed sustained pressure on the new pegs. By February 1973 the system again came under attack. The United States devalued the dollar a second time, to $42.22 per ounce on February 12. Japan floated within hours, and on March 9 the Group of Ten (G-10) accepted temporary floating arrangements, effectively marking the end of the Bretton Woods system.

Figure 5 documents the monetary pressures that preceded the collapse. From the early 1960s onward, the Federal Reserve's net domestic assets expanded steadily, driven primarily by credit to the US government, while net foreign assets declined as gold reserves were drawn down. As Bordo (2020) emphasizes, the central tension of the Gold Pool period was the difficulty of reconciling this monetary expansion with the external constraint of gold convertibility—a tension that ultimately resolved itself in the speculative attack on the dollar-gold peg, illustrated in Figure 3. After 1968, with gold convertibility suspended and the US no longer intervening in foreign exchange markets, this same pressure manifested differently: partner central banks absorbed the resulting dollar flows by accumulating reserves, and the scale of that accumulation was determined by how fast US credit was expanding relative to their own.

Figure 5: US Federal Reserve - Weekly Balance Sheet



Source: Bao et al. (2018). Net Foreign Assets (NFA) include gold or gold certificates and foreign financial assets, net of foreign liabilities. The Monetary Base (MB) includes currency and deposits. Net Domestic Assets (NDA) are computed residually as MB minus NFA, and consist of credit to banks and other financial institutions, credit to the nonfinancial private sector, credit to the central government, credit to government agencies, and mortgage-backed securities and other assets, net of amounts owed to banks (other than reserve deposits), amounts owed to government, other liabilities, other legal tender, and the net worth of the Federal Reserve System.

Table 1 documents the resulting asymmetry in domestic credit growth across G-10 economies.[9] Each entry reports the differential between US domestic credit growth and that of the country listed, estimated over two windows: the last Bretton Woods decade (1964–1973) and the post-Gold Pool period (1968–1973). A positive and significant coefficient indicates that US credit expanded faster than in the comparator country. US net domestic assets grew at roughly 8 percent per year in log terms, or around 4.5–5 percent scaled by GDP growth—a pace that exceeded most partner economies by a statistically significant margin. Germany and Japan, the two surplus countries at the center of the 1971 crises, show positive differentials of 4–8 percent across both windows, significant at the 10 percent level or better once scaled by GDP. The post-Gold Pool window produces larger point estimates for France, the UK, and Sweden, reflecting the acceleration of US monetary expansion in the late 1960s. Canada and Italy are notable exceptions: Canada shows near-zero differentials in the later window, while Italy's negative entries indicate domestic credit growth that outpaced even the United States over both periods. The key inconsistency was, in our interpretation, a structural divergence in domestic credit growth rates that a fixed exchange rate regime could not ultimately absorb. The model in section 3 makes this mechanism precise.

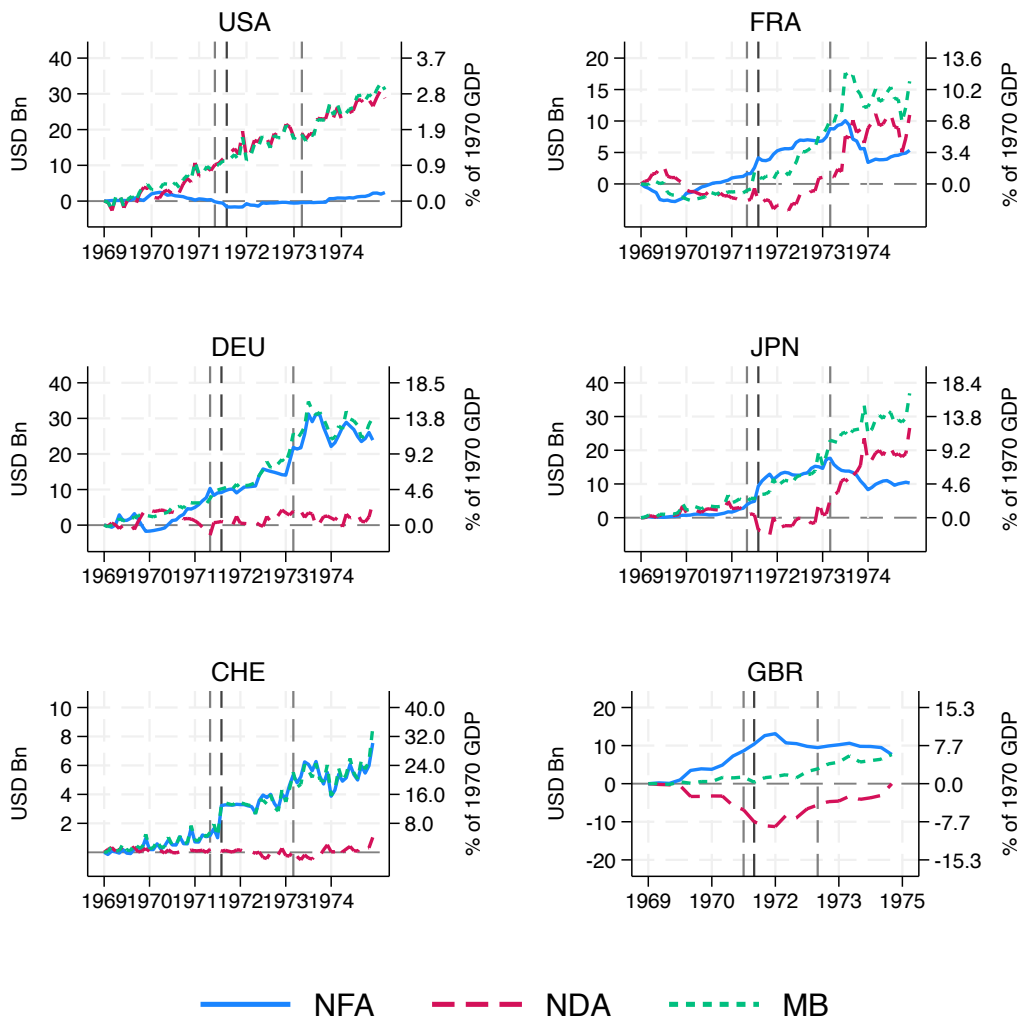
[9]The Netherlands and Switzerland are excluded because their NDA levels are negative over part of the sample, precluding a log-linear trend estimation. As Figures 6 and A6 show, their NDA growth during this period is negative in the Netherlands and approximately zero in Switzerland; including them would only reinforce the cross-country pattern.

Table 1: US Net Domestic Assets Growth Relative to Selected Countries ($\theta_{US} - \theta_c$)

		1964–1973		1968–1973	
	Min. Year	NDA (log)	NDA/Y (log)	NDA (log)	NDA/Y (log)
BEL	1964	0.1143***	0.1283***	0.1938***	0.2141***
		(0.0080)	(0.0087)	(0.0217)	(0.0208)
CAN	1964	0.0146***	0.0253***	-0.0097	0.0036
		(0.0062)	(0.0057)	(0.0067)	(0.0067)
DEU	1968	0.0438	0.0507*	0.0434*	0.0526*
		(0.0343)	(0.0334)	(0.0335)	(0.0321)
FRA	1964	-0.0088	0.0096	0.0461**	0.0672***
		(0.0097)	(0.0092)	(0.0278)	(0.0269)
GBR	1964	0.0794***	0.0747***	0.1627***	0.1617***
		(0.0159)	(0.0166)	(0.0307)	(0.0305)
ITA	1964	-0.0745	-0.0580	-0.1146	-0.1034
		(0.0079)	(0.0075)	(0.0064)	(0.0059)
JPN	1965	0.0147	0.0535**	0.0595	0.0807**
		(0.0280)	(0.0286)	(0.0477)	(0.0485)
SWE	1964	-0.0059	-0.0054	0.0934***	0.0935***
		(0.0182)	(0.0178)	(0.0332)	(0.0315)
USA	1964	0.0810***	0.0461***	0.0806***	0.0480***
		(0.0016)	(0.0012)	(0.0024)	(0.0024)

Sources: IMF Monetary and Financial Statistics (central bank balance sheets) and World Bank World Development Indicators (GDP). NDA is computed as reserve money minus net foreign assets. For each country c and sample window, we estimate linear trends in $X_{c,t} \in \{\log(\text{NDA}), \log(\text{NDA/Y})\}$, where Y is real GDP and t is a country-specific time index. Trend coefficients are annualized by multiplying by 12 (monthly data) or 4 (quarterly data; the United Kingdom only). Annual real GDP (in constant local currency units) is linearly interpolated in logs to obtain monthly (or quarterly) observations. For the United States, we estimate $X_{\text{US},t} = \alpha_{\text{US}} + \theta_{\text{US}} t + \varepsilon_t$ with Newey–West standard errors. For $c \neq$ US, we estimate a pooled two-country regression including the United States, $X_{i,t} = \alpha + \beta t + \gamma \mathbf{1}\{c\} + \delta\, t \times \mathbf{1}\{c\} + \varepsilon_{i,t}$, where $i \in \{\text{US}, c\}$. The coefficient β gives θ_{US}, while $\delta = \theta_c - \theta_{\text{US}}$, so that the reported differential is $-\delta = \theta_{\text{US}} - \theta_c$. The table reports θ_{US} for the United States and $\theta_{\text{US}} - \theta_c$ for $c \neq$ US. Standard errors for the pooled regressions use a Driscoll–Kraay estimator, robust to heteroskedasticity, serial correlation, and cross-sectional dependence. Stars denote significance for the one-sided test $H_0 : -\delta \leq 0$ against $H_1 : -\delta > 0$, i.e. that US domestic credit growth strictly exceeded that of country c.

Figure 6: Central Banks Balance Sheet (1969-1974)



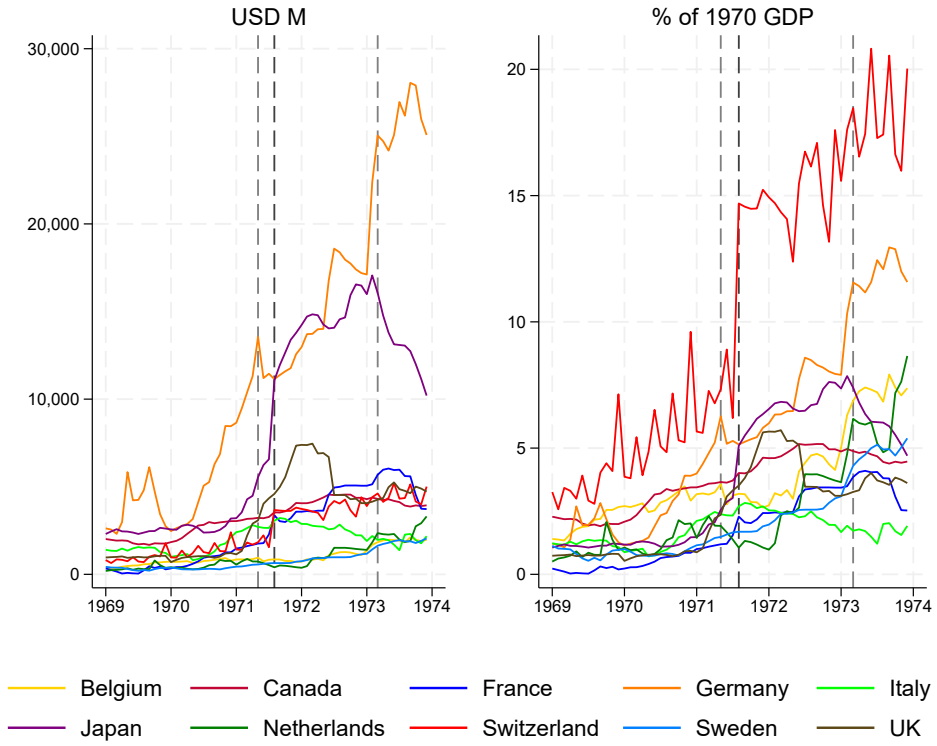
Sources: IMF Monetary and Financial Statistics (central bank balance sheets), Bank of International Settlements (exchange rates) and World Bank World Development Indicators (GDP). NFA denotes net foreign assets (foreign assets net of foreign liabilities). Net domestic assets (NDA) is computed as reserve money (monetary base or MB) minus NFA. Balance-sheet variables are expressed as changes relative to the base year and scaled by 1970 GDP (in current USD). Dashed lines represent the May 1971 DEM float, August 1971 Nixon Shock and March 1973 G-10 float.

By 1968, the Bretton Woods system had entered its final phase not as a gold-convertibility regime in any meaningful sense, but as a dollar-peg system sustained entirely by foreign central banks' willingness to accumulate dollar reserves. The United States and partner central banks deployed a range of tools to prolong this arrangement, including expanded foreign-exchange intervention, an enlarged network of Federal Reserve swap lines, and the creation of Special Drawing Rights in 1968, but none addressed the underlying monetary inconsistencies driving reserve accumulation (Bordo et al., 2015a,b). With US domestic credit expanding faster than in other major economies and US NFA barely declining after the end of the Gold Pool, parities could be maintained only if surplus-country central banks absorbed dollar inflows by accumulating foreign assets, so that their NFA rose even as US gold losses slowed. This is exactly what the data show. Figure 6 documents a

marked rise in foreign reserve assets for the major G-10 economies, most notably France, Germany, Japan, Switzerland, and even the United Kingdom, both in levels and notably as a share of GDP (Appendix Figure A7). A similar pattern is evident for Belgium, the Netherlands, and Sweden (Appendix Figure A6). These inflows continued to sustain the parities through large-scale reserve accumulation by surplus countries until 1973, when speculative pressures finally triggered the major currencies' decision to float.

Monthly data on official foreign exchange reserves provide more direct evidence of reverse speculative attacks in the final phase of Bretton Woods. Figure 7 shows sharp increases in reserve holdings around the major regime disruptions. Foreign exchange reserves surged in Germany in the months preceding the May 1971 suspension of intervention and float of the Deutsche Mark, consistent with capital inflows betting on revaluation. Similar reserve surges occur for Japan and other major economies immediately following the August 1971 Nixon Shock, as well as again in early 1973 after the February devaluation of the dollar against gold and before the G-10 decision to float. When scaled by GDP, the magnitude of these inflows is striking for smaller economies such as Belgium, the Netherlands, and Switzerland, indicating that the speculative pressures associated with the collapse of the system were not confined to its largest members but were broadly shared across the G-10.[10]

Figure 7: Central Banks Monthly Foreign Exchange Reserves



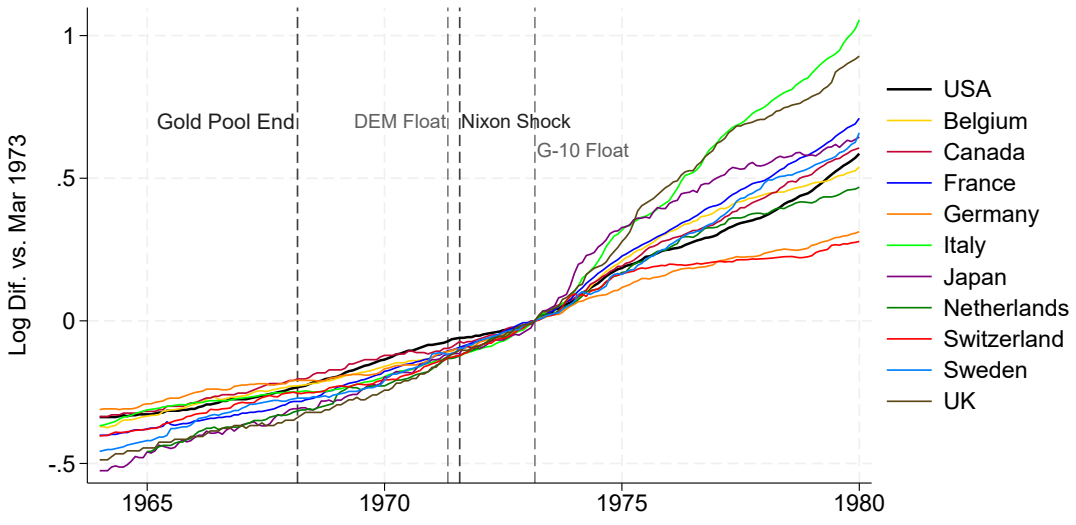
Sources: IMF International Liquidity (foreign currency reserves), World Bank World Development Indicators (GDP in current USD). Dashed lines represent the May 1971 DEM float, August 1971 Nixon Shock and March 1973 G-10 float.

[10]Reserves were not exclusively in US dollars, but the dollar dominated official reserve portfolios during this period: in 1970 about 73.5 percent of global currency reserves were held in dollars, rising to 76.1 percent by 1973 (Eichengreen et al., 2018).

Weekly balance sheet series allow a higher-frequency view of intervention dynamics. Using archival reports from national central banks, and work from Baubeau (2018) and Naef (2022), we reconstruct changes in weekly foreign exchange holdings for a subset of countries. Figure 1 documents sharp increases in foreign exchange assets for Germany, France, Japan, and Switzerland in May and August 1971, consistent with heavy dollar sales to central banks ahead of the breakdown of parities. Purchases of 1 billion dollars in the first forty minutes of the trading day on May 5th forced the Bundesbank to shut down foreign exchange operations and ultimately to float the currency (Bordo et al., 2015b). A broader wave of reserve accumulation took place in Japan in the two weeks after the Nixon Shock, during which the Bank of Japan was forced to abandon the peg after adding $4 billion USD in reserves (Angel, 1991; James, 1996). France displays a distinct pattern, with particularly large reserve movements around the Smithsonian Agreement. Pressures on major economies' exchange rates intensified again in February–March 1973, when speculative inflows surged across countries as the system entered its final crisis phase. Comparable dynamics for the United Kingdom, Sweden, Netherlands, Belgium, and Canada are shown in Appendix Figure A8, with Canada standing out as an outlier in terms of speculative attack dynamics. Overall, the weekly series point to episodic but highly synchronized reverse speculative attacks across countries during the final two years of the regime.

Figure 8 shows the evolution of price levels across countries. Prior to the breakdown of the system, inflation rates were broadly aligned, with the modest differentials that did exist consistent with a Balassa–Samuelson effect, given differences in relative productivity growth of the tradable and nontradable sectors across countries. After the end of the peg system, inflation rates diverged, although the consequences were initially delayed by the wage and price controls introduced alongside the Nixon Shock in August 1971. By 1980,the US price level had diverged sharply from low-inflation anchor countries such as Germany and Switzerland; Appendix Figure A9 shows a consistent divergence in inflation rates.

Figure 8: Price Level



Source: Bank for International Settlements.

3 Model

This section develops a two-country, perfect-foresight model designed to interpret the empirical patterns documented above—most notably, large-scale reserve accumulation in surplus countries, synchronized inflation under the peg, and the eventual collapse of parities following a sudden burst of sustained speculative inflows. The framework builds on the canonical first-generation model of Krugman (1979) and is adapted to allow for *reverse* speculative attacks: under a pegged exchange rate, sustained monetary expansion in the anchor country generates persistent money market pressure that is absorbed by reserve accumulation in surplus countries. As long as the peg is maintained, inflation is jointly determined across countries by the global evolution of domestic credit. When foreign official reserves reach an upper bound, the fixed exchange rate regime is abandoned, and the system transitions endogenously to a float.

3.1 Economic Environment

Consider a perfect-foresight, one-good, two-country endowment economy. We think of the US as the home country and Germany as the foreign country. In each country, there is a representative household and a government. Agents trade money and bonds denominated in local and foreign currency, as well as the consumption good. Trade and capital mobility are frictionless.

