

Exchange Rate Policy Beyond the Trilemma

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1 Introduction

What is the optimal exchange rate policy? This classical question in international economics remains as relevant as ever for policymakers around the world. The benefits of a flexible exchange rate regime, famously articulated by Friedman (1953), are well understood and widely accepted: a flexible exchange rate can act as a shock absorber, preserve monetary autonomy, and reduce the need for costly controls on trade and capital flows. Yet the vast majority of central banks in the world still intervene in currency markets and to varying degrees, manage their exchange rates. In fact, by some de facto measures, this “fear of floating” is wider today than under Bretton Woods 70 years ago (Ilzetzki, Reinhart, and Rogoff, 2019). The policy and academic debate has gone a long way, however, and is now much more nuanced, going beyond a simple dichotomy between freely floating and fixed exchange rates, with both extremes rarely implemented in practice. This article discusses recent developments in this area and explains how the experience of countries over the last fifty years changed our understanding of exchange rates and the role of monetary policy in open economies.

I start with the classical trilemma and the argument by Friedman in favour of freely floating exchange rates. These ideas were later formalised using the first generation of New Keynesian models and have become the bedrock for policy analysis in open economies. However, developed in the 1950s and 1960s during the heyday of Bretton Woods, these theories have only partly anticipated how a world with floating exchange rates would look. Rather than moving primarily in response to fundamental shocks and evolving in line with the no-arbitrage uncovered interest parity condition (UIP), exchange rates are an order of magnitude more volatile and largely “disconnected” from other macroeconomic variables. Furthermore, in contrast to predictions of trilemma models, the change in monetary policy from targeting the nominal exchange rate to more inward-looking policies at the end of Bretton Woods was not accompanied by any similarly sharp change in the dynamics of other macroeconomic variables.

This puzzling behaviour of exchange rates from the perspective of classical theories led to the development of a new generation of models that put financial frictions — rather than just sticky prices — at the centre stage of the analysis. Replacing risk-neutral deep-pocket financiers with limits to arbitrage, these theories show that substantial exchange rate movements and UIP deviations are required to compensate intermediaries for taking risk and absorbing currency demand shocks. Such financial shocks explain most of the high-to-medium frequency volatility in exchange rates and imply distorted international prices, trade, and capital flows. From a normative perspective, this means that central bank interventions in currency markets can be both consequential and desirable. First, foreign exchange (FX)

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interventions can absorb currency demand shocks, insulating exchange rates from their distortionary effects. Second, conventional interest rate instruments can be used to reduce excess volatility in exchange rates, making arbitrage less risky for private traders and incentivising them to take larger currency positions.

I then use this framework to interpret exchange rate policies observed in practice. The optimal regime is not universal, but depends on the openness of the economy, the depth of its currency markets, and the relative importance of macroeconomic and financial shocks. For large and relatively closed economies, or for economies with deep financial markets, the welfare gains from active exchange rate management are likely to be small, and inward-looking monetary policy remains a good approximation. In contrast, economies with shallow currency markets and large capital flow shocks benefit from managed floats, reserve accumulation, and occasional use of interest rates to stabilise exchange rates. Currency unions and pegs can also be desirable when the natural real exchange rate is stable, while commodity exporters and countries facing volatile terms of trade generally need more exchange rate flexibility.

Finally, I discuss why exchange rate policy cannot be separated from fiscal policy. Foreign demand booms, commodity windfalls, and capital inflows affect the economy not only through currency markets, but also through national income and aggregate demand. Given that higher export revenues should eventually translate into additional imports, the key policy question is whether the adjustment happens through quantities (higher aggregate consumption) or through prices (appreciation of the exchange rate). Tight monetary and fiscal policies shift this decomposition towards prices and help prevent the economy from overheating, while the accumulation of foreign assets does not necessarily change present-value quantities, but delays the adjustment and gives nominal prices and real interest rates more time to respond.

2 Classical View: Trilemma and Friedman Float

Since its development in the 1960s, the Mundell-Fleming trilemma has been the backbone of thinking about monetary policy in an open economy (Mundell, 1963; Fleming, 1962). It formalises the trade-off facing central banks by arguing that it is not possible to simultaneously have a fixed exchange rate, independent monetary policy, and free capital mobility without capital controls. Although originally developed as a theoretical argument, the trilemma is often supported by the historical experience of developed economies in the twentieth century: the gold standard limited monetary autonomy; the Bretton Woods system combined fixed but adjustable exchange rates with restrictions on capital mobility; and the post-1970s period moved towards greater capital mobility and more flexible exchange rates.

