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Reserve Adequacy in Georgia: How Much is Enough?

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Reserve Adequacy in Georgia: How Much is Enough?

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ABSTRACT: This paper extends the Jeanne-Rancière (2011) framework to assess Georgia's optimal level of international reserves by incorporating three additional channels particularly relevant to its economy: (i) sovereign risk and borrowing costs; (ii) private-sector dollarization; and (iii) foreign exchange volatility associated with market shallowness, building on Chen and others (2023). This integrated framework provides a more comprehensive measure of reserve adequacy than the baseline approach for partially dollarized emerging markets. Under these extensions, Georgia's optimal reserve coverage is estimated at around 145-150 percent of the IMF's ARA metric, compared to about 130 percent under the baseline framework. With current reserves at roughly 105 percent of ARA, the results point to scope for additional reserve accumulation to further strengthen resilience against external shocks and reach optimal levels.

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SELECTED ISSUES PAPERS

Reserve Adequacy in Georgia: How Much is Enough?

Georgia

Prepared by Mehmet Cangul and Will Abel[1]

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INTERNATIONAL MONETARY FUND

GEORGIA

SELECTED ISSUES

May 19, 2026

Approved By
Middle East and Central Asia Department

Prepared By Mehmet Cangul (SPR) and Will Abel (MCD)

CONTENTS

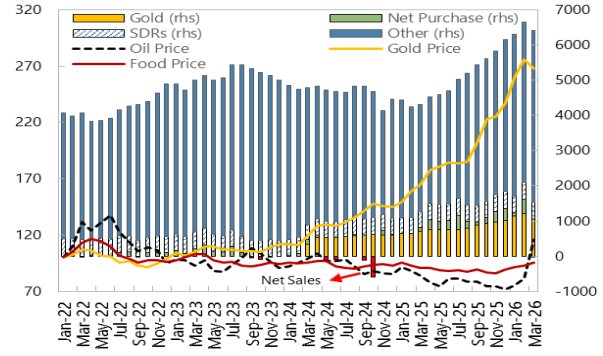
RESERVE ADEQUACY IN GEORGIA: HOW MUCH IS ENOUGH?[1]

This paper assesses the optimal level of international reserves ("reserves") for Georgia in a context of elevated external uncertainty. While reserve coverage has recently reached conventional adequacy thresholds, these benchmarks may not fully capture country-specific vulnerabilities and policy needs. Building on a standard cost-benefit framework for reserves, the analysis incorporates three additional channels: sovereign borrowing costs, private-sector dollarization, and the need for foreign exchange intervention (FXI) to smooth excessive exchange rate volatility associated with shallow FX markets. The results imply that reserves provide broader insurance and credibility benefits than suggested by standard metrics. Accordingly, the optimal level of reserves is estimated at around 145–150 percent of the ARA metric, exceeding standard adequacy benchmarks. These findings point to scope for additional opportunistic reserve accumulation to further strengthen resilience and reach optimal levels.

A. Introduction

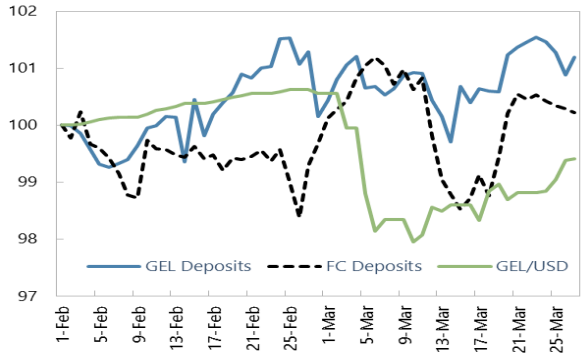
1. Reserves in Georgia have increased markedly in 2025, bringing coverage to conventional adequacy levels. After remaining below the IMF's Assessing Reserve Adequacy (ARA) threshold for several years and coming under pressure during the October 2024 parliamentary elections, Georgia's reserves recovered to 100 percent of ARA by end-2025, supported by strong services exports, higher gold prices, and de-dollarization (Figure 1). Continued reserve accumulation by the central bank strengthened market confidence, facilitating a successful Eurobond refinancing in early 2026. Despite recent increases in energy prices linked to the war in the Middle East and potential pressures on the current account, the exchange rate has remained broadly stable, indicating improved confidence in the lari, partly reflecting stronger reserve buffers (Figure 2).