Foreign variables are identified by an asterisk (*). The nominal exchange rate E_t is units of home currency per unit of foreign currency. The currency devalues at rate $\epsilon_t = \frac{\dot{E}_t}{E_t}$. The nominal interest rates are i_t and i_t^*. With a single traded good, the law of one price implies

$$P_t = E_t P_t^*, \tag{1}$$

Inflation is $\pi_t \equiv \dot{P}_t/P_t$ and $\pi_t^* \equiv \dot{P}_t^*/P_t^*$. Free trade and free capital mobility imply the no-arbitrage conditions

$$i_t = i_t^* + \epsilon_t \tag{2}$$
$$\pi_t = \pi_t^* + \epsilon_t. \tag{3}$$

Equations (2) and (3) imply equal real interest rates across countries, $r_t = r_t^*$, where $r_t \equiv i_t - \pi_t$. During Bretton Woods, $\epsilon_t = 0$, hence $\pi_t = \pi_t^*$ in this one-good baseline. We assume, for simplicity, a constant endowment, y in each country so that

$$y_t = y \text{ and } y_t^* = y^* \text{ for all } t. \tag{4}$$

3.1.1 Monetary and Fiscal Policy

We use a superscript to denote the holder of an asset and a subscript to denote its currency denomination. An empty superscript refers to the home private household, * to the foreign private household, and g, g^* to the home and foreign governments. Subscripts h, f denote assets denominated in home and foreign currency. The home central bank's nominal balance sheet is

$$M_{f,t}^{g} E_t + D_{h,t} = M_{h,t} + M_{h,t}^{g^*} + NW_{h,t} \tag{5}$$

Assets are foreign reserves $M_{f,t}^{g}$ (claims on foreigners) and net domestic assets $D_{h,t}$ (claims on the government/financial sector). Liabilities are money held by the home private sector $M_{h,t}$ and

the foreign central bank's holdings of home-currency reserves $M^{g^*}_{h,t}$. The net worth of the central bank is $NW_{h,t}$. We assume central bank international reserves do not earn interest. In real terms, equation (5) is

$$m^g_{f,t} + d_{h,t} = m_{h,t} + m^{g^*}_{h,t} + nw_{h,t}. \tag{6}$$

The home government's nominal budget constraint is $\dot{B}^g_{h,t} = \dot{D}_{h,t} - \dot{NW}_{h,t} + P_t\tau_t + i_t B^g_{h,t}$, where τ_t is the primary surplus (lump-sum taxes), $B^g_{h,t}$ are government assets in home currency, $D_{h,t}$ is central bank's credit to the government and $\dot{NW}_{h,t}$ are central bank profits not transferred to the government. Dividing by the price level and using $\dot{D}_{h,t}/P_t = \dot{d}_{h,t} + \pi_t d_{h,t}$ and $\dot{NW}_t/P_t = \dot{nw}_{h,t} + \pi_t nw_{h,t}$, the real government's budget constraint is

$$\dot{b}^g_{h,t} = \dot{d}_{h,t} - \dot{nw}_{h,t} + \pi_t(d_{h,t} - nw_{h,t}) + \tau_t + (i_t - \pi_t)b^g_{h,t} \tag{7}$$

Eliminating intra-public-sector claims, $d_{h,t}$ and $nw_{h,t}$, yields the consolidated public-sector real budget constraint. We define the government's net asset position as $a^g_t \equiv m^g_{f,t} + b^g_{h,t} - m_{h,t} - m^{g^*}_{h,t}$, which measures consolidated public wealth as the difference between the government's claims on the foreign central bank and its bond holdings, and its monetary liabilities to the domestic private sector and to the foreign central bank. The evolution of a^g_t reflects interest earnings, primary surpluses, and seigniorage revenues, $\dot{a}^g_t = r_t a^g_t + \tau_t + i_t\left(m_{h,t} + m^{g^*}_{h,t} - m^g_{f,t}\right)$, implying the following intertemporal budget constraint:[11]

$$0 = a^g_0 + \int_0^\infty \left(\tau_t + i_t(m_{h,t} + m^{g^*}_{h,t} - m^g_{f,t})\right) e^{-\int_0^t r_s ds} dt \tag{8a}$$

$$a^g_T = m^g_{f,T^+} + b^g_{h,T^+} - m_{h,T^+} - m^{g^*}_{h,T^+} = m^g_{f,T^-} + b^g_{h,T^-} - m_{h,T^-} - m^{g^*}_{h,T^-} \qquad \text{for } T \in \Theta \tag{8b}$$

where, $T^+ = \lim_{\Delta\to 0} T + \Delta$ and $T^- = \lim_{\Delta\to 0} T - \Delta$, and Θ is the times when there are portfolio reallocations. Equation (8a) is standard. The jump restriction (8b) states that at portfolio reallocation times $T \in \Theta$, consolidated public-sector real wealth is preserved across the reallocation. The foreign central bank balance sheet and consolidated budget constraints are analogous:

$$m^{g^*}_{h,t} + d^*_{f,t} = m^*_{f,t} + m^g_{f,t} + nw^*_{f,t}. \tag{9a}$$

$$0 = a^{g^*}_0 + \int_0^\infty \left(\tau^*_t + i^*_t\left(m^*_{f,t} + m^g_{f,t} - m^{g^*}_{h,t}\right)\right) e^{-\int_0^t r_s ds} dt \tag{9b}$$

$$a^{g^*}_T = m^{g^*}_{h,T^+} + b^{g^*}_{f,T^+} - m^*_{f,T^+} - m^g_{f,T^+} = m^{g^*}_{h,T^-} + b^{g^*}_{f,T^-} - m^*_{f,T^-} - m^g_{f,T^-} \qquad \text{for } T \in \Theta \tag{9c}$$

The policy environment during the Bretton Woods period is captured by three assumptions governing domestic credit creation, fiscal policy, and exchange rate intervention.

Assumption 1 (Monetary Policy)

- *Home country domestic credit and net worth:* $\frac{\dot{D}_{h,t}}{D_{h,t}} = \theta$, $NW_{h,0} = 0$ *and* $\dot{NW}_{h,t} = \dot{E}_t M^g_{f,t}$
- *Foreign country domestic credit and net worth:* $\frac{\dot{D}^*_{f,t}}{D^*_{f,t}} = \theta^* < \theta$, $NW^*_{f,0} = 0$ *and* $\dot{NW}^*_{f,t} = -\frac{\dot{E}_t}{E_t}\frac{M^{g^*}_{h,t}}{E_t}$

[11] For any time path x_t, define left and right limits at portfolio reallocation date T as $x_{T^-} \equiv \lim_{t\uparrow T} x_t$, $x_{T^+} \equiv \lim_{t\downarrow T} x_t$. When x_t is continuous at T, we write $x_T \equiv x_{T^-} = x_{T^+}$.

Assumption 1 captures the empirical patterns documented in section 2. The home country (the United States) follows a monetary policy with sustained domestic credit expansion relative to the foreign country, $\theta^* < \theta$. For tractability, we also assume that exchange-rate valuation effects are absorbed by central bank net worth and are not distributed to the treasury.

Assumption 2 (Fiscal Policy)

- *Home country fiscal policy:* $\tau_t = -r_t b^g_{h,t}$ *for* $t \neq T$, *and* $b^g_{h,T^+} = b^g_{h,T^-}$.
- *Foreign country fiscal policy:* $\tau^*_t = -r_t b^{g^*}_{f,t}$ *for* $t \neq T$, *and* $b^{g^*}_{f,T^+} = b^{g^*}_{f,T^-}$.

Assumption 2 is a simple way to assume a balanced budget in a Ricardian economy and restricts, for simplicity, open market operations with bonds at the time of the speculative attack.

Assumption 3 (Exchange Rate Policy)

1. *Fixed Exchange Rate for* $0 < t < T$: $E_t = E$, *fixed home currency reserves,* $m^{g}_{f,t} = 0$, *and market determined* foreign *international reserves* $m^{g^*}_{h,t}$.
2. *Floating Exchange Rate for* $t \geq T$: E_t *is market determined and* nominal *reserve positions are fixed, such that* $M^{g^*}_{h,t} = \bar{M}^{g^*}_{h} = \bar{m}^{g^*}_{h} P_{T^-}$.
3. *Regime Switch: the exchange rate regime switches at T when the post-switch foreign reserve position reaches its upper bound,* $m^{g^*}_{h,T^+} = \bar{m}^{g^*}_{h}$.

Assumption 3 captures the essence of the exchange rate policy adopted by the US and its G-10 partners during the 1968-73 period. A fixed exchange rate regime is maintained as long as foreign official reserves can absorb incoming capital flows; once these reserves reach an upper bound, the peg is abandoned, and the economy transitions to a floating exchange rate regime. To capture reverse speculative attacks observed in the data, we restrict attention to equilibria in which reserve accumulation occurs entirely in the foreign country. While modeled as an exogenous upper bound, the reserve limit should be interpreted as capturing political, institutional, or monetary-control constraints that made continued intervention increasingly costly for G-10 countries, as documented in the historical record.

3.1.2 Households

The home household chooses consumption, money holdings, and portfolio positions in home- and foreign-currency bonds. Their nominal flow budget constraint is

$$\begin{aligned} \dot{M}_{h,t} + E_t \dot{B}_{f,t} + \dot{B}_{h,t} &= P_t(y - c_t - \tau_t) + i_t B_{h,t} + E_t i^*_t B_{f,t}, && t \neq T, \\ E_T B_{f,T^+} + M_{h,T^+} + B_{h,T^+} &= E_T B_{f,T^-} + M_{h,T^-} + B_{h,T^-}, && T \in \Theta. \end{aligned}$$

At portfolio reallocation times $T \in \Theta$, households can reshuffle asset holdings without changing their nominal wealth. For the household's problem to have a solution in the perfect foresight model with no financial frictions, wealth must be bounded, and hence the exchange rate must be a continuous function of time—it cannot jump at T.

The home household's optimization problem in real terms is derived by dividing by the price level

P_t and using $\dot{B}/P = \dot{b} + \pi b$ so that,

$$\max_{c_t, m_{h,t}, a_t} \int_0^\infty u(c_t, m_{h,t}) e^{-\rho t} dt \text{ s.t. } \begin{cases} \dot{a}_t = r_t a_t + y - c_t - i_t m_{h,t} - \tau_t \\ a_0 \text{ given and } \lim_{t\to\infty} a_t e^{-\rho t} \geq 0, \end{cases} \tag{10}$$

where real wealth is $a_t = m_{h,t} + b_{f,t} + b_{h,t}$, with $m_{h,t} \equiv M_{h,t}/P_t$, $b_{h,t} \equiv B_{h,t}/P_t$, and $b_{f,t} \equiv E_t B_{f,t}/P_t$. With separable, differentiable preferences, the optimality conditions satisfy

$$\frac{u_m\left(m_{h,t}\right)}{u_c\left(c_t\right)} = i_t \tag{11a}$$

$$\frac{\dot{c}_t}{c_t} = -\frac{u_c(c_t)}{u_{cc}(c_t)c_t}\left(r_t - \rho\right) \tag{11b}$$

$$\int_0^\infty \left(c_t + i_t m_{h,t} - \tau_t\right) e^{-\int_0^t r_s ds}\, dt = a_0 + \int_0^\infty y e^{-\int_0^t r_s ds}\, dt \tag{11c}$$

$$a_T = m_{h,T^+} + b_{f,T^+} + b_{h,T^+} = m_{h,T^-} + b_{f,T^-} + b_{h,T^-} \tag{11d}$$

Condition (11a) characterizes the money demand. The household equates the marginal rate of substitution between real money balances and consumption to the nominal interest rate. Equation (11b) is the standard Euler equation governing intertemporal consumption choices. The intertemporal budget constraint (11c) is obtained by integrating the flow constraint forward and imposing the transversality condition, and is such that the present discounted value of expenditures, including the opportunity cost of holding money, equals initial wealth plus the present discounted value of income. At portfolio reallocation dates $T \in \Theta$, households adjust the composition of their asset holdings without changing nominal wealth. Equation (11d) imposes the continuity of nominal asset values at the time of regime changes. The foreign household's conditions are analogous:

$$\frac{u_m\left(m^*_{f,t}\right)}{u_c\left(c^*_t\right)} = i^*_t \tag{12a}$$

$$\frac{\dot{c}^*_t}{c^*_t} = -\frac{u_c(c^*_t)}{u_{cc}(c^*_t)c^*_t}\left(r^*_t - \rho\right) \tag{12b}$$

$$\int_0^\infty \left(c^*_t + i^*_t m^*_{f,t} - \tau^*_t\right) e^{-\int_0^t r^*_s ds}\, dt = a^*_0 + \int_0^\infty y^* e^{-\int_0^t r^*_s ds}\, dt \tag{12c}$$

$$a^*_T = m^*_{f,T^+} + b^*_{f,T^+} + b^*_{h,T^+} = m^*_{f,T^-} + b^*_{f,T^-} + b^*_{h,T^-} \tag{12d}$$

Aggregating private and public budget constraints yields the home-country net foreign asset dynamics

$$\dot{\bar{a}}_t = r_t \bar{a}_t + y - c_t + i_t\left(m^{g^*}_{h,t} - m^g_{f,t}\right), \tag{13}$$

where $\bar{a}_t \equiv a_t + a^g_t$, and analogously for the foreign country.

3.2 Equilibrium

Aggregate consistency requires goods, money, and bond markets to clear:

$$c_t + c^*_t = y + y^*, \tag{14a}$$

$$b_{h,t} + b^g_{h,t} + b^*_{h,t} = 0, \tag{14b}$$

$$b_{f,t} + b^{g^*}_{f,t} + b^*_{f,t} = 0. \tag{14c}$$

$$m_{h,t} + m^*_{f,t} = d_{h,t} + d^*_{f,t} \qquad \text{for } t \leq T. \tag{14d}$$

$$m_{h,t} = \frac{M_{h,t}}{P_t} \text{ and } m^*_{f,t} = \frac{M^*_{f,t}}{P^*_t} \qquad \text{for } t \geq T. \tag{14e}$$

Under a peg, free trade, and free capital mobility, there is only one world money market clearing condition equation (14d). Free trade and the fixed exchange rate imply there is only one price level to be determined, while free capital mobility under a peg implies that the money supply in each country is endogenous. If equation (14d) holds, reserves will adjust so that each country's money market clearing holds for $t \leq T$.[12] Under floating, the two conditions in equation (14e) must hold to determine the two price levels. Equations (14b) and (14c) are redundant by Walras law if the rest of the equations (14) hold.

Definition 1 (Competitive Equilibrium) *Given initial world wealth distribution satisfying* $a_0 + a^g_0 = -a^*_0 - a^{g^*}_0$, *a constant endowment* y *in each country, and policies satisfying Assumptions 1, 2, and 3, a* Competitive Equilibrium *is a regime-switch time* T*; paths for quantities*

$$(a_t, a^*_t, a^g_t, a^{g^*}_t, m_{h,t}, m^*_{f,t}, b_{h,t}, b^g_{h,t}, b^*_{h,t}, b_{f,t}, b^*_{f,t}, b^{g^*}_{f,t}, c_t, c^*_t)_{t\geq 0};$$

prices $(r_t, i_t, P_t, r^*_t, i^*_t, P^*_t)_{t\geq 0}$*; an exchange-rate path* $(E_t)_{t\geq 0}$ *with* $E_t = E$ *for* $t < T$ *and market-determined* E_t *for* $t \geq T$*; and reserve holdings* $(m^{g^*}_{h,t})_{t\in[0,T]}$*, such that:*

(i) The law of one price (1) and uncovered interest parity (2) hold.

(ii) The public-sector constraints (6), (8), and (9) are satisfied.

(iii) Households optimize, satisfying (11) and (12).

(iv) Aggregate consistency conditions (14) hold.

3.3 Characterization of equilibrium.

This section fully characterizes the equilibrium. In order to obtain a closed-form solution, we assume that domestic monetary policies satisfy $\theta > \theta^* = 0$ and restrict attention to separable preferences.

Assumption 4 (Domestic monetary policy) *The rates of growth of domestic credit satisfy*

$$\theta > \theta^* = 0$$

Assumption 5 (Preferences) *Preferences are separable in consumption and real money balances. We assume CES money demand with country-specific shifters* α, α^**:*

$$u(c_t, m_t) = \frac{c_t^{1-\sigma}}{1-\sigma} + \alpha \frac{m_t^{1-\sigma}}{1-\sigma}.$$

[12] Assumption 1 implies $\dot{NW}_{h,t} = \dot{NW}^*_{f,t} = 0$. Since $NW_{h,0} = NW^*_{f,0} = 0$, we have $nw_{h,t} = nw^*_{f,t} = 0$ for all $t < T$, so equation (14d) reduces to the condition $m_{h,t} + m^*_{f,t} = d_{h,t} + d^*_{f,t}$.

Assumption 4 reflects the patterns identified in Table 1, Figure 5, and Figure 6. The table shows that the rate of growth of domestic credit in the US exceeded that of partner G-10 countries, $\theta > \theta^*$, while Figure 6 suggests that domestic credit growth was practically nil in non-US G-10 countries in the pre-1973 period. Assumption 5 and the household's optimization problem imply the money demand functions

$$m(i_t, c) = c\left(\frac{\alpha}{i_t}\right)^{1/\sigma}, \qquad m^*(i_t^*, c^*) = c^*\left(\frac{\alpha^*}{i_t^*}\right)^{1/\sigma}. \tag{15}$$

Real Equilibrium. The real equilibrium of this economy is purposely simple. Assumption 5 and the definition of equilibrium imply that the equilibrium interest rates are

$$r_t = \rho \text{ for all } t. \tag{16}$$

The equilibrium interest rates in equation (16) follow directly from the assumptions of free capital mobility, the separability of preferences, and a constant endowment. Free capital mobility and perfect foresight imply $r_t = r_t^*$. Under Assumption 5, equation (11b) and equation (12b) imply that consumption growth is identical across countries—i.e., $\frac{\dot{c}_t}{c_t} = \frac{\dot{c}_t^*}{c_t^*} = \frac{1}{\sigma}(r_t - \rho)$. At the same time, a constant aggregate endowment and market clearing, equation (14a), imply a constant aggregate consumption. Since both countries have identical consumption growth, the only feasible path is zero growth. Substituting back into the Euler equation, this implies $r_t = \rho$ for all t. Equilibrium consumption is:

$$c = y + \rho\left(a_0 + a_0^g\right) + \rho \int_0^\infty i_t\left(m_{h,t}^{g^*} - m_{f,t}^g\right)e^{-\rho t}\, dt, \tag{17a}$$

$$c^* = y^* + \rho\left(a_0^* + a_0^{g^*}\right) - \rho \int_0^\infty i_t\left(m_{h,t}^{g^*} - m_{f,t}^g\right)e^{-\rho t}\, dt. \tag{17b}$$

Consumption equals permanent income: the constant endowment y plus the interest income on initial national wealth $\bar{a}_0$, plus the annuitized present value of net seignorage transfers. An analogous expression determines c^* for the foreign country. In a two-country environment, the seigniorage transfers are purely redistributive and sum to zero globally. When $m_{ht}^{g^*} > 0$ and $m_{ft}^g = 0$, home country consumers benefit from the "inflation tax" paid by foreigners. The equilibrium consumption in equation (17) follows from aggregating the government's and households' budget constraints for a constant level of consumption. For the domestic country, this entails adding equation (11c) and equation (8a). Assumption 5 yields a clean separation between consumption and monetary dynamics, which helps make the case that the balance-of-payments imbalances under Bretton Woods are independent of real variables, such as trade balance dynamics.

Monetary Equilibrium: Prices. The monetary equilibrium entails finding the equilibrium price levels P_t and P_t^*, as well as the regime-switch time T, which are jointly determined by the money market equilibrium conditions, the no arbitrage condition for goods, the continuity of prices as a function of time, and the household's boundary conditions.[13] No arbitrage in goods (1) implies that the exchange rate E determines the ratio P_t/P_t^* under a peg and the prices P_t/P_t^* determine the floating exchange rate E_t after fixed rate's collapse.

The money market equilibrium conditions are differential equations of the type studied in Sargent and Wallace (1973), with the nuance that they are different before and after the regime-switch time

[13] The continuity of prices is necessary for the existence of an equilibrium in a perfect foresight model with no borrowing constraints. We derive the equilibrium by solving for the price level after and before the switch to floating rates and imposing $P_T = \lim_{\delta \to 0} P_{T+\delta} = \lim_{\delta \to 0} P_{T-\delta}$, and the analogous condition for P_t^*.