When formulated as a choice between autonomous monetary policy, a peg, and capital controls, the trilemma has stark normative implications. The argument was brilliantly formulated by Milton Friedman in his famous essay *"The Case for Flexible Exchange Rates"* and was later confirmed analytically in a large class of New Keynesian open-economy models developed since the 1990s (see e.g. Corsetti and Pesenti, 2001; Devereux and Engel, 2003; Gali and Monacelli, 2005).

The main idea of Friedman can be summarised as follows. There are four ways to reach equilibrium in the currency market. First, one can simply allow the price to equilibrate demand and supply. This solution corresponds to the freely floating exchange rate and is the preferred solution of Friedman. Second, the government can use trade and capital controls to shift

demand and supply of currencies, but this solution distorts household and firm decisions in goods and asset markets, not to mention loopholes and political economy frictions. Third, the central bank can introduce a nominal peg. Since relative prices across economies need to adjust in response to aggregate shocks, and nominal prices are sticky and cannot change on impact, the constant nominal exchange rate implies a distorted allocation in the short run. Friedman famously uses the analogy with daylight savings to illustrate the benefits of adjusting the nominal exchange rate to achieve efficient relative prices in the short run: “obviously it is much simpler to change the clock that guides all than to have each individual separately change his pattern of reaction to the clock.”

Finally, the government can use FX reserves to offset supply and demand shocks in the currency market. This is arguably the most policy-relevant alternative to a floating regime today and, perhaps surprisingly, Friedman was much more open to it than one might expect. Indeed, he writes that “this device is feasible and not undesirable for movements that are small and temporary, though it is largely unnecessary since private speculative transactions will provide currency demand with only minor movements in exchange rates”. Thus, Friedman anticipated shocks in currency markets that would occasionally make the exchange rate deviate from its fundamental value — determined by productivity, fiscal, monetary, and other macro shocks — but thought such fluctuations would be small and transitory, as rational arbitrageurs would have strong incentives to step in, profit from such deviations, and eventually eliminate them. According to this view, FX interventions can potentially help smooth out non-fundamental shocks, but are largely unnecessary and can be difficult to implement when reserves are too small or too large.²

3 Exchange Rate Disconnect and Mussa Puzzle

It is important to keep in mind that the essay by Friedman was written at the heyday of Bretton Woods, long before exchange rates of advanced economies were allowed to float freely in 1973 (**Figure 1a**). The subsequent experience showed that under a floating regime, exchange rates are an order of magnitude more volatile and largely orthogonal to other macroeconomic variables — a phenomenon that has been referred to as the “exchange rate disconnect” (Meese and Rogoff, 1983). This empirical fact strongly suggests that exchange rates are driven to a large extent by non-fundamental financial shocks rather than only by standard productivity, fiscal, and monetary shocks (Itskhoki and Mukhin, 2021). Furthermore, these fluctuations are remarkably persistent, with most exchange rates well approximated by a random walk. These observations substantially undermine the original Friedman view by showing that arbitrageurs are unable or unwilling to fully offset currency demand shocks and that the resulting deviations of exchange rates from fundamental values are large and persistent.

The sharp increase in the volatility of the real exchange rate after the end of the Bretton Woods system, evident in **Figure 1b**, further challenges standard theories (Mussa, 1986). This fact is widely considered among the most convincing pieces of evidence that monetary shocks affect real outcomes and is especially appealing thanks to its simple and clear identification: a large and discontinuous change in the nominal exchange rate process makes it hard to attribute the increased volatility of the real exchange rate to other factors (Nakamura and Steinsson, 2018). What is often missing from this narrative, however, is that there was no simultaneous change in the properties of other macro variables — neither nominal variables

² The subsequent theoretical literature went even further, arguing that FX interventions are unlikely to have any real effects because private agents can always offset the positions of the central bank (Wallace, 1981).

such as inflation, nor real variables such as consumption and output (**Figure 2**). One could interpret this as an extreme form of neutrality, where a major shift in the monetary regime, which increases the volatility of the nominal exchange rate by an order of magnitude, does not affect the equilibrium properties of any macro variables, apart from the real exchange rate.³