Text Figure 1. Gross International Reserves, FXI, and Commodity Prices
(LHS: Index, Jan 2022=100; RHS: Millions, USD)



Sources: World Economic Outlook, Haver Analytics, and the National Bank of Georgia.

Text Figure 2. Deposits and Exchange Rate
(Index, Feb 1st, 2026=100)



Sources: Georgian authorities, Haver Analytics, and IMF staff calculations.

[1] Prepared by Mehmet Cangul (SPR) and Will Abel (MCD).

2. Reserves in Georgia could increase to 145–150 percent of the ARA metric to reach optimal levels. The accumulation of reserves by EMs can be viewed as a form of self-insurance against a range of external shocks, including capital outflow volatility, terms-of-trade shocks, and shifts in global financial conditions. Jeanne and Rancière (2011) propose a cost-benefit framework for reserve accumulation (the "baseline" framework), in which the opportunity cost of holding reserves in normal times is weighed against the benefit of using them to smooth consumption during crises that occur with a given probability. Building on this framework, the analysis assesses Georgia's optimal level of reserves by incorporating three key channels relevant to its economy: (i) sovereign risk; (ii) private-sector dollarization; and (iii) FXI-related liquidity needs (Chen and others, 2023).

B. Analytical Framework: Baseline and Extensions

3. In the baseline framework, optimal reserve holdings reflect a trade-off between the insurance benefits of reserves in a crisis and their opportunity cost in normal times. The model considers a small open economy facing a stochastic risk of a sudden stop in capital inflows. In such episodes, external financing dries up, requiring an abrupt adjustment in consumption unless sufficient reserves are available to smooth the shock and limit the long-term economic costs. A benevolent social planner chooses reserves to maximize expected utility under constant relative risk aversion (CRRA). Reserves provide insurance by smoothing consumption in crisis states but entail an opportunity cost in normal times, captured by the spread between the return on safe reserve assets and the cost of external borrowing. The simplified formula from the original paper is used to calibrate the main parameters of the model to Georgia:

$$\rho = \lambda + \gamma - (1 - \mathrm{p}^{-1/\sigma})$$

where p is the reserves to output ratio; λ is the level of private external debt as a share of GDP; γ is the output loss ratio from the sudden stop (assumed if the reserves are not used to smooth the consumption); and σ is the risk aversion parameter.[2] The baseline framework yields an optimal level of around 130 percent of ARA for Georgia, assuming a 10 percent probability of a sudden stop. This framework abstracts from differences in the liquidity of reserve assets, which may affect their effective use in practice.

Extension 1: Reserves and Sovereign Risk Premia

4. Higher reserves can reduce sovereign borrowing costs by improving market perceptions of liquidity and rollover risk. By strengthening confidence in the country's ability to meet external obligations during periods of stress, reserves increase the attractiveness of the

[2] In reserves to output ratio p =1 + $[\delta/(\pi\ (1-\delta-\pi)]$, δ represents the term premium between the interest rate of the long-term debt the government issues to finance reserves and the interest rate paid on the short-term external debt; and π is the probability of a sudden stop.

sovereign debt and reduce issuance costs. Thus, the opportunity cost of reserves may decline with higher reserves. In the baseline model, this cost is treated as exogenous and constant, but for small open economies with limited market access, this assumption may be overly restrictive. As a result, the opportunity cost of reserve accumulation becomes state-dependent. This channel is particularly relevant for economies such as Georgia, where access to external financing is sensitive to global risk conditions and domestic liquidity buffers.

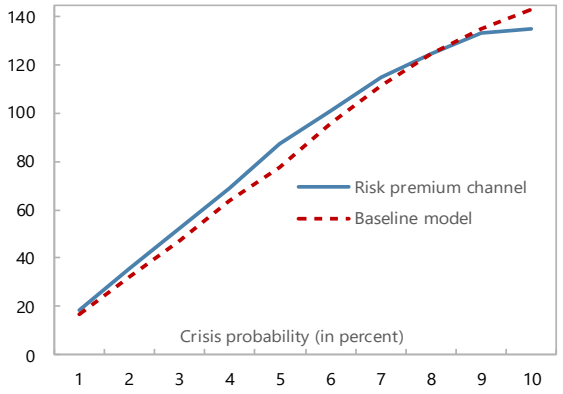
5. The negative relationship between reserve levels and sovereign spreads is well supported in the literature. Estimates suggest that a 10-percentage point increase in the reserves-to-GDP ratio can lower EM borrowing costs by around 30-70 basis points. Early contributions (e.g., Edwards, 1984; Eaton and Gersovitz, 1981) emphasize the role of liquid external assets in mitigating default risk. More recent work (Aizenman, Hutchison and Jinjarak ,2011; Bastourre, Carrera and Ibarlucia, 2012; and Alfaro and Kanzcuk ,2009) finds that higher reserves are associated with lower borrowing costs, particularly during periods of global financials stress. These effects are non-linear: reserve accumulation yields large reductions in spreads at low reserve levels, while marginal benefits diminish once reserves exceed standard adequacy thresholds.