T. We solve for the path of P_t using the domestic money market clearing condition for $t \geq T$ and the global market clearing condition for $t \leq T$. The money market equilibrium conditions under floating exchange rates are

$$D_{h,0}e^{\theta t} - P_T \bar{m}_h^{g^*} = P_t m(\rho + \pi_t, c) \qquad \text{for } t \geq T, \tag{18a}$$

$$D^*_{f,0} + \frac{P_T \bar{m}_h^{g^*}}{E_T} = P^*_t m^*(\rho + \pi^*_t, c^*) \qquad \text{for } t \geq T. \tag{18b}$$

The left-hand side of each equation (18) is the money supply, while the right-hand side is the demand for nominal money balances—the product of the demand for real money balances and the price level. The money supply under the floating regime on the left-hand side of equation (18) is driven by the evolution of domestic credit. The fixed exchange rate regime ends when the foreign countries' reserves reach an upper bound. After the regime change, reserves are fixed at that bound, $\bar{m}_h^{g^*}$. The home money supply then is domestic credit minus the home currency held as reserves by the foreign central bank. The foreign money supply is domestic credit plus international reserves denominated in the home currency. Since the money demand depends on inflation ($\pi_t = \dot{P}_t/P_t$), each money market clearing condition is a differential equation of the type solved forward by Sargent and Wallace (1973). It has a unique solution because equation (10) implies the boundary condition $\lim_{s\to\infty} e^{-\rho\sigma s} P_s^{-\sigma} = 0$. The solution to the money market clearing conditions in equation (18), derived in Appendix A.2.1, for the money demand in equation (15), is:

$$P_t = \left[\sigma\alpha \int_t^\infty \left(\frac{D_{h,0}e^{\theta s} - P_T \bar{m}_h^{g^*}}{c}\right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds\right]^{-1/\sigma} \qquad \text{for } t \geq T, \tag{19a}$$

$$P^*_t = \frac{D^*_{f,0}}{c^*(\alpha^*/\rho)^{1/\sigma} - \bar{m}_h^{g^*}} \qquad \text{for } t \geq T. \tag{19b}$$

The domestic price level depends on a weighted average of the future money supplies, $M_t = D_{h,0}e^{\theta s} - P_T \bar{m}_h^{g^*}$, and eventually grows at the rate θ. The foreign price level has a simpler expression because, as $\theta^* = 0$, the money supply is constant and, hence, the price level. For the fixed exchange rate regime, there is only one price to determine since the fixed exchange rate $E_t = E$ and free trade imply $P^*_t = P_t/E$ for $t < T$. The global money market clearing condition, equation (14d), becomes

$$D_{h,0}e^{\theta t} + ED^*_{f,0} = P_t\Big(m(\rho + \pi_t, c) + m^*(\rho + \pi_t, c^*)\Big). \tag{20}$$

The left-hand side of equation (20) is the global money supply, while the right-hand side is the global money demand. Equation (20) is a differential equation, and by the continuity of P_t, its boundary condition is the equilibrium price at P_T under the floating regime—determined by equation (19a). The solution for the price level is

$$P_t^{-\sigma} = \sigma\Big(c\,\alpha^{1/\sigma} + c^*(\alpha^*)^{1/\sigma}\Big)^\sigma \int_t^T \Big(D_{h,0}e^{\theta s} + ED^*_{f,0}\Big)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds + e^{-\rho\sigma(T-t)} P_T^{-\sigma} \qquad \text{for } t \leq T. \tag{21}$$

The price level at t is determined by the anticipated price level at the time of the regime switch, P_T, and by the evolution of the global money supply, $D_{h,0}e^{\theta t} + ED^*_{f,0}$, between t and T. Lemma 1 characterizes inflation dynamics throughout.

Lemma 1 (Inflation Dynamics) *Under Assumptions 1–5:*

(a) For all $t > T$: $\pi_t > \theta$, $\lim_{t\to\infty} \pi_t = \theta$ and $\pi^*_t = \theta^* = 0$.

(b) For all $t < T$: $\pi^*_{T^+} = \theta^* < \pi_t < \pi_{T^+}$. Moreover, if

$$c\left(\frac{\alpha}{\rho+\theta}\right)^{\frac{1}{\sigma}} < c^*\left(\frac{\alpha^*}{\rho+\theta^*}\right)^{\frac{1}{\sigma}}\left(1-\left(\frac{\rho+\theta^*}{\rho+\theta}\right)^{\frac{1}{\sigma}}\right) \tag{22}$$

then $\theta^* < \pi_t < \theta$ for all $t < T$.

Proof See Appendix A.2.2.

Under the peg, inflation is common across countries, $\pi_t = \pi^*_t$, determined jointly by the global money market clearing condition equation (20). Prior to the collapse, the common peg inflation rate lies strictly between the two post-collapse country-specific rates, $\pi^*_{T^+} < \pi_t < \pi_{T^+}$ for all $t < T$: the peg forces both countries onto a common price path whose inflation rate reflects a weighted average of home and foreign credit growth. If the home country's steady state money demand is not too large relative to the foreign country's—in the sense that condition equation (A18) holds—then peg inflation is strictly bounded between the two countries' domestic credit growth rates, $\theta^* < \pi_t < \theta$, for all $t < T$. The condition requires that the foreign economy contributes sufficiently to world money demand to anchor the common price path away from the home credit growth rate. This is satisfied in our quantitative illustration with the United States and Germany, and consequently holds when the foreign country is interpreted as the rest of the world economy. After the regime switch, inflation paths diverge sharply. In the home country, inflation jumps on impact and exceeds θ and then converges to θ from above. In the foreign country, inflation falls immediately to 0 since the foreign money supply is constant under the float.[14] Nominal interest rates inherit the dynamics of inflation as $i = \rho + \pi$ and $i^* = \rho + \pi^*$. The discontinuity of inflation at T implies that nominal interest rates jump at T, with the domestic one jumping up and the foreign one falling to ρ. By equation (3), the rate of depreciation jumps from $\epsilon_t = 0$ under the peg to $\epsilon_{T^+} = \pi_{T^+} - \pi^*_{T^+} > 0$ at the moment of collapse, and converges to $\theta - \theta^*$ from above.

Monetary Equilibrium: Capital Flows under the Peg. Under the peg, the home central bank balance sheet equation (6) and Assumption 3 imply $m^{g^*}_{h,t} = d_{h,t} - m_{h,t}$: foreign official holdings of home-currency reserves equal the excess of real domestic credit over home money demand. Reserve accumulation therefore reflects the gap between the rate at which the home country creates credit and the rate at which the world absorbs it through money demand, as derived in Appendix A.2.3:

$$\dot{m}^{g^*}_{h,t} = (\theta - \pi_t)\, d_{h,t} + \frac{1}{\sigma}\, m_{h,t}\, \frac{\dot{\pi}_t}{\rho + \pi_t}, \qquad t \le T. \tag{23}$$

The first term captures the direct effect of credit expansion: when $\pi_t < \theta$, real domestic credit grows faster than prices, and the excess flows abroad as reserves, which is always the case in our quantitative illustration. The second term captures the indirect effect through money demand: as peg inflation rises, real money demand falls, freeing additional resources that are absorbed as reserves. Using the world money-market condition under the peg and dividing by the outstanding stock of reserves, equation (23) can be rewritten as

$$\frac{\dot{m}^{g^*}_{h,t}}{m^{g^*}_{h,t}} = (\theta - \theta^W_t)\,\frac{m_{h,t}}{m^{g^*}_{h,t}} + (\theta - \pi_t), \qquad t \le T, \tag{24}$$

[14] For $\theta^* \neq 0$ and $\theta^* < \theta$: $\pi^*_t < \theta^*$ for $t > T$ and $\lim_{\delta\to\infty} \pi^*_{T+\delta} = \theta^*$.

where $\theta_t^W \equiv \dot{M}_t^W / M_t^W$ and $M_t^W = D_{h,0} e^{\theta t} + E D_{f,0}^*$ is the world money supply. The rate at which reserves grow equals the rate of real domestic credit growth, $\theta - \pi_t$, plus an amplification term that captures the excess of home credit growth over world money growth, scaled by the ratio of home real balances to the existing reserve stock.

In the model, reserve accumulation is almost entirely a capital-account phenomenon. Since consumption is constant in both countries, the trade balance is zero, and the only current-account flow is the seigniorage transfer that foreign reserve holdings imply: foreign central banks hold non-interest-bearing dollar reserves, effectively paying an inflation tax to the United States, which enters the US current account as a positive transfer. This term is quantitatively small in any empirically relevant calibration, and it cuts against the conventional narrative — it makes the US current account more positive, not less, even as dollar reserves accumulate abroad. The bulk of the balance-of-payments imbalance under Bretton Woods therefore operated through the capital account: excess dollar liquidity created by US domestic credit expansion was intermediated internationally through private capital flows and ultimately landed on foreign central bank balance sheets as official reserves. No real adjustment was required or occurred; the mechanism was monetary, not real. In particular, there is no role here for the traditional current-account adjustment narrative that dominates much of the Bretton Woods literature.

Monetary Equilibrium: The Speculative Attack. A speculative attack occurs when agents realize that the foreign central bank's accumulation of international reserves is approaching its upper bound and that a change of regime is imminent. At the moment of the switch, domestic nominal interest rates rise—reducing demand for home money—while foreign rates fall, increasing demand for foreign money. Since the foreign central bank is still supporting the peg at T, it accommodates countries' portfolio shifts by purchasing home currency in exchange for its own liabilities, producing the discrete jump in reserve holdings visible in Figure 1.

The regime-switch time T is pinned down by the requirement that the foreign price level P_t^* be continuous at T. Under the peg, PPP implies $P_{T^-}^* = P_{T^-}/E$; under the float, $P_{T^+}^*$ is given by equation (19b). Continuity requires these to coincide, yielding the condition

$$\frac{P_T}{E} = \frac{D_{f,0}^*}{c^*(\alpha^*/\rho)^{1/\sigma} - \bar{m}_h^{g^*}}. \tag{25}$$

The right-hand side of equation (25) is a positive constant, while the left-hand side is strictly increasing in T. Hence equation (25) has at most one solution. Proposition 1 provides a sufficient condition guaranteeing existence and shows it is also necessary.

Proposition 1 (Reverse Speculative Attack) *In an economy satisfying Assumptions 1–5, suppose*

$$\frac{D_{h,0}}{E\, D_{f,0}^*} < \frac{c\left(\dfrac{\alpha}{\rho+\theta}\right)^{1/\sigma}}{c^*\left(\dfrac{\alpha^*}{\rho}\right)^{1/\sigma} - \bar{m}_h^{g^*}}, \tag{26}$$

where c and c^* are determined by equation (17). Then the fixed exchange rate regime collapses at a unique finite date $0 < T < \infty$ if, and only if,

(i) $\theta > \theta^*$, *and*

(ii) $\bar{m}_h^{g^*} < \infty$.

Proof See Appendix A.2.4.

The parameter restriction equation (A38) ensures that the fixed exchange rate E is consistent with an equilibrium for $t \leq T$. The right-hand side compares the steady-state demand for home real balances under a float at $i = \rho + \theta$ to foreign real balances net of post-float reserves; the left-hand side is the initial relative supply of domestic credit. When the condition holds, the initial credit position is consistent with the upper bound on relative money demand under a float; when it fails, the regime-switch date implied by continuity of P_t^* is negative, indicating that the peg is attacked immediately.

Proposition 1 establishes that the two primitive asymmetries of the model are not merely sufficient but necessary for the peg to collapse in finite time. If credit growth rates are equal, the ratio P_T/P_T^* is constant in T and the switch condition equation (25) is never reached. If the reserve bound is infinite, the collapse date is pushed to infinity. Given both conditions, a reverse speculative attack is inevitable: the foreign central bank exhausts its willingness to accumulate reserves at a unique finite date T, and the peg collapses endogenously. Crucially, what drives the collapse is not the level of inflation—which under the peg is common across countries—but the asymmetry $\theta - \theta^* > 0$: it is the divergence in credit growth, not its level, that makes the attack unavoidable.

The collapse date T and the size of the reverse speculative attack both depend on the structural parameters of the model in intuitive ways. Given the initial relative nominal credit position $\Lambda \equiv \frac{D_{h,0}}{E\,D_{f,0}^*}$, the equilibrium collapse date and the size of the attack can be written as functions

$$T = T\Big(\Lambda,\, \bar{m}_h^{g^*},\, \theta - \theta^*\Big) \qquad \text{and} \qquad \Delta = \Delta\Big(\bar{m}_h^{g^*},\, \theta - \theta^*\Big),$$

holding the real allocation (c, c^*) fixed.[15] The exchange rate E and the nominal credit levels $(D_{h,0}, D_{f,0}^*)$ enter T only through Λ, reflecting the model's neutrality with respect to redenomination of nominal variables.

Lemma 2 (Comparative Statics) *Under Assumptions 1–5 and holding the real allocation (c, c^*) fixed:*

(a) The collapse date $T(\Lambda, \bar{m}_h^{g^*}, \theta - \theta^*)$ satisfies, for general θ^*, where $\Lambda \equiv \frac{D_{h,0}}{E\,D_{f,0}^*}$

$$\frac{\partial T}{\partial \Lambda} = -\frac{1}{(\theta - \theta^*)\,\Lambda} < 0, \qquad \frac{\partial T}{\partial \bar{m}_h^{g^*}} > 0, \qquad \frac{\partial T}{\partial \theta} < 0, \quad \frac{\partial T}{\partial \theta^*} > 0.$$

(b) The size of the reverse speculative attack, $\Delta \equiv m_{h,T^+}^{g^*} - m_{h,T^-}^{g^*} = m_{h,T^-} - m_{h,T^+} > 0$, is independent of Λ and satisfies $\partial\Delta/\partial\theta > 0$. If, in addition, $\theta^* \geq 0$, then $\partial\Delta/\partial\bar{m}_h^{g^*} > 0$.

Proof See Appendix A.2.5.

A larger initial credit position Λ brings the collapse forward, as does faster home credit growth θ, by accelerating reserve accumulation under the peg; a larger reserve bound $\bar{m}_h^{g^*}$ delays the collapse. The size of the attack, defined as the discrete increase in foreign reserve holdings at the moment of collapse, equals the drop in home real money demand as inflation jumps upward. It

[15] The comparative statics hold the real allocation (c, c^*) fixed. Changing θ, $\bar{m}_h^{g^*}$, or Λ also shifts (c, c^*) through the annuitized seigniorage term $\rho \int_0^\infty i_t (m_{h,t}^{g^*} - m_{f,t}^g) e^{-\rho t} dt$ in equation (17a). This term is quantitatively small relative to the endowment in any empirically relevant calibration, so the partial-equilibrium signs reported below carry through.

is strictly increasing in home credit growth θ and, when $\theta^* \geq 0$, in the reserve bound $\bar{m}_h^{g^*}$; but it is independent of Λ: the relative credit position governs when the regime collapses, not how large the resulting portfolio shift is.

The equilibrium also pins down the portfolio counterpart of the attack on the private-sector side. Let $\mathbf{b}_t \equiv b_{h,t} + b_{f,t}$ and $\mathbf{b}_t^* \equiv b_{h,t}^* + b_{f,t}^*$ denote the total real bond holdings of home and foreign households, respectively, summed across home- and foreign-currency denominations. From the household portfolio reallocation conditions equation (11d) and equation (12d), together with bond market clearing equation (14b)–equation (14c) and continuity of domestic credit, government bond holdings, and prices across the regime switch, the change in private bond positions at T satisfies

$$\mathbf{b}_{T^+} - \mathbf{b}_{T^-} = \Delta = -\left(\mathbf{b}_{T^+}^* - \mathbf{b}_{T^-}^*\right).$$

The attack therefore transfers Δ worth of bonds, in real terms, from foreign to home households. Home households, facing a higher nominal interest rate, reduce their real money holdings by Δ and raise their total bond holdings by the same amount; foreign households, facing a lower nominal interest rate, do the reverse. Under uncovered interest parity, equation (2), home- and foreign-currency bonds are perfect substitutes in household portfolios, so the currency composition of this reshuffle is indeterminate: only the totals $\mathbf{b}_t$ and $\mathbf{b}_t^*$ are pinned down by the equilibrium. The foreign central bank intermediates the corresponding cross-currency flow, absorbing Δ in home currency onto its balance sheet and issuing foreign currency of equal real value in exchange.

3.4 Quantitative Illustration

We now illustrate the quantitative implications of the model using data from the United States and Germany during the final years of the Bretton Woods system. The quantitative exercise shows that a two-country reverse-attack mechanism can jointly account for sustained reserve accumulation under the peg, a gradual rise in common inflation during the peg, and a discrete regime transition followed by sharply divergent inflation rates.

We proceed in four steps to calibrate the model. First, we fix output and consumption levels (y, y^*, c, c^*) using World Bank WDI data. We construct output using real GDP for the United States and Germany averaged over 1970–1973 and normalize so that $y + y^* = 1$, fixing relative economic size. We then use observed consumption-to-output ratios c/y and c^*/y^* over the same period to obtain (c, c^*), and rescale proportionally so that the resource constraint holds exactly, $c + c^* = 1$. This preserves the relative allocation c/c^* while ensuring feasibility in the two-country endowment economy.[16]

Second, we set credit growth using Table 1, and we set E to be equal to the average nominal exchange rate in 1970. Third, we calibrate money-demand shifters (α, α^*) using post-collapse long-run data. Under floating, π converges to θ and π^* to θ^* after the crisis, so combining money demand equation (15) with long-run money-to-output ratios yields $\alpha = (\rho + \theta)(m/c)^\sigma$ and $\alpha^* = (\rho + \theta^*)(m^*/c^*)^\sigma$. We set the foreign reserve upper bound $\bar{m}_h^{g^*}$ to match Germany's peak ratio of official reserves to consumption in the month of the collapse of the peg. Fourth, we pin down initial

[16] Equation (17a) implies that, conditional on the path of reserve holdings, the level of initial home national wealth $\bar{a}_0 \equiv a_0 + a_0^g$ acts as an initial condition that shifts the level of home consumption one-for-one. Given $\bar{a}_0$, equation (17a) pins down c, and the world resource constraint equation (14a) then pins down foreign consumption as $c^* = y + y^* - c$. In a closed two-country environment, global asset-market clearing implies $\bar{a}_0 + \bar{a}_0^* = 0$, so matching a relative consumption allocation (e.g. c/c^*) is equivalent to selecting the initial wealth distribution $(\bar{a}_0, \bar{a}_0^*)$ that makes both countries' intertemporal constraints jointly consistent with aggregate market clearing.

Table 2: Calibration inputs and data sources

Var.	Value	Description	Source
σ	2.000	Intertemporal elasticity parameter	Assumption
ρ	0.050	Discount rate	Assumption
y	0.788	Normalized real GDP, USA (avg 1970–1979)	WB
y^*	0.212	Normalized real GDP, DEU (avg 1970–1979)	WB
c	0.792	Normalized consumption, USA (avg 1970–1979)	WB
c^*	0.208	Normalized consumption, DEU (avg 1970–1979)	WB
θ	0.046	Home dom. credit drift	IMF, WB
θ^*	-0.005	Foreign dom. credit drift	IMF, WB
E	3.647	DEM-USD Fixed Exchange Rate 1970 Ave.	BIS
m_c/y	0.076	Avg mon. base-to-consumption ratio (1970–1979), USA	IMF, WB
m^*_f/c^*	0.215	Avg mon. base-to-consumption ratio (1970–1979), DEU	IMF, WB
$d_{h,0}/c$	0.067	Initial home dom. credit-to-consumption ratio (Jan. 1970), USA	IMF, WB
$d^*_{f,0}/c^*$	0.095	Initial foreign dom. credit-to-consumption ratio (Jan. 1970), DEU	IMF, WB
$\bar{m}^{g^*}_h/c^*$	0.074	Foreign FX reserves-to-consumption ratio at regime change (May 1971), DEU	IMF, WB
α	0.00056	Home money balances weight, $(\rho+\theta)(m_h/c)^\sigma$	Derived
α^*	0.00210	Foreign money balances weight, $(\rho+\theta^*)(m^*_f/c^*)^\sigma$	Derived

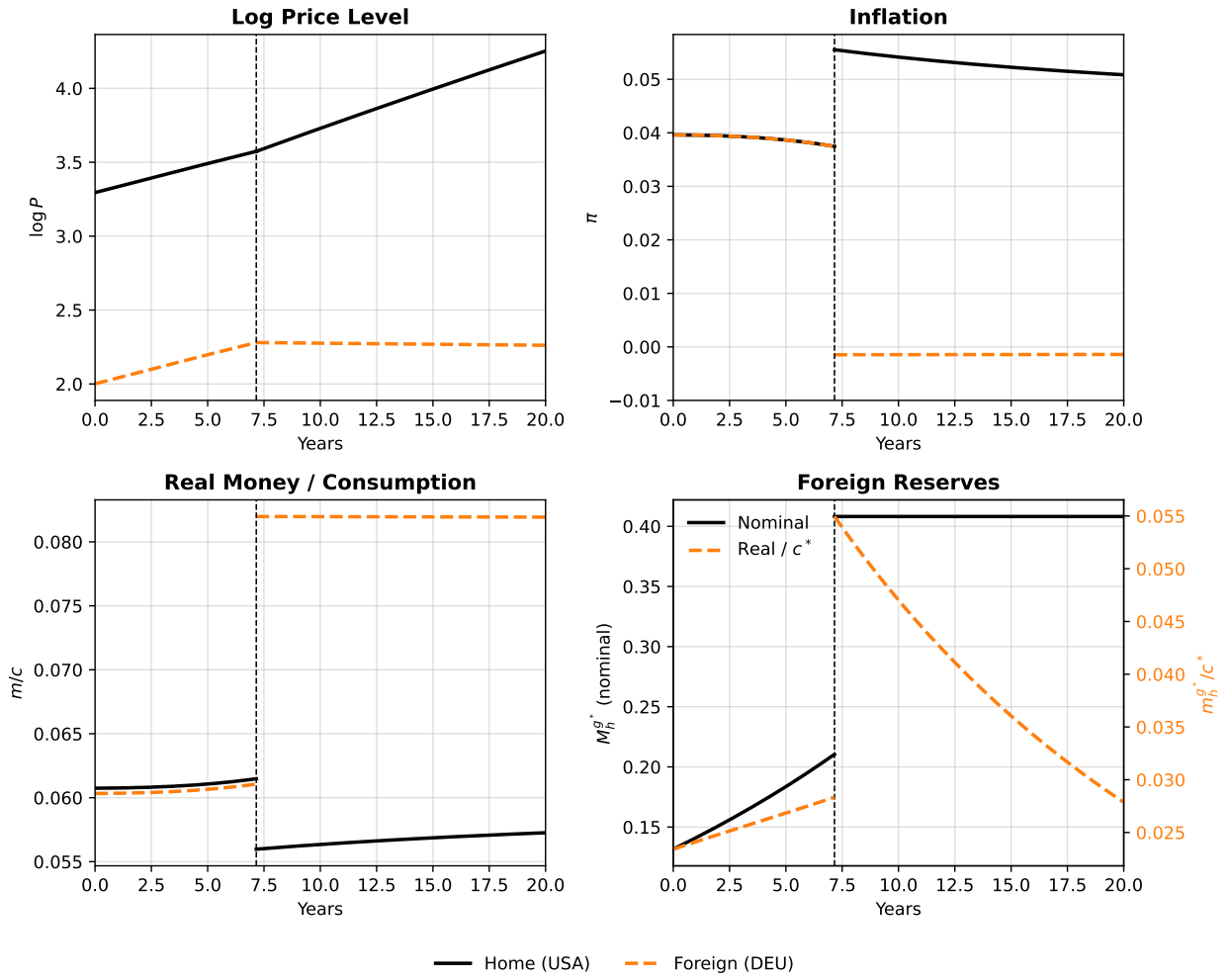
nominal balance-sheet positions. The initial nominal domestic credit stocks $(D_{h,0}, D^*_{f,0})$ are chosen to match the observed initial ratios of net domestic assets to consumption. Table 2 summarizes parameters taken directly from the data. Table A1 displays the calibration results.