Figure 1a: Nominal Exchange Rate

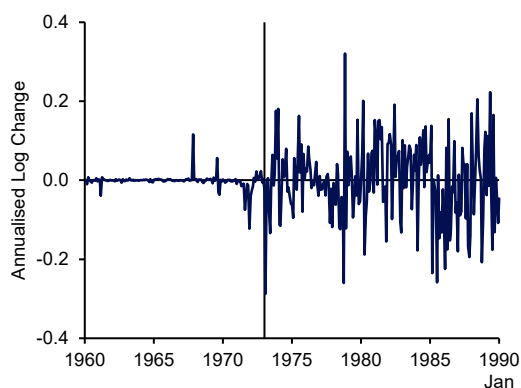
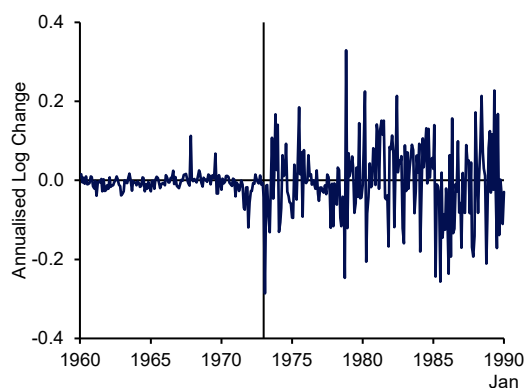


Figure 1b: Real Exchange Rate



Source: Itskhoki and Mukhin, 2025

Note: Monthly log changes, US vs the rest of the world (defined as G7 countries except Canada plus Spain), with the vertical line identifying the end of the Bretton Woods system of fixed exchange rates.

Figure 2a: Inflation Rate, π_t

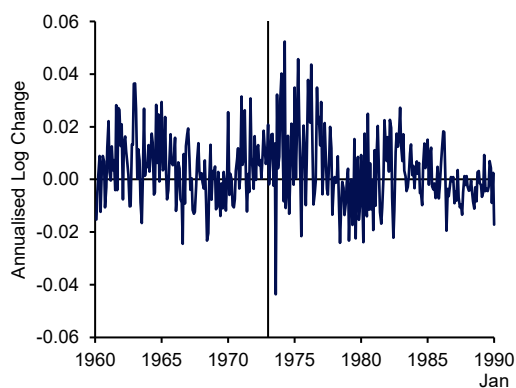
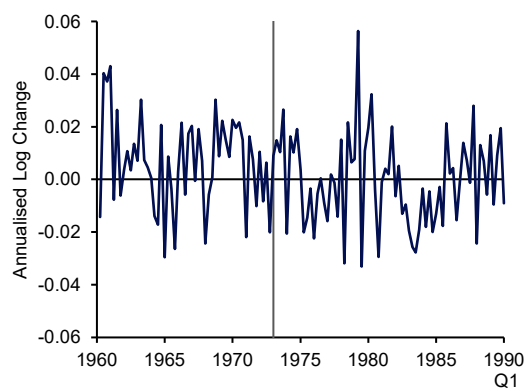


Figure 2b: Consumption Growth, Δc_t



Source: Itskhoki and Mukhin, 2025

Note: Monthly inflation and quarterly consumption growth rates for G7 countries except Canada plus Spain.

This evidence shows that a credible commitment by monetary authorities to a nominal peg can eliminate most real exchange rate volatility without much intervention on the equilibrium path. Though this result might sound surprising, it is very much in line with the predictions of a new generation of models with frictional currency markets (Itskhoki and Mukhin, 2025). Under a float, uncertainty about future exchange rates makes currency positions risky, so arbitrageurs require sizable risk premia to absorb currency demand shocks. When private currency supply is inelastic, these shocks translate into large

³ Neither FX interventions nor capital controls can explain these facts, as both were lifted gradually, while the properties of the exchange rate changed almost overnight.

movements in the nominal and real exchange rates. A credible peg changes this equilibrium by reducing the risk associated with currency positions. Traders are then willing to absorb larger imbalances at smaller premia, making the effective currency supply curve more elastic and sharply reducing the passthrough of financial shocks into exchange rates.

The same mechanism also helps reconcile the absence of a comparable break in other macroeconomic variables. While financial shocks are central for exchange rates, their effects on aggregate inflation, consumption, and output are much more limited. With home bias, limited openness, and incomplete passthrough, real exchange rate movements are transmitted only imperfectly to aggregate demand and production. Standard macro variables therefore remain primarily driven by productivity, monetary, and other fundamental shocks, whose properties do not change discontinuously with the exchange rate regime. Moreover, because a credible peg endogenously mutes the financial shocks hitting the currency market, stabilising the exchange rate does not require large changes in real rates and therefore, in inflation or real activity.