6. Motivated by these findings, we extend the baseline framework by allowing the opportunity cost of reserves to depend on reserve holdings. The effective opportunity cost of reserves declines with reserve accumulation, albeit at a diminishing rate, altering the trade-off between the insurance benefits and the opportunity cost of reserves. This mechanism is captured by the effective marginal cost of reserves:

$$\delta(R) + R \cdot \delta'(R)$$

where the first term reflects the direct cost of holding reserves, while the second term captures the reduction in borrowing costs induced by higher reserves.[3] For Georgia, incorporating this channel raises optimal reserves by about 5 percent of ARA at lower crisis probabilities, although the effect diminishes and can reverse as reserve levels increase since borrowing-cost benefits exhibit diminishing returns. At a 10 percent crisis probability, the net effect is about 8 percent of ARA lower than the baseline framework (Figure 3).

Text Figure 3. Baseline and Risk Premium Extension (In percent of ARA)



Sources: National authorities and IMF staff estimates.

Extension 2: Reserves and Dollarization

7. In highly dollarized economies, private agents hold foreign currency as a form of self-insurance against macroeconomic and financial risks. While individually optimal, this behavior

[3] See Annex 1 for technical details.

generates aggregate distortions, including currency mismatches, weaker monetary policy transmission, and heightened vulnerability to exchange rate depreciation. In such settings, public international reserves and private FX holdings can act as partial substitutes. Stronger reserve buffers reduce incentives for precautionary dollarization by private agents, by enhancing the credibility of the central bank's capacity to supply FX liquidity during stress episodes. Conversely, when reserves are perceived as insufficient, private agents increase foreign currency holdings, amplifying balance-sheet risks and the severity of crises. By ensuring the availability of FX liquidity in adverse states, reserves act as a collective insurance device that mitigates coordination failures and reduces the need for excessive private self-insurance.

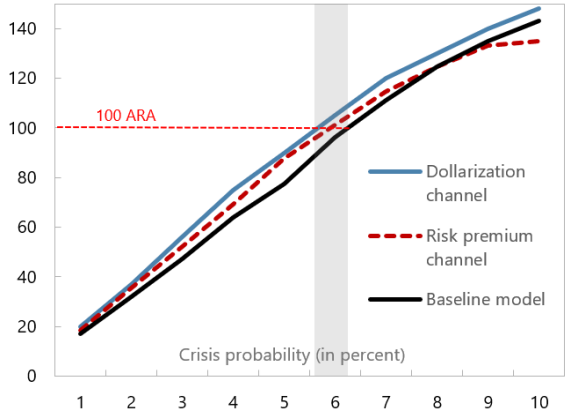
8. This mechanism is well supported by the literature on financial dollarization. Research identifies weak monetary credibility, exposure to exchange rate shocks, and underdeveloped local currency financial markets as key drivers of dollarization (Ize and Levy-Yeyati, 2003; De Nicolo, Honohan, and Ize 2005). In such environments, households and firms rationally choose FX assets and liabilities to hedge against inflation and depreciation risks, even though these choices may amplify systemic vulnerabilities. A growing body of work finds that stronger reserve buffers can partially substitute for private self-insurance by reducing the perceived probability and severity of balance-sheet crises (Obstfeld, Shambaugh, and Taylor, 2010; Bianchi, Hatchondo, and Martinez, 2018). Empirically, higher reserve adequacy is associated with lower financial dollarization and reduced exchange rate pass-through, particularly in emerging markets with improving policy credibility (Levy-Yeyati, 2006; Garcia-Escribano and Sosa, 2011; IMF, 2015, 2020).