The equilibrium is solved numerically as follows. For any candidate regime-switch date T and values of $(D_{h,0}, D^*_{f,0})$, the post-crisis price paths under the floating exchange rate are obtained from money market clearing. These terminal values are then used to construct the pre-crisis price paths under the fixed exchange rate. The equilibrium collapse date T is the unique value such that the peg condition holds at the switch, $\frac{P_T}{P^*_T} = E$. As part of this numerical procedure, the values of $(D_{h,0}, D^*_{f,0})$ are calibrated so that the model exactly matches the observed initial real domestic credit positions.

Figure 9 reports the calibrated equilibrium dynamics before and after the collapse of the peg. The model delivers the intended mechanism. The southeast panel shows that the foreign country gradually accumulates reserves prior to the speculative attack at time T, followed by a discrete jump at the moment of collapse. Although nominal reserve holdings remain elevated thereafter, their real value declines over time due to continued inflation in the home country—capturing the incentive of foreign policymakers to limit exposure to the home currency. Importantly, even in the absence of a discrete exchange-rate jump at T, the foreign country experiences a capital loss on its accumulated dollar reserves following the collapse of the peg.

The remaining panels show the paths of prices, inflation, and real money balances. The top panels show that, under the fixed exchange rate regime, inflation is equal across countries, reflecting PPP and the common price level implied by the peg. During this phase, inflation lies between the domestic credit growth rates of both countries. Following the crisis, inflation paths diverge and converge to country-specific credit growth rates: in the surplus country, inflation falls immediately to θ^*, while in the US, inflation declines gradually to θ as domestic credit continues to expand. Price levels mirror these dynamics. While prices move in lockstep prior to the crisis, they diverge sharply once the peg collapses, reflecting differential post-crisis inflation rates (and leading to a depreciation of the nominal exchange rate). Real money balances decline slowly during the pre-crisis phase as rising inflation erodes money demand, then jump discretely at the regime switch.

Figure 9: Calibrated Model Results



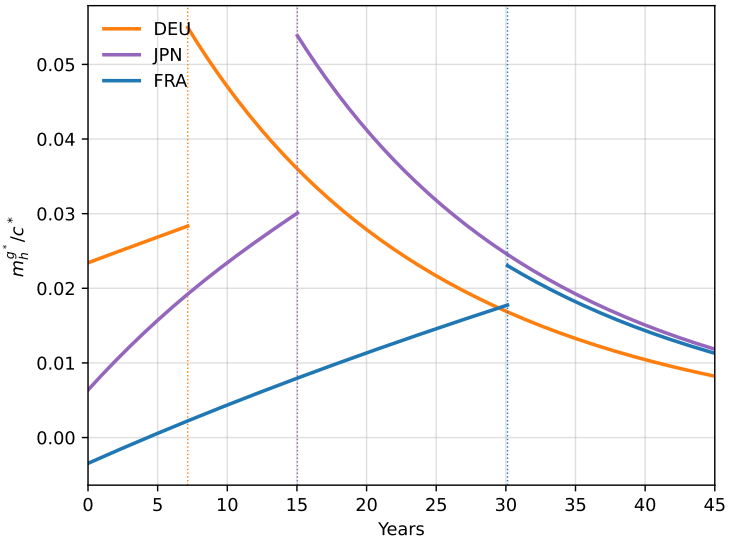
The baseline calibration uses annualized credit-growth rates and yields a peg duration of roughly seven years (calibrated to 1970 data), whereas the empirically relevant horizon is closer to one to two years; the exercise should be read as illustrative of the mechanism rather than as a tight match to the 1971–73 timing. The model's comparative statics—formalized in Lemma 2—show that the timing of the attack depends critically on the growth rate of domestic credit, the foreign reserve ceiling, and the relative initial credit position. Appendix Figure A10 illustrates how θ governs both inflation and timing: higher home credit growth raises inflation before and after the crisis, brings the collapse forward, and increases the size of the discrete adjustment at the switch; as θ approaches 0.2, the attack becomes instantaneous (consistent with Proposition 1). Figure A11 shows that a larger reserve limit $\bar{m}_h^{g^*}$ mainly delays the crisis with little effect on long-run inflation, while a sufficiently low $\bar{m}_h^{g^*}$ likewise triggers an instantaneous attack. Figure A12 shows an analogous pattern for the relative nominal credit position: a higher position—consistent with a lower initial peg E—compresses the period of reserve accumulation and, when sufficiently high, produces an immediate collapse.

Table 3: Calibration multiple countries

	USA/DEU	USA/FRA	USA/JPN
y^*	0.212	0.151	0.232
c^*	0.208	0.143	0.194
θ^*	-0.005	0.037	-0.007
E_0	3.647	5.528	358.070
m_f^*/c^*	0.215	0.756	0.114
$d_{f,0}^*/c_f^*$	0.095	0.747	0.074
$\bar{m}_h^{g^*}/c_f^*$	0.074	0.031	0.077
α^*	0.00210	0.04943	0.00056

Figure 10 illustrates how cross-country calibrations generate distinct predictions for the timing and magnitude of crises. Table 3 reports the corresponding parameter values. Japan and Germany's domestic credit growth was essentially zero, while France's was about 3.7% per year. The upper bound on reserve accumulation, computed as the maximum level of reserves before each country abandoned the peg, is 7.4%, 3.1%, and 7.7% of consumption for Germany, France, and Japan, respectively. The model predicts the earliest crisis for Germany, followed by Japan and then France, driven by differences in net domestic credit growth that more than offset France's lower peak reserve accumulation. The ordering is qualitatively consistent with the observed sequence of events, although—as with the baseline calibration—the quantitative horizons are longer than those observed: the model predicts a crisis horizon for France of around 30 years, against an actual breakdown within three.

Figure 10: Comparative Statics - Foreign Home Currency Reserves



The model yields qualitative implications that map directly to the four empirical patterns in section 2. First, US monetary expansion is driven by net domestic assets while net foreign assets remain stable: with the US not intervening in foreign exchange markets, sustained credit growth at rate θ feeds entirely through NDA. Second, non-US G-10 economies pursue restrictive domestic credit

policies (captured by $\theta^* = 0$) under which their monetary bases expand endogenously through net foreign asset accumulation. Third, the model interprets the May 1971 and February–March 1973 episodes as reverse speculative attacks: surges in foreign official reserve accumulation that precede the abandonment of the peg. Fourth, it accounts for the post-1973 divergence in inflation and price levels: once the common price-level path implied by fixed exchange rates disappears, asymmetric domestic credit policies generate heterogeneous inflation dynamics, consistent with Figure 8. Cross-country heterogeneity in the timing and magnitude of reserve accumulation arises naturally from differences in credit-growth differentials and reserve limits.

4 Final Remarks

This paper interprets the collapse of Bretton Woods as a sequence of reverse speculative attacks on the US dollar, driven by persistent asymmetries in domestic credit growth under fixed exchange rates. With the Federal Reserve expanding net domestic assets while the Bundesbank and Bank of Japan pursued tight domestic credit policies, excess dollar liquidity flowed abroad and was absorbed by partner central banks, expanding their monetary bases endogenously. The model shows that any upper bound on these banks' willingness to continue accumulating reserves—whether imposed by currency risk, inflation tolerance, institutional mandate, or political constraints—makes a reverse speculative attack inevitable. Consistent with the balance-sheet evidence and contemporaneous policy accounts, the framework accounts for the buildup of reserve imbalances, the dynamics of inflation under the peg, and the timing and sequencing of crises across countries. In the baseline, the exchange rate does not jump at the regime switch; extending the framework to allow for discrete devaluations, along the lines of Broner (2008), is a natural direction for future work.

We take the divergence in domestic credit growth as given, but a natural interpretation is that it reflects a commitment problem. The United States was bound by the regime to maintain money creation consistent with the nominal anchor; in practice, policy was guided by naive faith in the Phillips curve tradeoff (Sargent, 1999), and the Federal Reserve accommodated inflation expectations rather than pursue the politically costly disinflation required to stabilize the dollar. This is the bad equilibrium of Barro and Gordon (1983a,b): a central bank that cannot commit to low inflation validates expectations of monetary expansion, even though all parties would be better off under a commitment to price stability. Historical evidence is consistent with this interpretation: sustained political pressures shaped US monetary policy under Johnson and Nixon, while partner economies remained committed to containing credit growth.[17] This asymmetry in commitment, under fixed exchange rates and capital mobility, forced partner economies to absorb US monetary expansion until the currency risk on their balance sheets became untenable. Why partner economies proved more resistant to these inflationary pressures remains an open question.

[17] See Bremner (2008); Hetzel (2008) on Martin's accommodation of Vietnam-era fiscal expansion, and Abrams (2006); Ferrell (2010) on Burns's expansionary stance ahead of the 1972 election.

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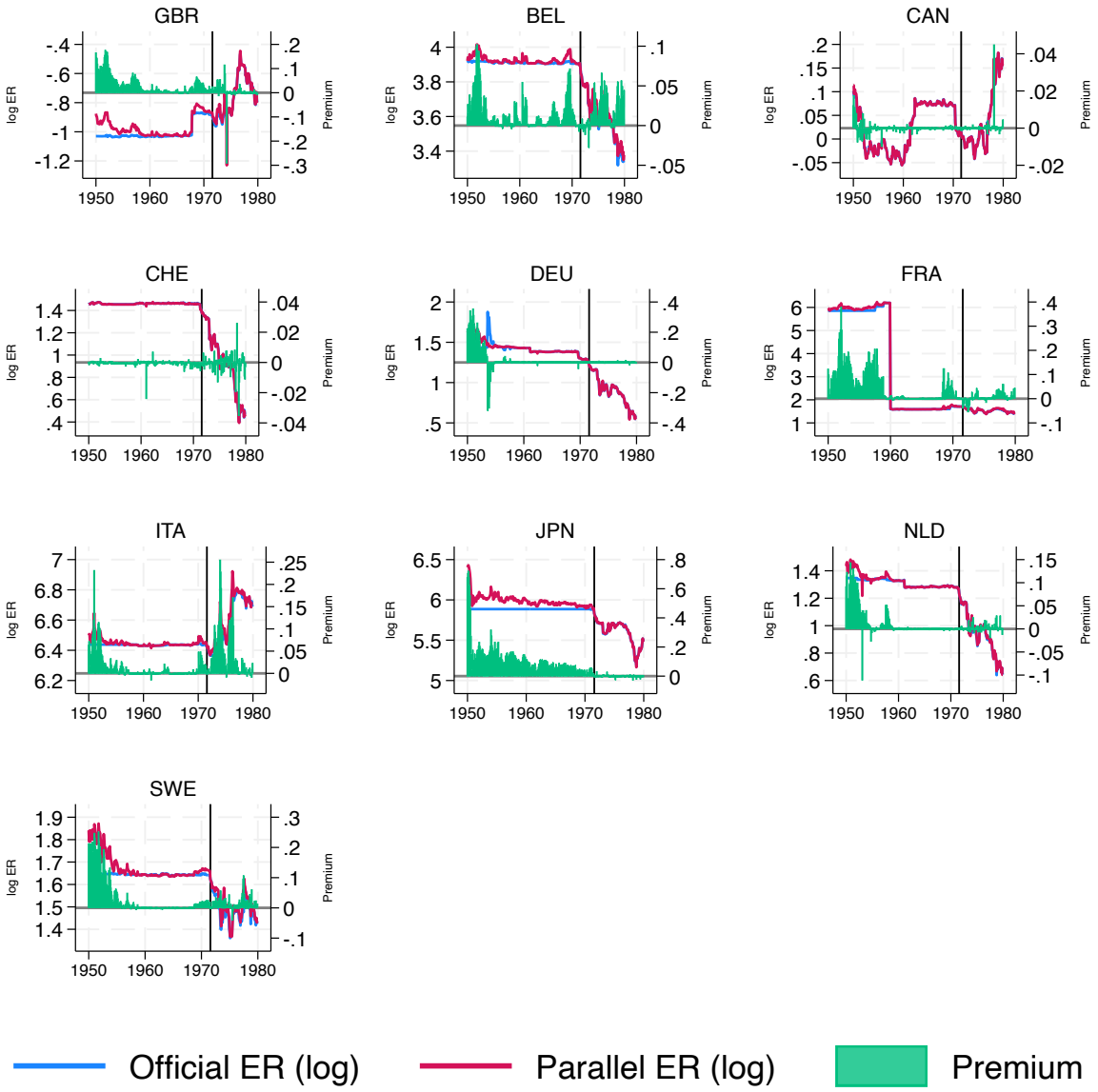
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A Appendix

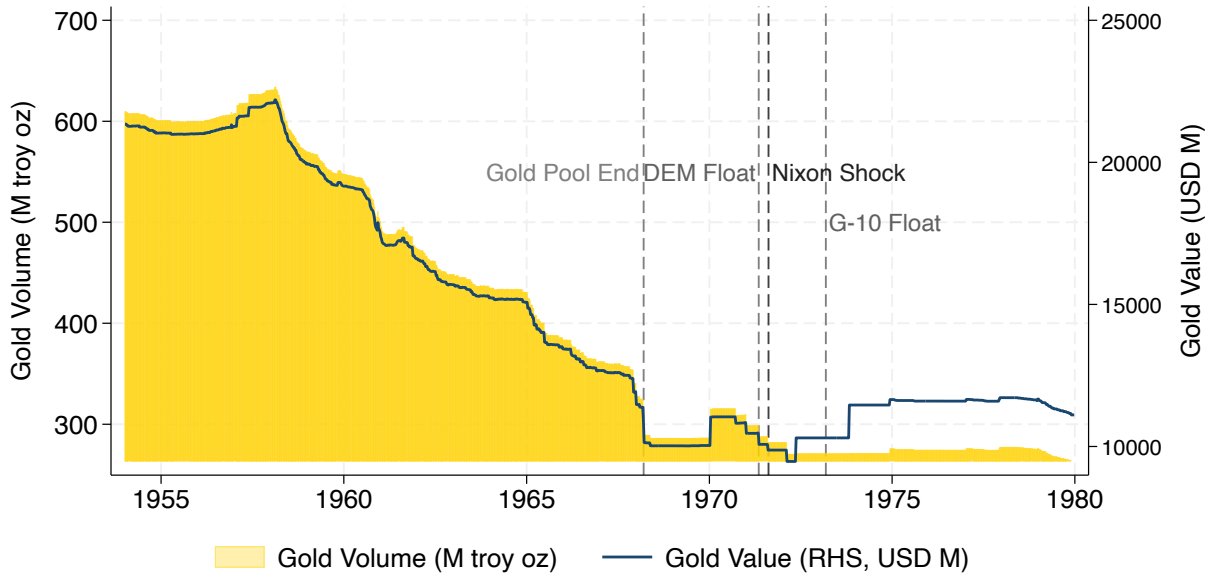
A.1 Additional Figures

Figure A1: Official and Parallel Exchange Rates



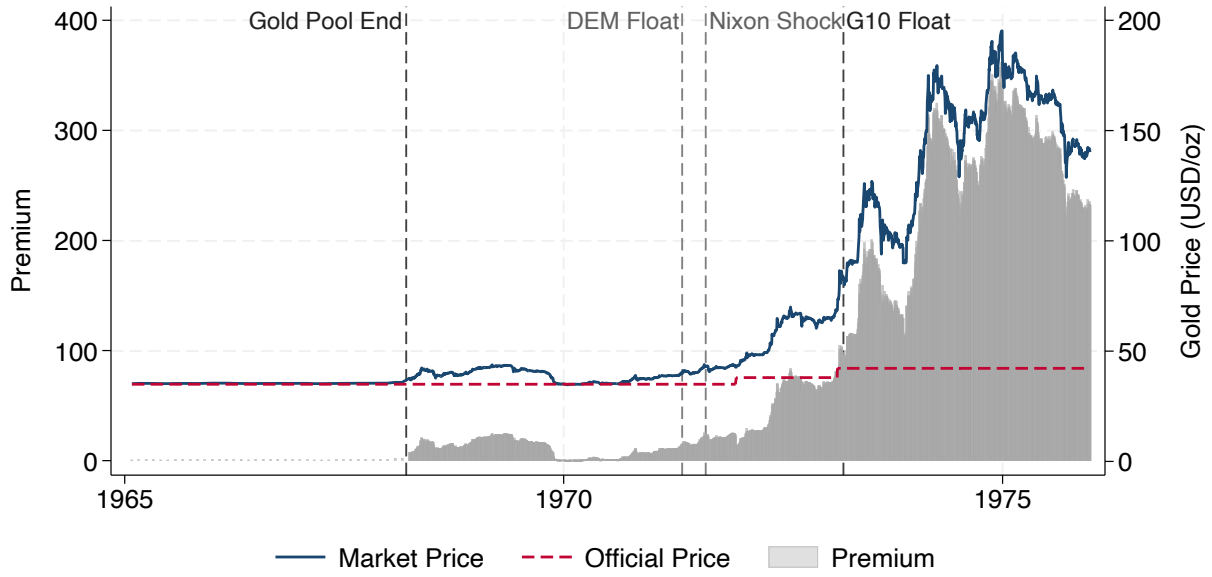
Source: Finaeon. Premium is the percentage by which the market price exceeds the official price.