4 New Paradigm: Role of FX Interventions and Peg

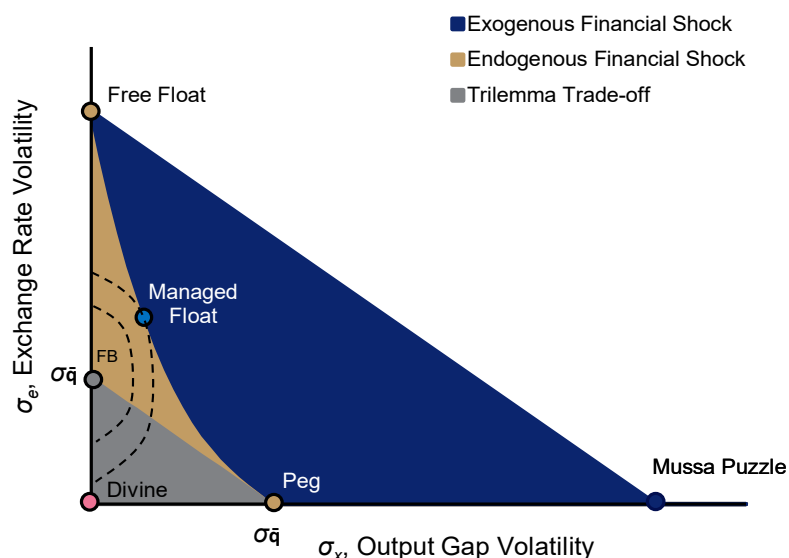
This shift in the paradigm for how currency markets operate and what shocks drive exchange rates has profound policy implications. Instead of focusing on sticky prices as the only friction that central banks should address, a new generation of theories emphasises financial frictions in currency markets. Both risk aversion and capital constraints create limits to arbitrage and preclude speculators from fully offsetting currency demand shocks. As a result, exchange rate movements often reflect the demand of noise traders or constrained investors rather than fundamental productivity shocks. This in turn distorts relative prices across economies and results in suboptimal trade flows and risk sharing.

However, limits to arbitrage not only distort the allocation, but also make FX interventions more effective, giving the government an additional instrument to manage the economy. As a result, with two unconstrained instruments at its disposal, the central bank can restore the efficient allocation. Each policy instrument accommodates a different inefficiency in the economy – with monetary policy targeting inflation and closing the output gap, and FX interventions targeting UIP deviations and eliminating inefficient capital flows. The policymaker uses the FX instrument to shift currency risk away from intermediary balance sheets, thus eliminating the intermediation wedge. Importantly, exchange rate stabilisation is not a direct goal of welfare-maximising policy. The optimal policy offsets liquidity demand shocks for currency but fully accommodates fundamental macroeconomic shocks to ensure efficient expenditure switching. The resulting nominal exchange rate tracks the frictionless “natural” real exchange rate, similarly to how the optimal nominal interest rate tracks the natural real rate, and both output and employment converge to their natural levels.

Figure 3 provides an illustration of the policy trade-off and the optimal policy choice, comparing a framework from Itskhoki and Mukhin (2023) with endogenous UIP deviations to two alternative classes of models, namely classical trilemma models without UIP deviations and alternative models with exogenous financial shocks resulting in exogenous UIP deviations (Basu, Boz, Gopinath, Roch, and Unsal, 2020; Fanelli and Straub, 2021). Specifically, the figure plots the policy trade-off in the space of output gap and nominal exchange rate volatility. The first best (FB) corresponds to a fully eliminated output gap and a nominal exchange rate that, under sticky prices, must accommodate the volatility of the natural real exchange rate to ensure efficient expenditure switching. In trilemma models without UIP deviations, a freely floating exchange rate under inward-looking monetary policy and no FX

intervention achieves exactly this allocation, as suggested by Milton Friedman. More generally, when UIP deviations arise in equilibrium, a laissez-faire float results in excessive exchange rate volatility, reflecting both macro-fundamental and non-fundamental financial volatility, consistent with exchange rate disconnect. In such models, both free floats and full pegs are generally suboptimal, and the optimal policy requires an additional use of FX interventions to offset financial volatility.