9. We extend the baseline framework to incorporate the interaction between public reserves and private dollarization decisions, following Gonçalves (2020). In this setting, higher reserves reduce incentives for private agents to hold foreign currency, reducing balance-sheet mismatches, mitigating consumption losses in crisis states as well as decreasing the effective opportunity cost of reserves through lower private FX demand. This reflects the role of reserves in substituting for private self-insurance and reducing the severity of crises. We allow crisis losses to depend on reserves via dollarization:

$$\Delta C(R) = \Delta C(D(R))$$

where dollarization $D(R)$ declines with reserves. For Georgia, incorporating this mechanism raises optimal reserve holdings by about 18 percent of ARA at a 10 percent crisis probability.[4] The dollarization channel becomes dominant at relatively low reserve levels (below 100 percent of ARA), raising optimal reserves above both the baseline and the sovereign-risk extension (Figure 4).

Text Figure 4. Baseline and All Extensions
(In percent of ARA)



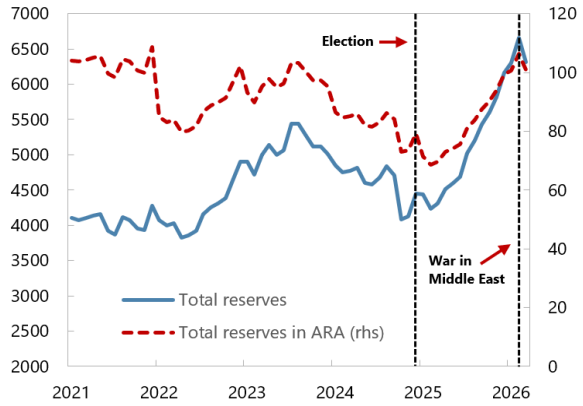
Sources: National authorities and IMF staff estimates.

[4] See Annex I for technical details.

Extension 3: Reserves and FXI

10. The last extension accounts for reserve needs associated with FXI aimed at smoothing excessive exchange rate volatility. An additional "working liquidity" may be required for this need above the level of reserves held purely for crisis insurance. To quantify this additional need, we use the model developed by Chen and others (2023) estimated on Georgian data for 2005-2024. The framework incorporates a quantitative integrated policy framework (QIPF), capturing the effect of relatively shallow FX markets, which implies that exchange rates may at times overshoot—even outside crisis episodes—due to shifts in market sentiment, providing a potential rationale for FXI.

Text Figure 5. History of Gross International Reserves
(LHS: million, USD; RHS: in percent of ARA)

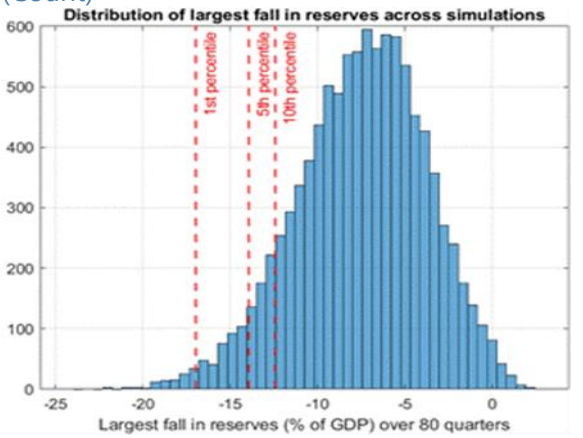


Sources: National Bank of Georgia.

11. FXI is occasionally used by the NBG to reduce excessive exchange rate volatility. This approach was assessed in the 2025 Article IV staff report through the lens of the IMF's integrated policy framework (IPF).[5] A recent episode ahead of the 2024 parliamentary elections illustrates this practice when FXI was deployed to reduce volatility in the lari. This resulted in a substantial drawdown of reserves – around USD 750 million or approximately 10 percent of the ARA metric (Figure 5).[6] While reserves have since been rebuilt to more comfortable levels, the episode highlights that FXI can put pressure on buffers and may warrant holding additional reserves beyond minimum precautionary levels.

12. Model simulations suggest that FXI may require additional reserves of up to 10 percent of the ARA metric as working liquidity to smooth exchange rate volatility. This estimate is obtained by simulating the estimated model 10,000 times over a 20-year period, with and without FXI, and comparing the resulting reserve drawdowns (Figure 6). A caveat is that these estimates partly reflect double counting, as the shocks driving FXI in the QIPF framework may overlap with stress scenarios

Text Figure 6. FXI Simulations
(Count)



Sources: National authorities and IMF staff estimates.

[5] Georgia 2025 Article IV Consultation-Press Release; and Staff Report", IMF Staff Country Reports 2025, 216 (2025), https://doi.org/10.5089/9798229017022.002.