Figure A2: Federal Reserve Gold Holdings



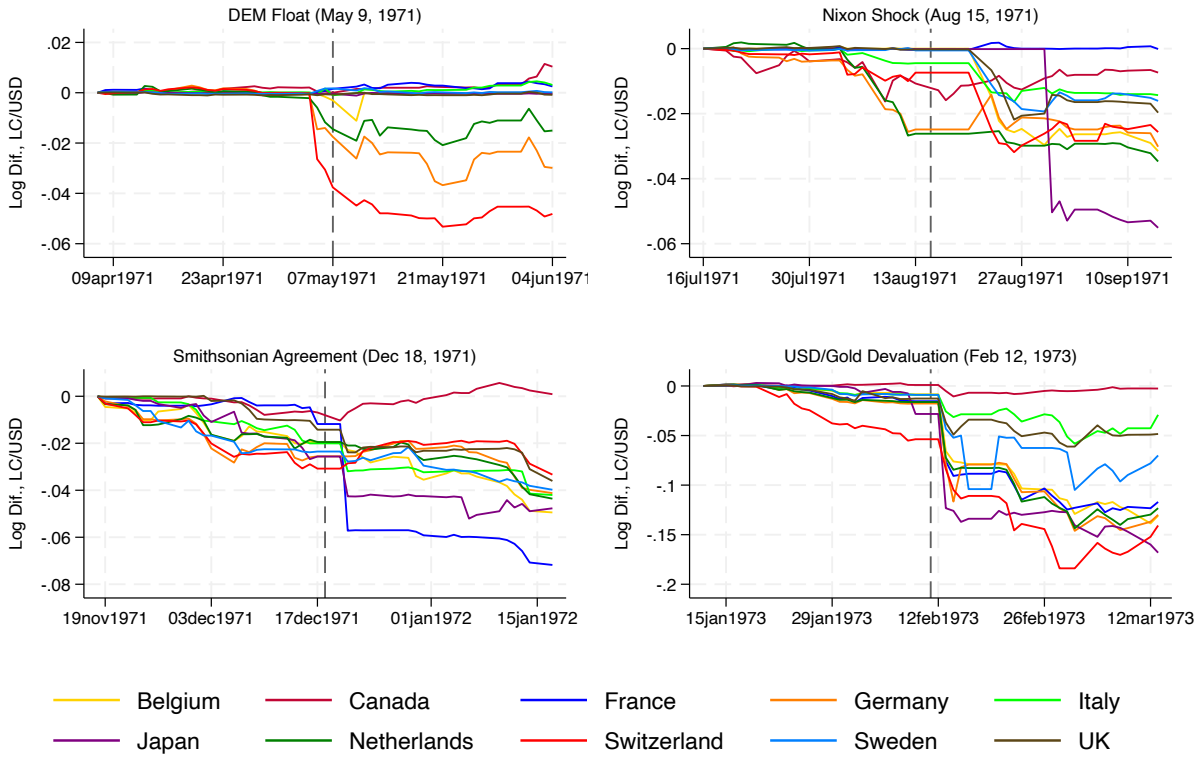
Source: Bao et al. (2018).

Figure A3: Gold Price - Official and Market



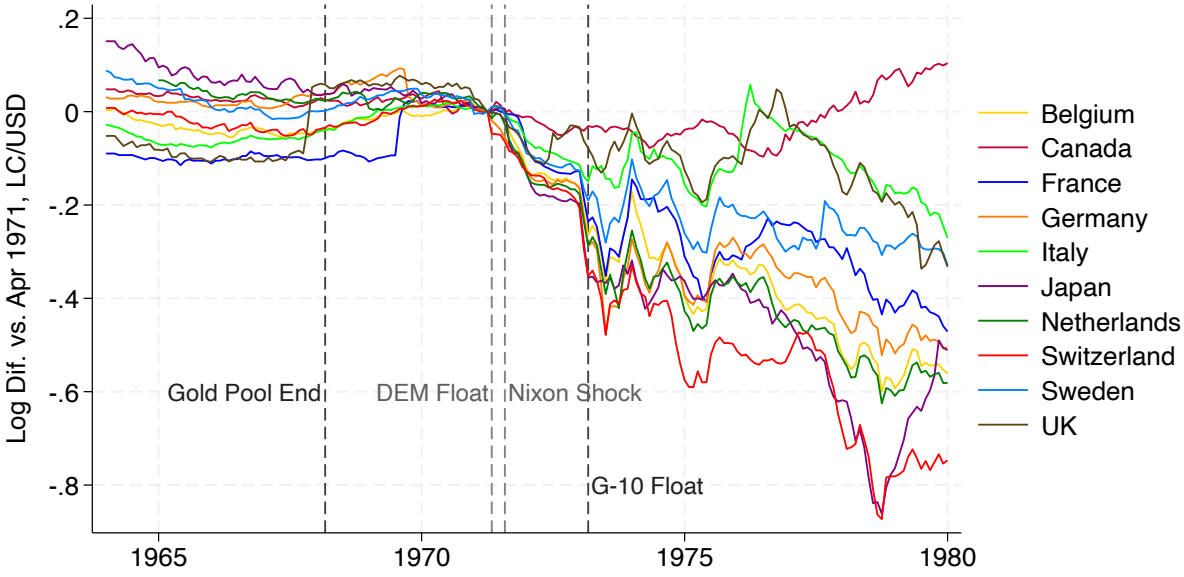
Source: Finaeon (Gold Bullion Price, New York). Premium is the percentage by which the market price exceeds the official price.

Figure A4: Nominal Exchange Rate (LC/USD), Daily



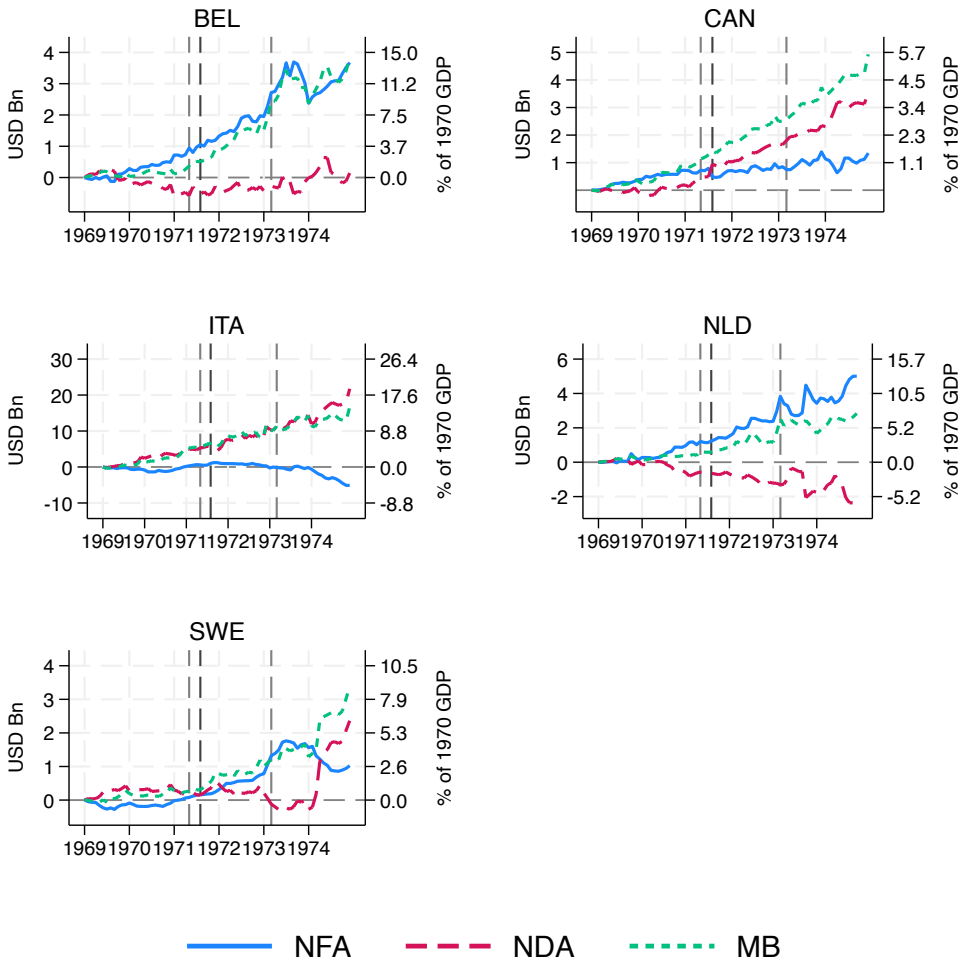
Source: Bank for International Settlements. Missing daily observations are filled forward using the last available rate. A positive log change represents a nominal appreciation of the US dollar vis-à-vis the currency indicated in the legend.

Figure A5: Real Exchange Rate (LC/USD), Monthly (1964-1979)



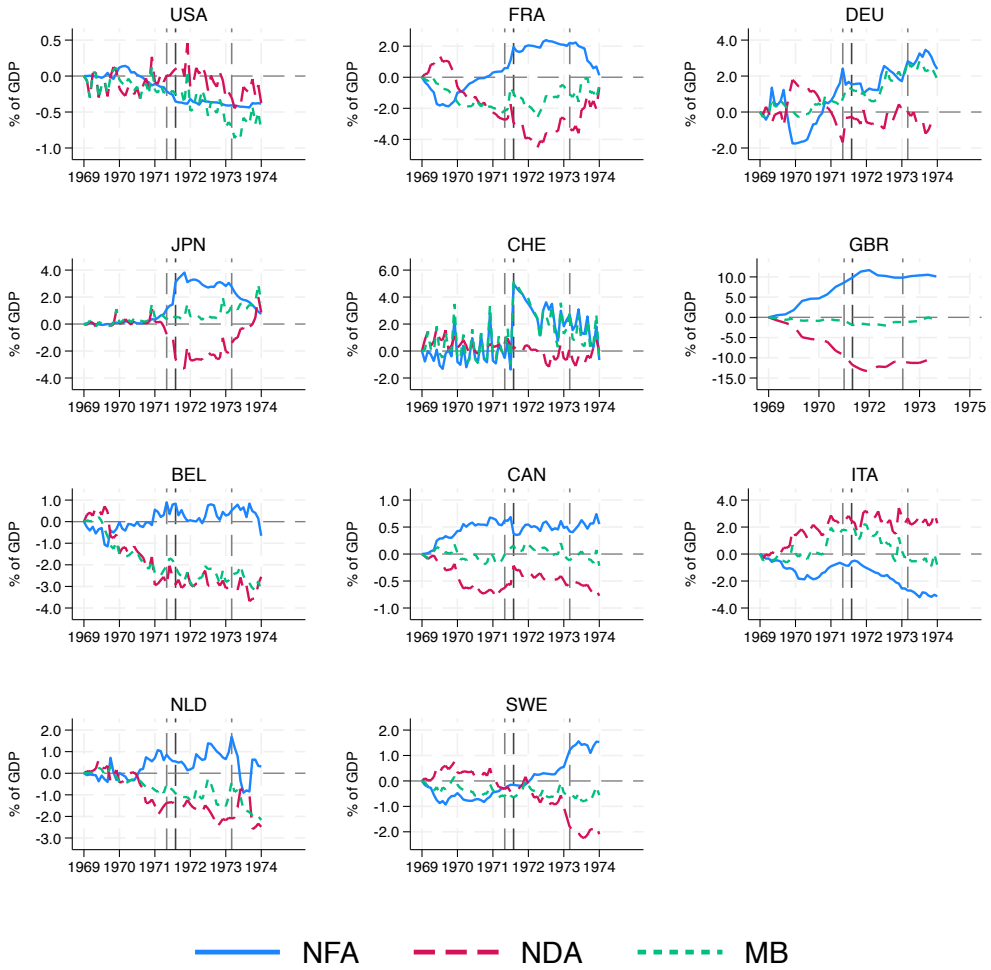
Source: Bank for International Settlements. Real exchange rates are constructed as the nominal exchange rate adjusted for relative CPIs. A positive log change represents a real appreciation of the US dollar vis-à-vis the currency indicated in the legend.

Figure A6: Central Banks Balance Sheet (1969-1974)



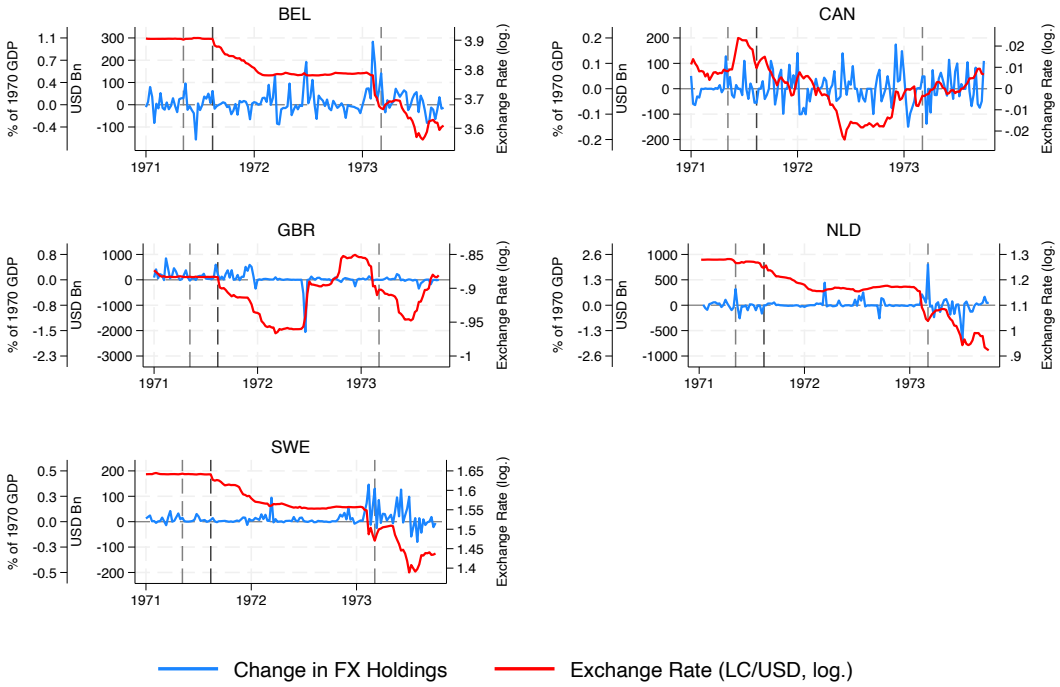
Sources: IMF Monetary and Financial Statistics (central bank balance sheets), Bank of International Settlements (exchange rates) and World Bank World Development Indicators (GDP). NFA denotes net foreign assets (foreign assets net of foreign liabilities). Net domestic assets (NDA) is computed as reserve money (monetary base or MB) minus NFA. Balance-sheet variables are expressed as changes relative to the base year and scaled by 1970 GDP (in current USD). Dashed lines represent the May 1971 DEM float, August 1971 Nixon Shock and March 1973 G-10 float.

Figure A7: Central Banks Balance Sheet (1969-1974), as % of GDP



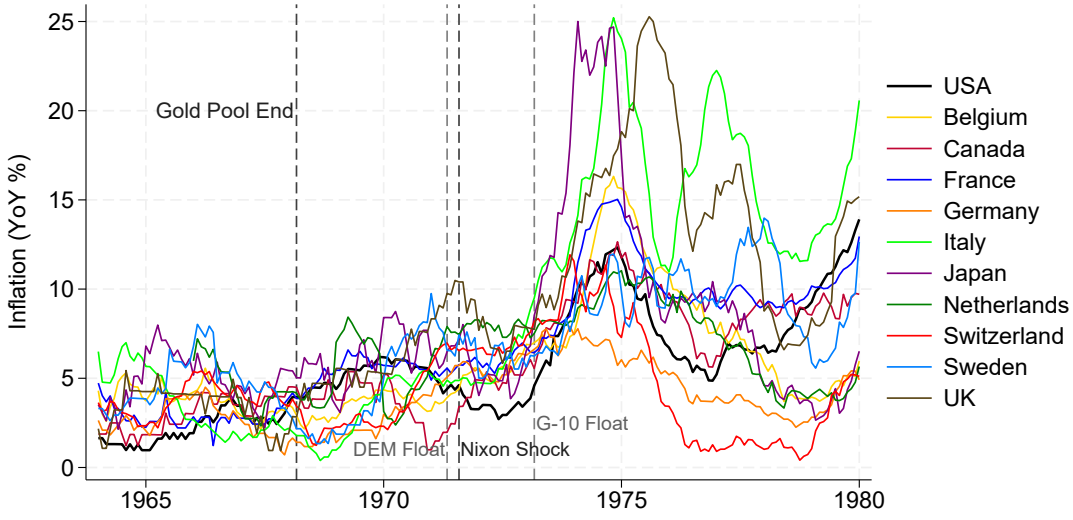
Sources: IMF Monetary and Financial Statistics (central bank balance sheets) and World Bank World Development Indicators (GDP). NFA denotes net foreign assets (foreign assets net of foreign liabilities). Net domestic assets (NDA) are computed as reserve money (monetary base, MB) minus NFA. Balance-sheet variables are expressed as changes in ratios relative to the base year (i.e., $100 \times [(X_t/GDP_t) - (X_0/GDP_0)]$). Annual GDP (in local currency units) is linearly interpolated in logs to obtain monthly (or quarterly, for the United Kingdom) observations for scaling purposes. Dashed lines mark the May 1971 Deutsche Mark float, the August 1971 Nixon Shock, and the March 1973 move to generalized floating (G-10).

Figure A8: Additional Central Banks Weekly Foreign Exchange Holdings



Sources: National Bank of Belgium, weekly returns published in the *Moniteur Belge* (weekly *Foreign currencies*); Bank of Canada, *Statistical Summary* (weekly balance sheet, up to November 1971) and *Bank of Canada Review* (thereafter), with foreign exchange positions measured as foreign currency assets minus foreign currency liabilities; Naef (2022) (Bank of England: daily *Total intervention in USD (excluding customer operations)*); De Nederlandsche Bank, *Verkorte balans van De Nederlandsche Bank* (weekly *Vorderingen en geldswaardige papieren luidende in goud of in buitenlandse geldsoorten* - "claims and marketable securities denominated in gold or foreign currencies"); Sveriges Riksbank, *Årsbok* (Annual Report), Table A:13 "*Guld och utländska valutor varje rapportdag*" (weekly *Utländska statspapper, fordringar hos utländsk bank eller bankir, nettobelopp, samt utrikes växlar* - "foreign government securities, claims on foreign banks and bankers, net, and bills payable abroad"); Bank of International Settlements (exchange rates); World Bank World Development Indicators (GDP). Dashed lines represent the May 1971 DEM float, August 1971 Nixon Shock and March 1973 G-10 float. The figure combines weekly changes in foreign-exchange assets drawn from central bank balance sheets with reported intervention (purchase) data when available. Balance-sheet changes reflect movements in foreign currency asset positions, while reported intervention series measure net foreign exchange purchases. Exchange rates are quoted as local currency units per USD; a fall denotes a revaluation of the local currency.

Figure A9: Inflation



Source: Bank for International Settlements.