Figure 3: Exchange Rate Policy Trade-offs



Note: The figure plots the frontiers of output gap and exchange rate volatility, namely menus of (σ_x, σ_e) that can be chosen by monetary policy, in three types of models: (a) classic trilemma models where UIP holds, (b) models with endogenous UIP deviations driven by exchange rate risk, and (c) models with exogenous UIP (or CIP) shocks. FB corresponds to the first best (or a "Friedman float") with $\sigma_x = 0$ and $\sigma_e = \sigma_{\bar{q}}$, the volatility of the first-best real exchange rate. The line connecting FB and peg corresponds to the classic trilemma constraint when UIP holds. Free float in models with UIP shocks features σ_e that combines macro-fundamental (grey) and financial (yellow and blue) exchange rate volatility, and the first best is only feasible when FXI offset financial shocks. Dashed indifference curves are for the welfare loss function, and managed float is the optimal monetary policy rule in the absence of FXI.

Implementing the optimal allocation in goods and asset markets generally requires unconstrained use of both monetary and FX instruments. In practice, FX interventions are often constrained. A central bank cannot sell foreign currency to support the exchange rate if it runs out of foreign reserves. It may also be unwilling to expand its balance sheet above some threshold because of value-at-risk constraints, accounting losses, or the political repercussions of losing money on its asset positions. However, there exists an important special case in which addressing both frictions can be achieved with a nominal exchange rate peg by means of monetary policy alone. This open-economy "divine coincidence" arises if the natural real exchange rate that ensures the efficient allocation in the goods market is stable, resulting in no trade-off from the point of view of the asset market. In this case, a fixed nominal exchange rate is consistent with efficient expenditure switching in the goods market and also eliminates risk in the international financial market, allowing for frictionless intermediation. In **Figure 3**, divine coincidence corresponds to the situation when the entire blue area collapses to the origin, making the peg and FB coincide.

More generally, monetary policy alone cannot implement the optimal allocation. Instead, optimal policy trades off the output gap and exchange rate stabilisation to reduce UIP violations, putting more weight on the latter objective in periods with large capital (out)flows.

Managed float in **Figure 3**, or a crawling peg, emerges as the second-best policy, consistent with the “fear of floating” documented for many developing countries. This policy is complemented with both forward guidance and macroprudential accumulation of FX reserves to relax future and past constraints on FX interventions: because of the forward-looking nature of capital flows, future interventions and commitment to future exchange rate stabilisation mitigate current distortions.

5 Policies in Real World

In practice, the optimal policy is specific to each economy and depends on characteristics such as openness, the shallowness of currency markets, and the combination of fundamental and financial shocks. Consider first countries that are relatively well insulated from international shocks due to low openness of the economy and muted transmission of exchange rates into prices and quantities – large currency areas such as the US and the Eurozone considered as a whole. Because of the limited welfare consequences of suboptimal capital flows for these economies, the optimal monetary policy is largely inward-looking and focuses on price stability and full employment. At the same time, the large volumes of trade in currency markets imply that enormous FX interventions would be required to stabilise the exchange rate, making it not worthwhile to use this additional policy instrument given the small welfare gains.

A similar argument applies to countries that are open and more exposed to the risk-sharing wedge, but have deep financial markets that can absorb currency demand shocks without substantial movements in exchange rates or the UIP premium. With high currency supply elasticity, countries such as the UK, Canada, and Australia might find it suboptimal to use FX interventions and focus instead on domestic objectives. This contrasts with the individual members of the Eurozone, which are both very open and have, on average, more shallow financial markets. At the same time, the fundamental shocks hitting these countries are highly correlated and, as a result, the open-economy divine coincidence provides a good approximation. Having a currency union then comes at a low cost in terms of distorting the real exchange rate relative to the natural level, while at the same time eliminating the distortionary effects of currency demand shocks.⁴ The latter result complements the classical insight of Mundell (1961) and explains the benefits of having a currency union.

A high exposure to capital flow shocks and shallow financial markets also characterises several economies in Latin America (e.g. Brazil, Chile, Columbia and Peru). Differently from their European counterparts, however, these economies are also primarily commodity exporters and therefore are subject to a volatile natural real exchange rate. As a result, a nominal peg would come at a high cost in terms of domestic macroeconomic stabilisation. Instead, the optimal policy mix includes a floating exchange rate and FX interventions offsetting currency demand shocks.⁵ Most of these countries indeed actively intervene in currency markets or accumulate large FX reserves, while at the same time using interest rates primarily to target inflation and economic activity. That said, monetary authorities do occasionally deviate from strict inflation targeting and hike interest rates during periods of large capital outflows, especially if FX reserves run low.