Table A1: Calibration Results

	Calibrated value	Target	Model-implied
$D_{h,0}$	1.4288	$d_{h,0} = 0.0415$	$d_{h,0} = 0.0530$
$D^*_{f,0}$	0.0569	$d^*_{f,0} = 0.0073$	$d^*_{f,0} = 0.0077$

Figure A10: Calibrated Model Results - Comparative Statics θ

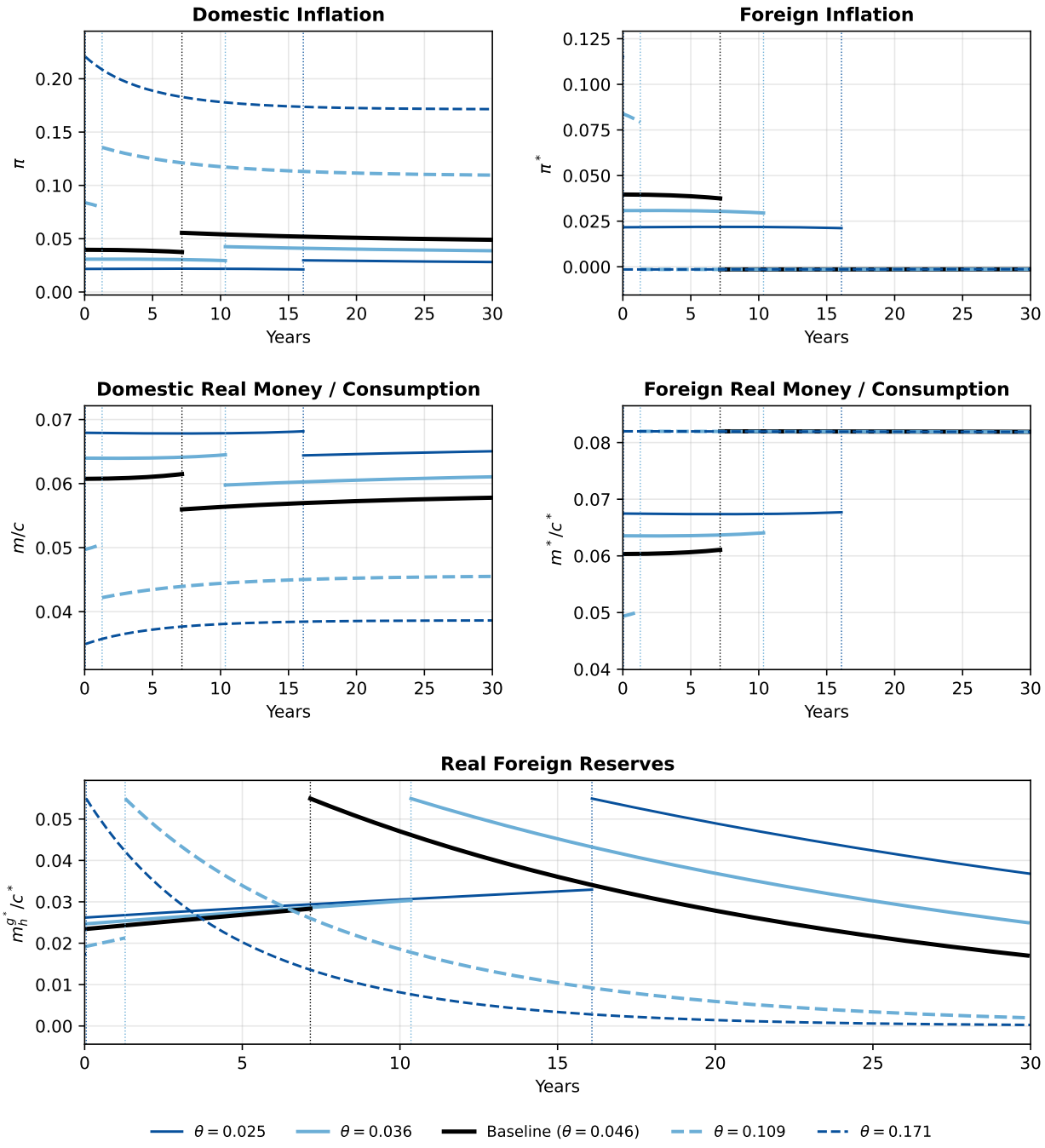


Figure A11: Calibrated Model Results - Comparative Statics $\bar{m}_h^{g^*}$

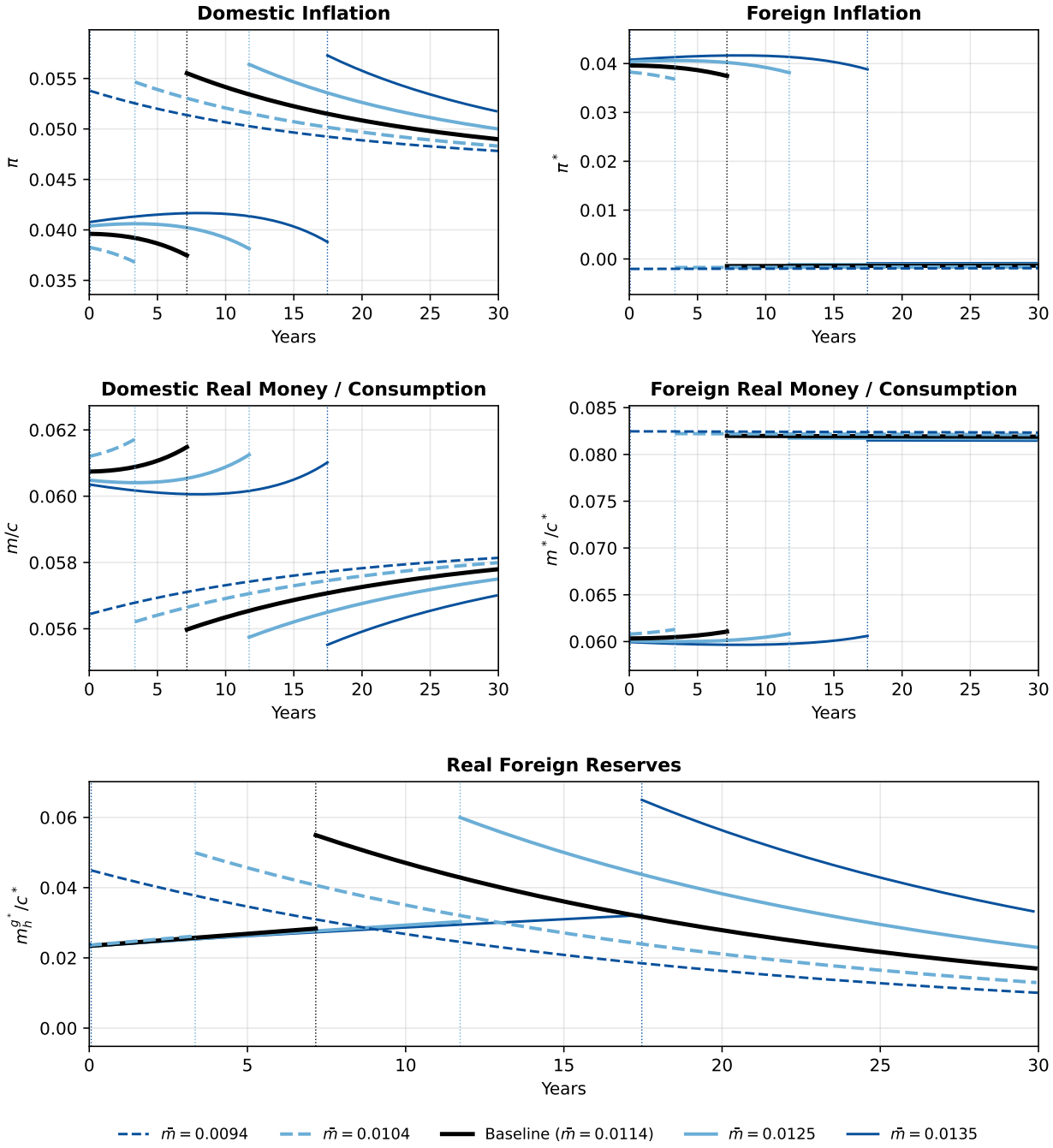


Figure A12: Calibrated Model Results - Comparative Statics $\Lambda \equiv \frac{D_{h,0}}{ED_{f,0}}$

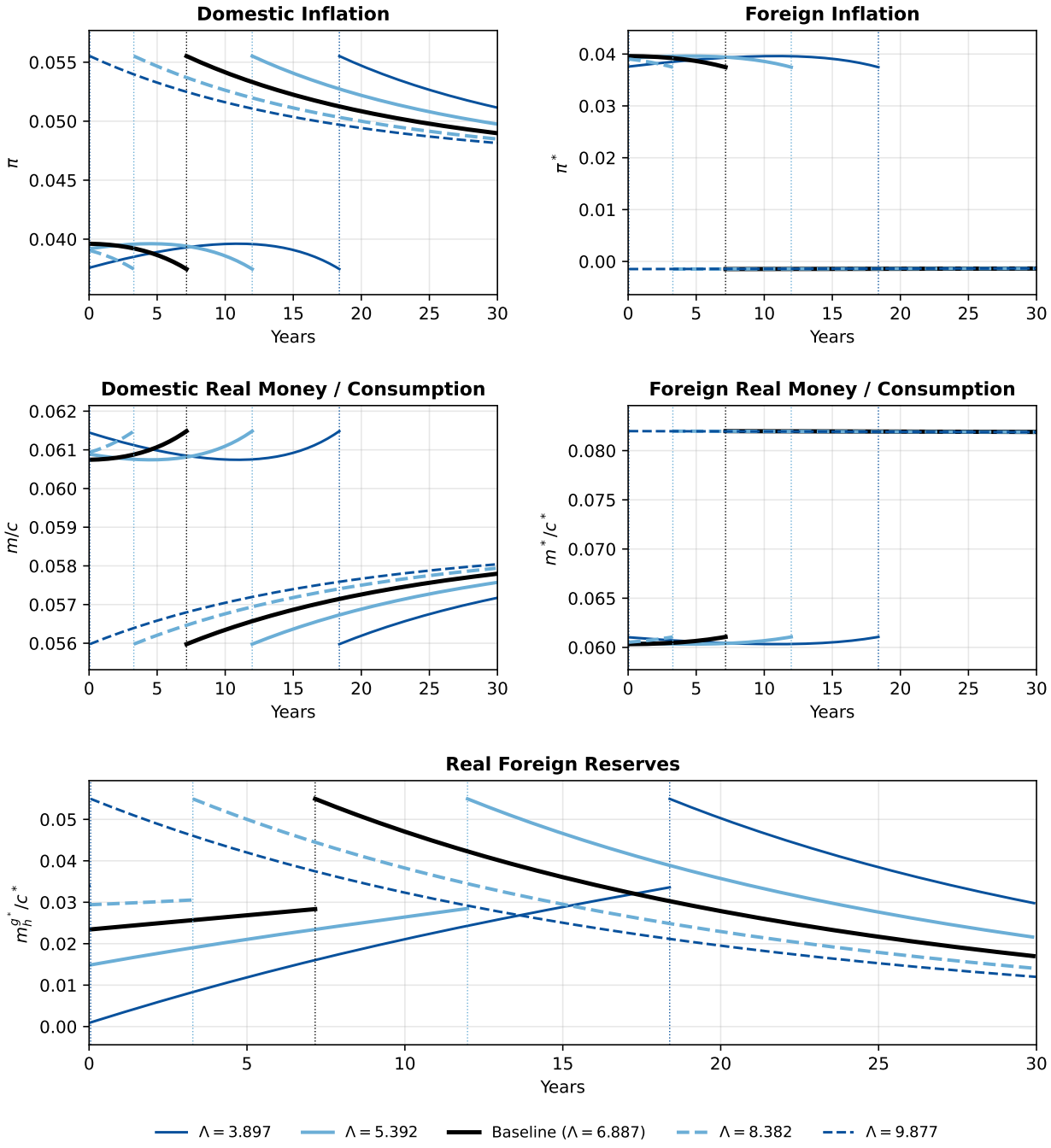
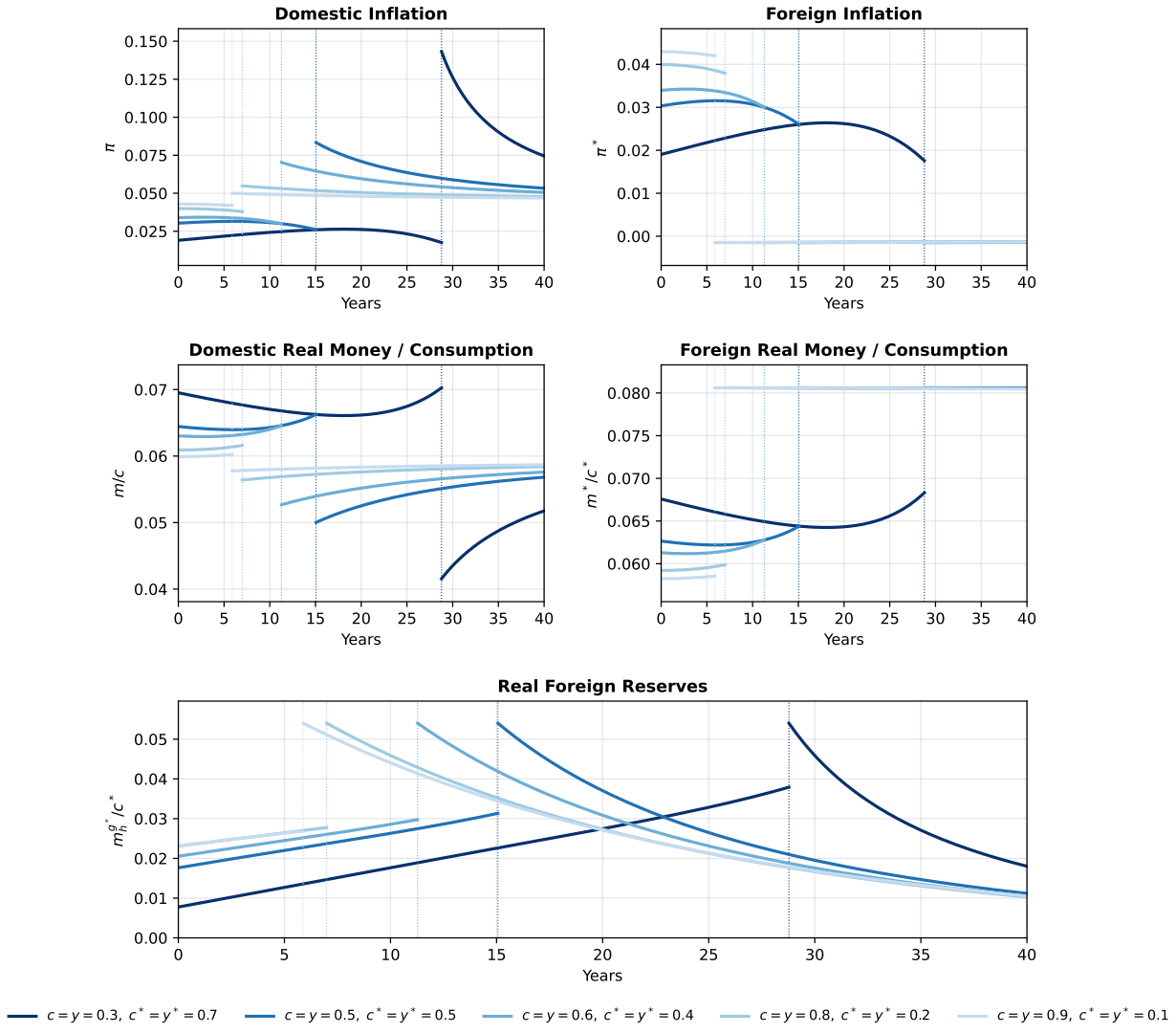


Figure A13: Calibrated Model Results - Comparative Statics Size



A.2 Proofs

A.2.1 Derivation of Prices and Inflation

A.2.1.1 Home prices under floating exchange rate — $P_t, t \geq T$. Under a float, nominal reserve positions are constant and money market clearing in the home country is

$$M_t \equiv D_{h,0}e^{\theta t} - P_T \bar{m}_h^{g^*} = P_t\, m(\rho + \pi_t, c), \qquad t \geq T. \tag{A1}$$

Substituting CES money demand equation (15):

$$M_t = P_t\, c\left(\frac{\alpha}{\rho + \pi_t}\right)^{1/\sigma} \quad \Rightarrow \quad \alpha\left(\frac{M_t}{c}\right)^{-\sigma} = P_t^{-\sigma}\,(\rho + \pi_t)\,. \tag{A2}$$

Using $\pi_t = \dot{P}_t/P_t$,

$$P_t^{-\sigma}\,(\rho + \pi_t) = \rho P_t^{-\sigma} + \dot{P}_t\, P_t^{-(\sigma+1)}. \tag{A3}$$

Combining equation (A2) and equation (A3) and letting $z_t \equiv P_t^{-\sigma}$, so that $\dot{z}_t = -\sigma P_t^{-(\sigma+1)}\dot{P}_t$, yields the linear ODE

$$\dot{z}_t - \rho\sigma z_t = -\sigma\alpha\left(\frac{M_t}{c}\right)^{-\sigma}. \tag{A4}$$

The general solution to equation (A4) is

$$z_t = Ce^{\rho\sigma t} + \sigma\alpha \int_t^\infty \left(\frac{M_s}{c}\right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds, \tag{A5}$$

where C is a constant of integration. Since $M_s = D_{h,0}e^{\theta s} - P_T\bar{m}_h^{g^*}$ is strictly increasing in s (as $\dot{M}_s = \theta D_{h,0}e^{\theta s} > 0$), for all $s \geq t$ we have $M_s \geq M_t$, so $(M_s/c)^{-\sigma} \leq (M_t/c)^{-\sigma}$. Hence the particular solution satisfies

$$\sigma\alpha \int_t^\infty \left(\frac{M_s}{c}\right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds \leq \frac{\alpha}{\rho}\left(\frac{M_t}{c}\right)^{-\sigma} \to 0 \quad \text{as } t \to \infty,$$

since $M_t = D_{h,0}e^{\theta t} - P_T\bar{m}_h^{g^*} \to \infty$. So $Ce^{\rho\sigma t}$ dominates z_t for large t. If $C < 0$, then $z_t < 0$ for all sufficiently large t, contradicting $z_t = P_t^{-\sigma} > 0$. If $C > 0$, then $z_t \to \infty$, implying $P_t \to 0$ and hence $m_{h,t} = M_t/P_t \to \infty$. Since $a_t = m_{h,t} + b_{h,t} + b_{f,t}$, if $a_t \to \infty$ the home household's transversality condition is violated. Hence $b_{h,t}$ or $b_{f,t}$ must diverge to $-\infty$ to offset the divergence of $m_{h,t}$. Without loss of generality suppose $b_{h,t} \to -\infty$. By home bond market clearing equation (14b) and Assumption 2, which keeps $b_{h,t}^g$ bounded, we have $b_{h,t}^* \to +\infty$. But then foreign real wealth $a_t^* = m_{f,t}^* + b_{h,t}^* + b_{f,t}^* \to \infty$, violating the foreign household's transversality condition. Hence $C = 0$ and the unique equilibrium price path is

$$P_t = \left[\sigma\alpha \int_t^\infty \left(\frac{D_{h,0}e^{\theta s} - P_T\bar{m}_h^{g^*}}{c}\right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds\right]^{-1/\sigma}, \qquad t \geq T. \tag{A6}$$

P_T is defined implicitly:

$$P_T = \left[\sigma\alpha \int_t^\infty \left(\frac{D_{h,0}e^{\theta s} - P_T\bar{m}_h^{g^*}}{c}\right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds\right]^{-1/\sigma}, \qquad t \geq T. \tag{A7}$$

A.2.1.2 Home inflation under floating exchange rate — π_t for $t \geq T^+$. The inflation rate is the derivative of $\log(P_t)$, with the prices in equation (A6), that is,

$$\pi_t = -\rho + \frac{1}{\sigma} \frac{\left(D_{h,0} e^{\theta t} - P_T \bar{m}_h^{g^*}\right)^{-\sigma}}{\int_t^\infty \left(D_{h,0} e^{\theta s} - P_T \bar{m}_h^{g^*}\right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds}. \tag{A8}$$

As $t \to \infty$, the constant reserve term $P_T \bar{m}_h^{g^*}$ becomes negligible relative to $D_{h,0} e^{\theta t}$, so $\pi_t \to \theta$. We can also see that the money demand condition at $t = T^+$ gives

$$\frac{\alpha}{\rho + \pi_{T^+}} = \left(\frac{D_{h,0} e^{\theta T} - P_T \bar{m}_h^{g^*}}{P_T\, c} \right)^{\sigma}. \tag{A9}$$

Since $P_T \bar{m}_h^{g^*} > 0$, we have $D_{h,0} e^{\theta s} - P_T \bar{m}_h^{g^*} < D_{h,0} e^{\theta s}$ for all $s \geq T$, and in particular $M_T \equiv D_{h,0} e^{\theta T} - P_T \bar{m}_h^{g^*} < D_{h,0} e^{\theta T}$. For $s \geq T$,

$$D_{h,0} e^{\theta s} - P_T \bar{m}_h^{g^*} - M_T\, e^{\theta(s-T)} = P_T \bar{m}_h^{g^*} \left(e^{\theta(s-T)} - 1 \right) \geq 0,$$

with strict inequality for $s > T$. Hence $\left(D_{h,0} e^{\theta s} - P_T \bar{m}_h^{g^*}\right)^{-\sigma} \leq M_T^{-\sigma}\, e^{-\theta\sigma(s-T)}$, so

$$P_T^{-\sigma} = \sigma\alpha \int_T^\infty \left(\frac{D_{h,0} e^{\theta s} - P_T \bar{m}_h^{g^*}}{c} \right)^{-\sigma} e^{-\rho\sigma(s-T)}\, ds < \frac{\alpha}{\rho + \theta} \left(\frac{M_T}{c} \right)^{-\sigma}.$$

Rearranging and substituting into equation (A9):

$$\frac{\alpha}{\rho + \pi_{T^+}} = \left(\frac{M_T}{P_T c} \right)^{\sigma} < \frac{\alpha}{\rho + \theta},$$

and therefore

$$\pi_{T^+} > \theta > 0.$$

Moreover, differentiating equation (A8) with respect to time yields $\dot{\pi}_t = \sigma(\pi_t + \rho)(\pi_t - \mu_t)$, where $\mu_t = \theta \dfrac{D_{h,0} e^{\theta t}}{D_{h,0} e^{\theta t} - P_T \bar{m}_h^{g^*}} > \theta$ is decreasing in t with $\mu_t \to \theta$. Suppose, for contradiction, that $\pi_{t_0} \geq \mu_{t_0}$ at some $t_0 \geq T$. Then $\dot{\pi}_{t_0} \geq 0$ while $\dot{\mu}_{t_0} < 0$, so $\pi_t - \mu_t$ is strictly increasing through t_0, $\dot{\pi}_t$ becomes strictly positive and bounded away from zero, and π_t diverges — contradicting $\pi_t \to \theta$. Hence $\pi_t < \mu_t$ and $\dot{\pi}_t < 0$ for all $t \geq T$, so π_t decreases monotonically from $\pi_{T^+} > \theta$ to θ.