⁴ In practice, default risk leads to spreads across bonds issued by different members of the Eurozone. The ECB open market operations aim to mitigate these spreads and largely resemble FX interventions.

⁵ The same argument applies to other large commodity exporters in the world, including Norway and Russia.

Finally, Switzerland and many East Asian countries routinely use both FX interventions and conventional monetary policy to stabilise their exchange rates. Similarly to the previous two categories, these countries actively participate in international trade and are exposed to international capital flows. What distinguishes them from Latin American commodity exporters is a relatively low share of commodities in exports and large capital flow shocks relative to the size of the economy. This is particularly true for Switzerland, with its status as a safe haven that attracts large foreign investment in periods of high global stress, but also applies to Singapore, Hong Kong, and other countries. The local central banks accumulate enormous foreign reserves, but also use interest rates, liquidity management, or exchange-rate-centred monetary frameworks to avoid excessive currency appreciation (Switzerland) or exchange rate volatility (Singapore).

6 Role of Fiscal Policy

In practice, exchange rate management is rarely implemented through pure FX interventions that simply swap domestic currency for foreign currency. Even when these operations are conducted by the central bank, they are often part of a broader government policy with an important fiscal component, including budget rules, public saving, and contributions to sovereign wealth funds. This is particularly clear in commodity-exporting economies, where movements in export revenues are often the main source of volatility. More generally, open economies are exposed not only to financial shocks in currency markets, but also to shocks to foreign spending, terms of trade, and national income. These shocks naturally call for a joint monetary, fiscal, and external-asset-management response (Lian, Mukhin, and Wolf, 2026).

Consider first the effect of a foreign demand boom on the home economy when local monetary and fiscal policies are passive and do not “lean against the wind”. Higher spending abroad raises demand for domestic goods. Domestic firms expand production, revenues increase, and this translates into higher household income. To the extent that this extra income is spent on domestic goods, the initial external shock is amplified by domestic demand and generates higher output, consumption, and inflation. This propagation mechanism is especially strong when households have a high marginal propensity to consume out of current income. In that case, a foreign boom is imported not only through the direct export channel, but also through the induced rise in domestic spending.

A central bank that keeps the path of interest rates unchanged in response to a foreign boom effectively lets the propagation mechanism of the economy determine how much of the shock is imported. When the domestic spending channel is strong, such a neutral stance can be too passive: the foreign boom becomes a domestic demand boom, creating overheating and inflationary pressure. Aggressive monetary tightening might be needed to dampen aggregate demand and force adjustment through appreciation of the home currency. Similarly, fiscal policy can be used to cool down the economy. Taxes, transfers, and public saving determine how much of a temporary rise in national income is passed through to current domestic demand. By saving part of an export windfall abroad, the government can reduce pressure on domestic production and prices.

Perhaps the most surprising result concerns the use of a combination of fiscal policy and FX interventions. In particular, imagine that in response to extra export revenues the government increases fiscal surpluses, while the central bank conducts sterilised interventions by purchasing foreign currency and selling domestic currency. On net, these two policies increase the amount of foreign assets on the consolidated balance sheet of the

public sector and closely resemble contributions to a sovereign wealth fund. Interestingly, such a policy does not affect the present value of the domestic economic boom. On the one hand, fiscal surpluses suppress aggregate demand by taking away part of household income that would otherwise be spent on local goods. On the other hand, FX interventions do not allow the currency to appreciate, blocking the exchange rate adjustment to extra export revenues. As a result, the sovereign wealth fund does not per se change the decomposition of the export shock into aggregate demand and exchange rate channels, but rather delays the adjustment, leaving more room for nominal prices and real rates to adjust.

This distinction is important for policy. A sovereign wealth fund can be very useful for smoothing public spending, sharing resource revenues across generations, and reducing short-run pressure on the domestic economy. But it should not be viewed as a substitute for the macroeconomic adjustment itself. Unless higher export revenues are permanently saved abroad, the economy must eventually absorb the additional national income through higher domestic spending or changes in relative prices. The central policy choice is therefore not whether adjustment occurs, but when it occurs and through which margins. Monetary policy, fiscal policy, FX intervention, and sovereign wealth accumulation jointly determine that path.

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