A.2.1.3 Foreign prices under floating exchange rate — $P_t^*, t \geq T$ Under a float, nominal reserve positions are frozen at their time-T values. The foreign central bank balance sheet equation (9a) and Assumption 1 imply that valuation changes in the reserve position are absorbed by net worth, so that foreign money market clearing reduces to

$$M^* \equiv D_{f,0}^* + P_T^* \bar{m}_h^{g^*} = P_t^*\, m^*(\rho + \pi_t^*, c^*), \qquad t \geq T, \tag{A10}$$

where M^* is a constant. Substituting CES money demand equation (15) and letting $z_t^* \equiv (P_t^*)^{-\sigma}$ yields the linear ODE

$$\dot{z}_t^* - \rho\sigma z_t^* = -\sigma\alpha^* \left(\frac{M^*}{c^*} \right)^{-\sigma}. \tag{A11}$$

The general solution is $z_t^* = Ce^{\rho\sigma t} + \frac{\alpha^*}{\rho}(M^*/c^*)^{-\sigma}$, where the particular solution is a positive constant. If $C < 0$, then z_t^* becomes negative in finite time, contradicting $z_t^* = (P_t^*)^{-\sigma} > 0$. If $C > 0$, then $z_t^* \to \infty$

and $P_t^* \to 0$; by an argument analogous to Appendix A.2.1.1, this leads to $m_{f,t}^* \to \infty$, violating the foreign household's transversality condition unless $b_{h,t}^*$ or $b_{f,t}^* \to -\infty$, which by bond market clearing equation (14b)–equation (14c) forces home real wealth to diverge, violating the home household's transversality condition. Hence $C = 0$, and the unique equilibrium foreign price level is

$$P_t^* = \left(\frac{\rho}{\alpha^*}\right)^{1/\sigma} \frac{M^*}{c^*}, \qquad t \geq T. \tag{A12}$$

Evaluating at $t = T$ and substituting $M^* = D_{f,0}^* + P_T^* \bar{m}_h^{g^*}$ gives

$$P_T^* = \frac{D_{f,0}^*}{c^*(\alpha^*/\rho)^{1/\sigma} - \bar{m}_h^{g^*}}. \tag{A13}$$

Since M^* is constant, $\pi_t^* = 0$ for all $t \geq T$.

A.2.1.4 Home prices under fixed exchange rate — $P_T, t \leq T$. Under the peg, PPP implies $P_t = EP_t^*$ and inflation is common across countries, given $\epsilon_t = 0$. World money market clearing under the peg is

$$M_t^W \equiv D_{h,0} e^{\theta t} + ED_{f,0}^* = P_t\Big(m(\rho + \pi_t, c) + m^*(\rho + \pi_t, c^*)\Big). \tag{A14}$$

Under CES with country-specific money-demand shifters α (home) and α^* (foreign),

$$\begin{aligned} m(\rho + \pi_t, c) + m^*(\rho + \pi_t, c^*) &= c\left(\frac{\alpha}{\rho + \pi_t}\right)^{1/\sigma} + c^*\left(\frac{\alpha^*}{\rho + \pi_t}\right)^{1/\sigma} \\ &= \left(\frac{1}{\rho + \pi_t}\right)^{1/\sigma} \Big(c\,\alpha^{1/\sigma} + c^*(\alpha^*)^{1/\sigma}\Big). \end{aligned} \tag{A15}$$

Define the constant

$$\kappa \equiv c\,\alpha^{1/\sigma} + c^*(\alpha^*)^{1/\sigma}.$$

Substituting equation (A15) into equation (A14) yields

$$M_t^W = P_t\,\kappa\left(\frac{1}{\rho + \pi_t}\right)^{1/\sigma} \quad \Rightarrow \quad \kappa^\sigma M_t^{W-\sigma} = \rho P_t^{-\sigma} + \dot{P}_t\,P_t^{-(\sigma+1)}. \tag{A16}$$

Let $z_t \equiv P_t^{-\sigma}$. Then z_t solves the linear ODE

$$\dot{z}_t - \rho\sigma z_t = -\sigma\,\kappa^\sigma\,M_t^{W-\sigma}.$$

Using the terminal condition P_{T^-} inherited from the post-crisis solution and integrating from t to T,

$$z_t = \sigma\,\kappa^\sigma \int_t^T M_s^{W-\sigma} e^{-\rho\sigma(s-t)}\,ds + e^{-\rho\sigma(T-t)} z_T, \qquad z_T = {P_{T^-}}^{-\sigma}.$$

Hence the pre-switch price level is

$$P_t = \left[\sigma\,\kappa^\sigma \int_t^T \left(D_{h,0} e^{\theta s} + ED_{f,0}^*\right)^{-\sigma} e^{-\rho\sigma(s-t)}\,ds + e^{-\rho\sigma(T-t)} {P_T}^{-\sigma}\right]^{-1/\sigma}, \qquad t < T, \tag{A17}$$

and $P_t^* = P_t/E$.

A.2.1.5 Home inflation under fixed exchange rate — π_t for $t \le T^-$. The derivative of $\log(P_t)$ in equation (A17) is

$$\pi_t = -\rho + \kappa^\sigma \left(\frac{P_t}{D_{h,0} e^{\theta t} + ED^*_{f,0}} \right)^\sigma ,$$

which recovers the aggregate world money demand on the left of equation (A16). Let $V_t^{-1} = \rho + \pi_t$. Substituting for P_t with equation (A17) and simplifying yields,

$$\pi_t = -\rho + \frac{1}{\sigma \int_t^T \left(\frac{M_s^W}{M_t^W} \right)^{-\sigma} e^{-\rho\sigma(s-t)}\, ds + e^{-\rho\sigma(T-t)} \kappa^{-\sigma} \left(\frac{P_T}{M_t^W} \right)^{-\sigma}} = -\rho + \frac{1}{V_t}$$

Inflation depends on a combination of an average of future rates of growth of the money supply and a terminal condition on world real money balances at T. Differentiating the world money market equilibrium $M_t^W = P_t \kappa V_t^{1/\sigma}$ yields $\dot{V}_t = \sigma V_t(\mu_t - \pi_t) = -\sigma + \sigma(\rho + \mu_t)V_t$, where $\mu_t \equiv \dot{M}_t^W / M_t^W$. Hence

$$\dot{\pi}_t > 0 \iff \dot{V}_t < 0 \iff \mu_t < \pi_t .$$

On the other hand, $\mu_t = \frac{\theta D_{h,0} e^{\theta t}}{D_{h,0} e^{\theta t} + ED^*_{f,0}}$ is increasing in t, with $\mu_t < \theta$ for all $t < T$ (and $\mu_t \to \theta$ as t grows). When the global money supply grows slowly at the beginning of our examples, $\mu_t < \pi_t$, prices grow faster than the money supply, and real money balances are falling while interest rates rise. However, as time evolves, μ_t grows, approaching θ, and at some point $\mu_t > \pi_t$, $\dot{\pi} < 0$, inflation and interest rates fall, and real money balances grow.

A.2.2 Proof of Lemma 1

Under Assumptions 1–5:

(a) For all $t > T$: $\pi_t > \theta$, $\lim_{t\to\infty} \pi_t = \theta$ and $\pi_t^* = \theta^* = 0$.

(b) For all $t < T$: $\pi^*_{T^+} = \theta^* < \pi_t < \pi_{T^+}$. Moreover, if

$$c \left(\frac{\alpha}{\rho + \theta} \right)^{\frac{1}{\sigma}} < c^* \left(\frac{\alpha^*}{\rho + \theta^*} \right)^{\frac{1}{\sigma}} \left(1 - \left(\frac{\rho + \theta^*}{\rho + \theta} \right)^{\frac{1}{\sigma}} \right) \tag{A18}$$

then $\theta^* < \pi_t < \theta$ for all $t < T$.

Proof Part (a) follows from Appendix A.2.1.2 and Appendix A.2.1.3. We now prove part (b).

The world money market clearing condition equation (A14) and CES money demand equation (15) together imply

$$\frac{\kappa^\sigma}{\rho + \pi_t} = \left(\frac{M_t^W}{P_t} \right)^\sigma , \qquad t \le T, \tag{A19}$$

where $M_t^W \equiv D_{h,0} e^{\theta t} + ED^*_{f,0} e^{\theta^* t}$ and $\kappa \equiv c\alpha^{1/\sigma} + c^*(\alpha^*)^{1/\sigma}$. Rearranging equation (A19) gives $P_t^{-\sigma} = \kappa^\sigma M_t^{W-\sigma}/(\rho + \pi_t)$, and analogously $P_T^{-\sigma} = \kappa^\sigma M_T^{W-\sigma}/(\rho + \pi_{T^-})$. Substituting both expressions into the pre-switch price-level solution equation (21), dividing by κ^σ, and multiplying through by $M_t^{W\sigma}$ yields

$$\frac{1}{\rho + \pi_t} = \sigma \int_t^T \left(\frac{M_t^W}{M_s^W} \right)^\sigma e^{-\rho\sigma(s-t)}\, ds + \frac{e^{-\rho\sigma(T-t)}}{\rho + \pi_{T^-}} \left(\frac{M_t^W}{M_T^W} \right)^\sigma , \qquad t \le T. \tag{A20}$$

The terminal condition in equation (A20) involves π_{T^-}, the left limit of inflation at the switch date, which in general differs from the post-collapse rates π_{T^+} and $\pi^*_{T^+}$ established in Appendix A.2.1.2. Since $D_{h,0}$, $ED^*_{f,0} > 0$ and $\theta > \theta^*$, for all $s > t$:

$$e^{-\theta(s-t)} < \frac{M_t^W}{M_s^W} < e^{-\theta^*(s-t)}. \tag{A21}$$

We now can show that at the switch date $\pi^*_{T^+} < \pi_{T^-} < \pi_{T^+}$. Evaluating equation (A1) and equation (A10) at $t = T^+$ and adding, using $P^*_T = P_T/E$, the reserve terms $\pm P_T \bar{m}_h^{g^*}$ cancel and yield

$$M^W_T = P_T\Big[c\,\alpha^{1/\sigma}(\rho + \pi_{T^+})^{-1/\sigma} + c^*(\alpha^*)^{1/\sigma}(\rho + \pi^*_{T^+})^{-1/\sigma}\Big]. \tag{A22}$$

From equation (A19) evaluated at $t = T^-$:

$$M^W_T = P_T\,\kappa\,(\rho + \pi_{T^-})^{-1/\sigma}. \tag{A23}$$

We can then set the two expressions equal:

$$(\rho + \pi_{T^-})^{-1/\sigma} = w\,(\rho + \pi_{T^+})^{-1/\sigma} + (1 - w)\,(\rho + \pi^*_{T^+})^{-1/\sigma}, \tag{A24}$$

where $w \equiv c\alpha^{1/\sigma}/\kappa \in (0, 1)$ and $1 - w = c^*(\alpha^*)^{1/\sigma}/\kappa \in (0, 1)$. Since $f(x) = (\rho + x)^{-1/\sigma}$ is strictly decreasing and $\pi_{T^+} > \pi^*_{T^+}$, equation equation (A24) expresses $f(\pi_{T^-})$ as a strict convex combination of the distinct values $f(\pi_{T^+})$ and $f(\pi^*_{T^+})$. Hence $f(\pi^*_{T^+}) > f(\pi_{T^-}) > f(\pi_{T^+})$, i.e. $\pi^*_{T^+} < \pi_{T^-} < \pi_{T^+}$.

We now show that for $t < T$, $\pi^*_{T^+} < \pi_t < \pi_{T^+}$.

Upper bound: $\pi_t < \pi_{T^+}$. Applying $(M^W_t/M^W_s)^\sigma > e^{-\theta\sigma(s-t)}$ from equation (A21) to the integral in equation (A20), and $(M^W_t/M_T)^\sigma > e^{-\theta\sigma(T-t)}$ together with $\pi_{T^-} < \pi_{T^+}$ to the terminal term:

$$\begin{aligned}\frac{1}{\rho + \pi_t} &> \sigma\int_t^T e^{-(\rho+\theta)\sigma(s-t)}\,ds + \frac{e^{-(\rho+\theta)\sigma(T-t)}}{\rho + \pi_{T^+}} \\ &= \frac{1 - e^{-(\rho+\theta)\sigma(T-t)}}{\rho + \theta} + \frac{e^{-(\rho+\theta)\sigma(T-t)}}{\rho + \pi_{T^+}}.\end{aligned} \tag{A25}$$

Since $\pi_{T^+} > \theta$ given Appendix A.2.1.2, $(\rho + \theta)^{-1} > (\rho + \pi_{T^+})^{-1}$, so the right-hand side of equation (A25) strictly exceeds

$$\frac{1 - e^{-(\rho+\theta)\sigma(T-t)}}{\rho + \pi_{T^+}} + \frac{e^{-(\rho+\theta)\sigma(T-t)}}{\rho + \pi_{T^+}} = \frac{1}{\rho + \pi_{T^+}}.$$

Hence $\pi_t < \pi_{T^+}$.

Lower bound: $\pi_t > \pi^*_{T^+}$. Applying $(M^W_t/M^W_s)^\sigma < e^{-\theta^*\sigma(s-t)}$ from equation (A21) to the integral in equation (A20), and $(M^W_t/M_T)^\sigma < e^{-\theta^*\sigma(T-t)}$ together with $\pi_{T^-} > \pi^*_{T^+}$ to the terminal term:

$$\begin{aligned}\frac{1}{\rho + \pi_t} &< \sigma\int_t^T e^{-(\rho+\theta^*)\sigma(s-t)}\,ds + \frac{e^{-(\rho+\theta^*)\sigma(T-t)}}{\rho + \pi^*_{T^+}} \\ &= \frac{1 - e^{-(\rho+\theta^*)\sigma(T-t)}}{\rho + \theta^*} + \frac{e^{-(\rho+\theta^*)\sigma(T-t)}}{\rho + \pi^*_{T^+}}.\end{aligned} \tag{A26}$$

Since $\pi^*_{T^+} = \theta^*$ (from part (a)) and $\pi_{T^-} > \pi^*_{T^+}$ (shown above), $(\rho + \pi_{T^-})^{-1} < (\rho + \pi^*_{T^+})^{-1} = (\rho + \theta^*)^{-1}$, so the right-hand side of equation (A26) is strictly below

$$\frac{1 - e^{-(\rho+\theta^*)\sigma(T-t)}}{\rho + \theta^*} + \frac{e^{-(\rho+\theta^*)\sigma(T-t)}}{\rho + \theta^*} = \frac{1}{\rho + \theta^*} = \frac{1}{\rho + \pi^*_{T^+}}.$$

Hence $\pi_t > \pi^*_{T^+}$.

Stronger upper bound $\pi_t < \theta$ under equation (A18). Condition equation (A18) gives

$$c\left(\frac{\alpha}{\rho + \theta}\right)^{\frac{1}{\sigma}} < c^*\left(\frac{\alpha^*}{\rho + \theta^*}\right)^{\frac{1}{\sigma}}\left(1 - \left(\frac{\rho + \theta^*}{\rho + \theta}\right)^{\frac{1}{\sigma}}\right)$$

This is equivalent to:

$$\frac{c}{c^*} < \left(\frac{\alpha^*}{\alpha}\right)^{1/\sigma} \frac{(\rho+\theta)^{1/\sigma} - (\rho+\theta^*)^{1/\sigma}}{(\rho+\theta^*)^{1/\sigma}}$$

Cross-multiplying by $c^*\alpha^{1/\sigma}(\rho+\theta^*)^{1/\sigma} > 0$ and adding $c^*(\alpha^*)^{1/\sigma}(\rho+\theta^*)^{1/\sigma}$ to both sides gives $\kappa(\rho+\theta^*)^{1/\sigma} < c^*(\alpha^*)^{1/\sigma}(\rho+\theta)^{1/\sigma}$, which dividing through by $\kappa(\rho+\theta)^{1/\sigma}$ is equivalent to

$$1 - w > \left(\frac{\rho+\theta^*}{\rho+\theta}\right)^{1/\sigma}. \tag{A27}$$

Since $\pi^*_{T^+} \le \theta^*$, the convex combination equation (A24) satisfies

$$(\rho+\pi_{T^-})^{-1/\sigma} \ge (1-w)(\rho+\theta^*)^{-1/\sigma} \overset{\text{equation (A27)}}{>} \left(\frac{\rho+\theta^*}{\rho+\theta}\right)^{1/\sigma} (\rho+\theta^*)^{-1/\sigma} = (\rho+\theta)^{-1/\sigma},$$

hence $\pi_{T^-} < \theta$. Substituting this into the bound equation (A25), replacing π_{T^+} with θ and using $\pi_{T^-} < \theta$ so that $(\rho+\pi_{T^-})^{-1} > (\rho+\theta)^{-1}$, the right-hand side of equation (A25) strictly exceeds $(\rho+\theta)^{-1}$, giving $\pi_t < \theta$ for all $t < T$.

The lower bound $\pi_t > \theta^*$ follows immediately from the existing result $\pi_t > \pi^*_{T^+}$: when $\theta^* = 0$, $\pi^*_{T^+} = 0 = \theta^*$ by Appendix A.2.1.3, so no additional condition is required. For $\theta^* < 0$ the bound is automatic since world money supply grows at rate $\theta^W_t > 0$ for all $t \le T$.

A.2.3 Derivation of Reserves

The home real central bank balance sheet equation (6) is

$$d_{h,t} = m_{h,t} + m^{g^*}_{h,t} \qquad \Rightarrow \qquad m^{g^*}_{h,t} = d_{h,t} - m_{h,t}.$$

Differentiating gives

$$\dot{m}^{g^*}_{h,t} = \dot{d}_{h,t} - \dot{m}_{h,t}. \tag{A28}$$

Domestic credit obeys $\dot{D}_{h,t} = \theta D_{h,t}$. Since $d_{h,t} \equiv D_{h,t}/P_t$,

$$\dot{d}_{h,t} = \frac{\dot{D}_{h,t}}{P_t} - \frac{D_{h,t}}{P_t}\frac{\dot{P}_t}{P_t} = (\theta - \pi_t) d_{h,t}. \tag{A29}$$

Money demand under the peg is $m_{h,t} = c(\alpha/(\rho+\pi_t))^{1/\sigma}$, so with constant c,

$$\dot{m}_{h,t} = -\frac{1}{\sigma} m_{h,t} \frac{\dot{i}_t}{i_t} = -\frac{1}{\sigma} m_{h,t} \frac{\dot{\pi}_t}{\rho+\pi_t}. \tag{A30}$$

Combining equation (A28)–equation (A30),

$$\dot{m}^{g^*}_{h,t} = (\theta - \pi_t) d_{h,t} + \frac{1}{\sigma} m_{h,t} \frac{\dot{\pi}_t}{\rho+\pi_t}, \qquad t \le T. \tag{A31}$$

It is useful to rewrite equation (A31) in terms of the growth rate of world nominal money under the peg. We take logs on equation (A16) and differentiate:

$$\frac{\dot{M}^W_t}{M^W_t} = \pi_t - \frac{1}{\sigma}\frac{\dot{\pi}_t}{\rho+\pi_t}. \tag{A32}$$

Define the growth rate of world nominal money under the peg as

$$\theta_t^W \equiv \frac{\dot{M}_t^W}{M_t^W} = \theta \frac{D_{h,0} e^{\theta t}}{D_{h,0} e^{\theta t} + E D_{f,0}^*} < \theta. \tag{A33}$$

Then equation (A32) implies

$$\frac{1}{\sigma} \frac{\dot{\pi}_t}{\rho + \pi_t} = \pi_t - \theta_t^W. \tag{A34}$$

Substituting equation (A34) into equation (A31),

$$\dot{m}_{h,t}^{g^*} = (\theta - \pi_t) d_{h,t} + m_{h,t} \left(\pi_t - \theta_t^W \right). \tag{A35}$$

Using $d_{h,t} = m_{h,t} + m_{h,t}^{g^*}$, we obtain

$$\begin{aligned} \dot{m}_{h,t}^{g^*} &= (\theta - \pi_t) \left(m_{h,t} + m_{h,t}^{g^*} \right) + m_{h,t} \left(\pi_t - \theta_t^W \right) \\ &= (\theta - \theta_t^W) m_{h,t} + (\theta - \pi_t) m_{h,t}^{g^*}. \end{aligned} \tag{A36}$$

We can divide by $m_{h,t}^{g^*}$ and obtain:

$$\frac{\dot{m}_{h,t}^{g^*}}{m_{h,t}^{g^*}} = (\theta - \theta_t^W) \frac{m_{h,t}}{m_{h,t}^{g^*}} + (\theta - \pi_t), \qquad t \leq T. \tag{A37}$$

A.2.4 Proof of Proposition 1

In an economy satisfying Assumptions 1–5, suppose

$$\frac{D_{h,0}}{E D_{f,0}^*} < \frac{c \left(\dfrac{\alpha}{\rho + \theta} \right)^{1/\sigma}}{c^* \left(\dfrac{\alpha^*}{\rho} \right)^{1/\sigma} - \bar{m}_h^{g^*}}, \tag{A38}$$

where c and c^* are determined by equation (17). Then the fixed exchange rate regime collapses at a unique finite date $0 < T < \infty$ if, and only if,

(i) $\theta > \theta^*$, and

(ii) $\bar{m}_h^{g^*} < \infty$.

Proof We prove the result for arbitrary $\theta^* < \theta$. We begin by establishing a general result on the ratio P_T / P_T^* that is used throughout. Define the rescaled variables $\widetilde{P}_T \equiv e^{-\theta T} P_T$ and $\widetilde{P}_T^* \equiv e^{-\theta^* T} P_T^*$. Substituting into equation (A7) evaluated at $t = T$ and changing variables $u = s - T$ yields

$$\widetilde{P}_T = \left[\sigma \alpha \int_0^\infty \left(\frac{D_{h,0} e^{\theta u} - \widetilde{P}_T \bar{m}_h^{g^*}}{c} \right)^{-\sigma} e^{-\rho \sigma u} du \right]^{-1/\sigma},$$

$$\widetilde{P}_T^* = \left[\sigma \alpha^* \int_0^\infty \left(\frac{D_{f,0}^* e^{\theta^* u} + \widetilde{P}_T^* \bar{m}_h^{g^*}}{c^*} \right)^{-\sigma} e^{-\rho \sigma u} du \right]^{-1/\sigma},$$

neither of which depends on T. Hence $\widetilde{P}_T = \widetilde{P}$ and $\widetilde{P}^*_T = \widetilde{P}^*$ are constants, and for any θ, θ^*,

$$\frac{P_T}{P^*_T} = \frac{\widetilde{P}}{\widetilde{P}^*} e^{(\theta-\theta^*)T}. \tag{A39}$$

This ratio is strictly increasing in T when $\theta > \theta^*$, constant when $\theta = \theta^*$, and strictly decreasing when $\theta < \theta^*$.

(*Only if*)

(i) $\theta > \theta^*$ is necessary. Suppose $\theta = \theta^*$. From equation (A39), $P_T/P^*_T = \widetilde{P}/\widetilde{P}^*$ is constant in T. From the rescaled equations, $\widetilde{P}$ satisfies the upper bound

$$\widetilde{P} \leq \left(\frac{\rho+\theta}{\alpha}\right)^{1/\sigma} \frac{D_{h,0}}{c},$$

and $\widetilde{P}^*$ satisfies the lower bound

$$\widetilde{P}^* \geq \left(\frac{\rho+\theta^*}{\alpha^*}\right)^{1/\sigma} \frac{D^*_{f,0}}{c^*}.$$

Hence $\widetilde{P}/\widetilde{P}^* < E$ is implied by

$$\frac{D_{h,0}}{ED^*_{f,0}} < \frac{c\left(\frac{\alpha}{\rho+\theta}\right)^{1/\sigma}}{c^*\left(\frac{\alpha^*}{\rho+\theta^*}\right)^{1/\sigma}}, \tag{A40}$$

so $P_T/P^*_T = \widetilde{P}/\widetilde{P}^* < E$ for all T and the switch condition $P_T/P^*_T = E$ is never satisfied. Hence $T = \infty$.

(ii) $\bar{m}_h^{g^*} < \infty$ is necessary. Suppose $\bar{m}_h^{g^*} \to \infty$. From equation (A39), the collapse date T satisfies

$$T = \frac{\ln(E\widetilde{P}^*/\widetilde{P})}{\theta - \theta^*},$$

where $\widetilde{P}$ and $\widetilde{P}^*$ depend on $\bar{m}_h^{g^*}$. We show $\widetilde{P} \to 0$ and $\widetilde{P}^* \to \infty$, so that $T \to \infty$.

Home: $\widetilde{P} \to 0$. The integrand in the rescaled home equation is well-defined only when $D_{h,0}e^{\theta u} - \widetilde{P}\bar{m}_h^{g^*} > 0$ for all $u \geq 0$, which (since the LHS is increasing in u) requires $\widetilde{P} < D_{h,0}/\bar{m}_h^{g^*}$ at $u = 0$. Hence $\widetilde{P} \to 0$ as $\bar{m}_h^{g^*} \to \infty$.

Foreign: $\widetilde{P}^* \to \infty$. By analogous monotonicity, $\widetilde{P}^*$ is increasing in $\bar{m}_h^{g^*}$. The rescaled foreign equation gives the upper bound (using $D^*_{f,0}e^{\theta^* u} + \widetilde{P}^*\bar{m}_h^{g^*} \geq \widetilde{P}^*\bar{m}_h^{g^*}$):

$$(\widetilde{P}^*)^{-\sigma} \leq \sigma\alpha^*(c^*)^\sigma(\widetilde{P}^*\bar{m}_h^{g^*})^{-\sigma}\int_0^\infty e^{-\rho\sigma u}\,du = \frac{\alpha^*(c^*)^\sigma}{\rho}(\widetilde{P}^*\bar{m}_h^{g^*})^{-\sigma},$$

which rearranges to $\bar{m}_h^{g^*} \leq (\alpha^*/\rho)^{1/\sigma}c^*$. This bound is independent of $\widetilde{P}^*$; as $\bar{m}_h^{g^*}$ approaches it, $\widetilde{P}^*$ diverges to keep the equation satisfiable, and beyond it no equilibrium exists. Hence $\widetilde{P}^* \to \infty$ as $\bar{m}_h^{g^*} \to \infty$.

Since $\widetilde{P} \to 0$ and $\widetilde{P}^* \to \infty$, we have $\ln(E\widetilde{P}^*/\widetilde{P}) \to \infty$ and hence $T \to \infty$. No finite collapse date exists. Hence $\bar{m}_h^{g^*} < \infty$ is necessary.

(*If*)

Suppose $\theta > \theta^*$ and $\bar{m}_h^{g^*} < \infty$. From equation (A39), since $\theta > \theta^*$, P_T/P^*_T is strictly increasing in T and

diverges as $T \to \infty$. It remains to show $P_0/P_0^* < E$, i.e. $\widetilde{P}/\widetilde{P}^* < E$, so that the intermediate value theorem applies. Evaluating equation (A7) at $t = T$ and then $T = 0$, since $D_{h,0}e^{\theta s} - P_0 \bar{m}_h^{g^*} \leq D_{h,0}e^{\theta s}$,

$$P_0 \leq \left(\frac{\rho + \theta}{\alpha}\right)^{1/\sigma} \frac{D_{h,0}}{c}.$$

The condition $P_0/E < \widetilde{P}^*$ is therefore implied by the parameter restriction equation (A38), which generalizes for arbitrary $\theta^* < \theta$ to

$$\frac{1}{E}\left(\frac{\rho + \theta}{\alpha}\right)^{1/\sigma} \frac{D_{h,0}}{c} < \left(\frac{\rho + \theta^*}{\alpha^*}\right)^{1/\sigma} \frac{D_{f,0}^*}{c^*},$$

since $\widetilde{P}^* \geq (\rho+\theta^*)^{1/\sigma}(\alpha^*)^{-1/\sigma} D_{f,0}^*/c^*$ from the rescaled foreign equation. The original restriction equation (A38) corresponds to the case $\theta^* = 0$. By the intermediate value theorem,and strict monotonicity of equation (A39), there exists a unique finite $T > 0$ such that $P_T/P_T^* = E$, establishing $0 < T < \infty$.

A.2.5 Proof of Lemma 2

Under Assumptions 1–5 and holding the real allocation (c, c^*) fixed:

(a) The collapse date $T(\Lambda, \bar{m}_h^{g^*}, \theta - \theta^*)$ satisfies, for general θ^*, where $\Lambda \equiv \frac{D_{h,0}}{E\, D_{f,0}^*}$

$$\frac{\partial T}{\partial \Lambda} = -\frac{1}{(\theta - \theta^*)\,\Lambda} < 0, \qquad \frac{\partial T}{\partial \bar{m}_h^{g^*}} > 0, \qquad \frac{\partial T}{\partial \theta} < 0, \quad \frac{\partial T}{\partial \theta^*} > 0.$$

(b) The size of the reverse speculative attack, $\Delta \equiv m_{h,T^+}^{g^*} - m_{h,T^-}^{g^*} = m_{h,T^-} - m_{h,T^+} > 0$, is independent of Λ and satisfies $\partial\Delta/\partial\theta > 0$. If, in addition, $\theta^* \geq 0$, then $\partial\Delta/\partial\bar{m}_h^{g^*} > 0$.

Proof (a) Comparative statics for T. From the proof of Proposition 1, define $\hat{P} \equiv \widetilde{P}/D_{h,0}$ and $\hat{P}^* \equiv \widetilde{P}^*/D_{f,0}^*$. The rescaled equations show that $\hat{P}$ depends on $(\theta, \bar{m}_h^{g^*})$ and $\hat{P}^*$ on $(\theta^*, \bar{m}_h^{g^*})$. Taking logs of equation (A39) and using $P_T/P_T^* = E$ at the collapse date,[18]

$$(\theta - \theta^*)\, T = -\ln \Lambda + \ln \hat{P}^* - \ln \hat{P}, \qquad \Lambda \equiv \frac{D_{h,0}}{E\, D_{f,0}^*}. \tag{A41}$$

Effect of Λ. Differentiating equation (A41) implicitly:

$$(\theta - \theta^*)\frac{\partial T}{\partial \Lambda} = -\frac{1}{\Lambda} \quad \Longrightarrow \quad \frac{\partial T}{\partial \Lambda} = -\frac{1}{(\theta - \theta^*)\Lambda} < 0.$$

Effect of θ. Define

$$\Psi(\widetilde{P}, \theta) \equiv \widetilde{P}^{-\sigma} - \sigma\alpha c^{\sigma} \int_0^{\infty} \left(D_{h,0}e^{\theta s} - \widetilde{P}\,\bar{m}_h^{g^*}\right)^{-\sigma} e^{-\rho\sigma s}\, ds.$$

The implicit function theorem gives $\widetilde{P}_\theta = -\Psi_\theta/\Psi_{\widetilde{P}} > 0$, since

$$\Psi_\theta = \sigma^2\alpha c^{\sigma} \int_0^{\infty} \left(D_{h,0}e^{\theta s} - \widetilde{P}\,\bar{m}_h^{g^*}\right)^{-\sigma-1} D_{h,0}\, s\, e^{\theta s} e^{-\rho\sigma s}\, ds > 0,$$

[18] We hold the real allocation (c, c^*) fixed throughout, abstracting from the seigniorage channel through which θ, $\bar{m}_h^{g^*}$, and Λ affect consumption via equation (17a).

$$\Psi_{\widetilde{P}} = -\sigma\widetilde{P}^{-\sigma-1} - \sigma^2\alpha c^\sigma\, \bar{m}_h^{g^*} \int_0^\infty \left(D_{h,0}e^{\theta s} - \widetilde{P}\,\bar{m}_h^{g^*}\right)^{-\sigma-1} e^{-\rho\sigma s}\, ds < 0.$$

Hence $\partial \ln \hat{P}/\partial\theta > 0$, and $\hat{P}^*$ does not depend on θ, so differentiating equation (A41) in θ:

$$T + (\theta - \theta^*)\frac{\partial T}{\partial \theta} = -\frac{\partial \ln \hat{P}}{\partial \theta} \quad \Longrightarrow \quad \frac{\partial T}{\partial \theta} = -\frac{T + \partial \ln \hat{P}/\partial\theta}{\theta - \theta^*} < 0.$$

The analogous argument applied to $\hat{P}^*$ yields $\partial T/\partial\theta^* > 0$.

Effect of $\bar{m}_h^{g^*}$. From the proof of Proposition 1, $\hat{P}$ is strictly decreasing and $\hat{P}^*$ strictly increasing in $\bar{m}_h^{g^*}$. Differentiating equation (A41):

$$\frac{\partial T}{\partial \bar{m}_h^{g^*}} = \frac{1}{\theta - \theta^*}\left[-\frac{\partial \ln \hat{P}}{\partial \bar{m}_h^{g^*}} + \frac{\partial \ln \hat{P}^*}{\partial \bar{m}_h^{g^*}}\right] > 0.$$

(b) Comparative statics for Δ. For the attack-size, we first see that, under the peg, Assumption 3 imposes $m_{f,t}^g = 0$ and Assumption 1 implies $nw_{h,t} = 0$, so the home real balance sheet equation (6) reduces to $m_{h,t}^{g^*} = d_{h,t} - m_{h,t}$. Given continuity of $D_{h,t}$ and P_t, we get

$$\Delta = m_{h,T^+}^{g^*} - m_{h,T^-}^{g^*} = (d_{h,T^+} - m_{h,T^+}) - (d_{h,T^-} - m_{h,T^-}) = m_{h,T^-} - m_{h,T^+}.$$

Positivity of Δ follows from Lemma 1(b): $\pi_{T^-} < \pi_{T^+}$ combined with money demand strictly decreasing in inflation. Let $u \equiv m_{h,T^+}$ and $v \equiv m_{f,T^+}^*$. Under the peg both countries face the common nominal interest rate $\rho + \pi_{T^-}$, so CES money demand gives

$$\frac{m_{h,T^-}}{m_{f,T^-}^*} = \frac{c\,\alpha^{1/\sigma}}{c^*(\alpha^*)^{1/\sigma}} = \frac{w}{1-w},$$

where $w \equiv c\alpha^{1/\sigma}/\kappa \in (0,1)$ and $\kappa \equiv c\alpha^{1/\sigma} + c^*(\alpha^*)^{1/\sigma}$ are as in Lemma 1. From post-switch money-market conditions :

$$P_T u + E\,P_T^* v = (D_{h,0}e^{\theta T} - P_T\bar{m}_h^{g^*}) + (E\,D_{f,0}^* e^{\theta^* T} + E\,P_T^*\bar{m}_h^{g^*}) = D_{h,0}e^{\theta T} + E\,D_{f,0}^* e^{\theta^* T} = P_T(m_{h,T^-} + m_{f,T^-}^*),$$

where the last equality uses the peg money market clearing. We can now see that $m_{h,T^-} = w(u+v)$ and then:

$$\Delta = w(u+v) - u = w\,v - (1-w)\,u. \tag{A42}$$

From the home money-market condition at T^+, $P_T\,u = D_{h,0}e^{\theta T} - P_T\bar{m}_h^{g^*}$, so $\widetilde{P} = D_{h,0}/(u + \bar{m}_h^{g^*})$, where $\widetilde{P} = e^{-\theta T}P_T$ as defined in the proof of Proposition 1. Substituting into the fixed-point equation:

$$\widetilde{P}^{-\sigma} = \sigma\alpha\, c^\sigma \int_0^\infty \left(D_{h,0}e^{\theta s} - \widetilde{P}\,\bar{m}_h^{g^*}\right)^{-\sigma} e^{-\rho\sigma s} ds,$$

both sides scale homogeneously in $D_{h,0}^{-\sigma}(u + \bar{m}_h^{g^*})^\sigma$, so we get:

$$G(u, \theta, \bar{m}_h^{g^*}) \equiv 1 - \sigma\alpha\, c^\sigma \int_0^\infty \left[(u + \bar{m}_h^{g^*})e^{\theta s} - \bar{m}_h^{g^*}\right]^{-\sigma} e^{-\rho\sigma s} ds = 0. \tag{A43}$$

Analogously, $\widetilde{P}^* = D_{f,0}^*/(v - \bar{m}_h^{g^*})$ and we can get for the foreign rescaled equation:

$$H(v, \theta^*, \bar{m}_h^{g^*}) \equiv 1 - \sigma\alpha^* c^{*\sigma} \int_0^\infty \left[(v - \bar{m}_h^{g^*})e^{\theta^* s} + \bar{m}_h^{g^*}\right]^{-\sigma} e^{-\rho\sigma s} ds = 0. \tag{A44}$$

We differentiate:

$$G_u = \sigma^2 \alpha\, c^\sigma \int_0^\infty \left[(u + \bar{m}_h^{g^*})e^{\theta s} - \bar{m}_h^{g^*}\right]^{-\sigma-1} e^{\theta s} e^{-\rho\sigma s} ds > 0,$$
$$G_\theta = \sigma^2 \alpha\, c^\sigma \int_0^\infty \left[(u + \bar{m}_h^{g^*})e^{\theta s} - \bar{m}_h^{g^*}\right]^{-\sigma-1} (u + \bar{m}_h^{g^*})\, s\, e^{\theta s} e^{-\rho\sigma s} ds > 0,$$
$$G_{\bar{m}_h^{g^*}} = \sigma^2 \alpha\, c^\sigma \int_0^\infty \left[(u + \bar{m}_h^{g^*})e^{\theta s} - \bar{m}_h^{g^*}\right]^{-\sigma-1} (e^{\theta s} - 1)\, e^{-\rho\sigma s} ds > 0,$$

where the sign of $G_{\bar{m}_h^{g^*}}$ follows from $\theta > 0$, which makes $e^{\theta s} - 1 > 0$ for $s > 0$. Then by IFT we get:

$$u_\theta = -G_\theta / G_u < 0, \qquad u_{\bar{m}_h^{g^*}} = -G_{\bar{m}_h^{g^*}} / G_u < 0.$$

We also have $u_\Lambda = 0$. Then for H:

$$H_v = \sigma^2 \alpha^* c^{*\sigma} \int_0^\infty \left[(v - \bar{m}_h^{g^*})e^{\theta^* s} + \bar{m}_h^{g^*}\right]^{-\sigma-1} e^{\theta^* s} e^{-\rho\sigma s} ds > 0,$$
$$H_\theta = 0,$$
$$H_{\bar{m}_h^{g^*}} = \sigma^2 \alpha^* c^{*\sigma} \int_0^\infty \left[(v - \bar{m}_h^{g^*})e^{\theta^* s} + \bar{m}_h^{g^*}\right]^{-\sigma-1} (1 - e^{\theta^* s})\, e^{-\rho\sigma s} ds.$$

The sign of $H_{\bar{m}_h^{g^*}}$ is strictly negative when $\theta^* > 0$ (since $1 - e^{\theta^* s} < 0$ for $s > 0$), identically zero when $\theta^* = 0$, and strictly positive when $\theta^* < 0$. Hence

$$v_\theta = v_\Lambda = 0, \qquad v_{\bar{m}_h^{g^*}} \begin{cases} > 0 & \text{if } \theta^* > 0, \\ = 0 & \text{if } \theta^* = 0, \\ < 0 & \text{if } \theta^* < 0. \end{cases}$$

From equation (A42) with $w \in (0,1)$ constant (since $(c, c^*, \alpha, \alpha^*, \sigma)$ are held fixed):

$$\Delta_\Lambda = -(1-w)\, u_\Lambda + w\, v_\Lambda = 0$$
$$\Delta_\theta = -(1-w)\, u_\theta + w\, v_\theta = -(1-w)\, u_\theta > 0,$$
$$\Delta_{\bar{m}_h^{g^*}} = -(1-w)\, u_{\bar{m}_h^{g^*}} + w\, v_{\bar{m}_h^{g^*}}.$$

From equation (A42) with $w \in (0,1)$ constant: $\Delta_\Lambda = 0$, since u and v are independent of Λ (they solve the rescaled fixed-point equations G and H, which contain no Λ). Then $\Delta_\theta = -(1-w)\, u_\theta + w\, v_\theta = -(1-w) u_\theta > 0$ (since $u_\theta < 0$ and $v_\theta = 0$ when θ^* is held fixed). For $\Delta_{\bar{m}_h^{g^*}}$: when $\theta^* \geq 0$ the foreign channel $v_{\bar{m}_h^{g^*}} \geq 0$, so both terms in $\Delta_{\bar{m}_h^{g^*}} = -(1-w) u_{\bar{m}_h^{g^*}} + w\, v_{\bar{m}_h^{g^*}}$ are nonnegative and the home channel is strictly positive; hence $\Delta_{\bar{m}_h^{g^*}} > 0$. When $\theta^* < 0$ the two channels have opposite signs, and $\Delta_{\bar{m}_h^{g^*}} > 0$ holds whenever the home channel dominates.