[6] The ARA metric is calculated on an annual basis, so this is an approximation.

already captured in the broader model. As a result, the additional reserve need should be interpreted as an upper bound.

C. Conclusions and Policy Options

13. The level of optimal reserves for Georgia is materially higher than suggested by the baseline framework. The need for additional reserves reflects the benefits of higher reserves in reducing sovereign borrowing costs, lowering private-sector dollarization, and the demand for liquidity that may arise for FXI to smooth excessive exchange rate volatility. At a 10 percent crisis probability, the fully extended model implies an optimal reserve range of about 145-150 percent of ARA.[7] Georgia's current reserve position (102 percent of ARA) appears adequate under moderate stress scenarios and broadly in line with the sovereign-risk extension, but remains below the range suggested under higher-risk scenarios (Figure 3). At the same time, reserves composition matters for their effective use, as part of the recent increase reflects valuation effects—particularly higher gold prices—and some assets may be less liquid or more costly to deploy under stress.

14. These results suggest scope for further opportunistic reserve accumulation, particularly in a context of elevated global uncertainty. The current price-based framework governing NBG's FX purchases appears appropriate for calibrating the pace and scale of such accumulation, while allowing flexibility in response to external conditions. FXI can play a role in mitigating large swings arising from market shallowness, but should be used sparingly to allow the exchange rate to function effectively as a shock absorber.

[7] While the extended framework captures the main channels affecting reserve needs in Georgia, it abstracts from differences in the liquidity and composition of reserve assets and operational constraints that may affect the timely deployment of reserves in crisis episodes (e.g., Bussière et al., 2015; Bank for International Settlements, 2022).

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Annex I. Technical Details

Borrowing Cost Channel:

The return on reserve assets is assumed to equal the risk-free rate r^* and the sovereign borrowing rate in international markets is given by r(R).

The opportunity cost of reserves is then defined as:

$$\delta(R) \equiv\ r(R) - r*.$$

The sovereign borrowing rate is assumed to be a decreasing and a concave function of reserves. Higher reserve buffers improve liquidity, reduce rollover risk, and strengthen perceived repayment capacity, thereby lowering sovereign risk premium. These effects exhibit diminishing marginal returns as reserves increase. A convenient reduced form representation capturing these features is:

$$\delta(R) = \delta(0) - \phi ln(1+R/Y), \phi > 0$$

Where $\delta(0)$ denotes the baseline spread in the absence of reserves and ϕ governs the strength of the reserve-spread relationship.

The policy maker chooses reserves R to maximize expected utility:

$$(1-\pi)\ \text{u(Y- } \delta(R)R) \ +\ \pi u(Y - L + R),$$

Where π is the probability of a sudden stop, L is the output loss in crisis states, and preferences are CRRA with coefficient of relative risk aversion γ.

The optimality condition equates the marginal insurance benefit of reserves in crisis states to their marginal cost in normal times:

$$\pi u'(Y - L + R) = (1-\pi)u'(Y - \ \delta(R)R)[\ \delta(R) + R\delta'(R)].$$

Relative to the benchmark case with an exogenous opportunity cost, the marginal cost term now includes $R\delta'(R)$, which captures the borrowing cost savings generated by additional reserves.

Because the effective marginal cost $\delta(R)\ +\ R\delta'(R)$ is decreasing in R, reserve accumulation occurs along a flattening marginal cost schedule.
Consistent with the convexity, for $\delta(R)$, we choose a reduced-form specification from the sovereign spread literature:

$$\delta(R) = s0 - k\ log(1 + R/Y)$$

Where S0 represents the initial spread for Georgia and k the spread elasticity.

The first order condition is derived by equating the marginal benefit of reserves to their marginal cost:

Marginal cost is defined as: MC = ρ + S0 – k log (1+R/Y) – ($k(R/Y)/ 1 + (R/Y)$)

Marginal benefit is defined as MB = $(\pi/1-\pi)$ $(\Delta C/ R)$

This first order condition then becomes:
$(\pi/1-\pi)$ $(\Delta C/ R)$= ρ + S0 – k log (1+R/Y) -($k(R/Y)/ 1 + (R/Y)$)

This boils down to the following equation that does not have a closed form solution.
F(R) = $(\pi/1-\pi)$ $(\Delta C/ R)$ − [ρ + S0 – k log (1+R/Y) – ($k(R/Y)/ 1 + (R/Y)$))

However, fixing values for ΔC , S0, and P, at their initial baseline levels, and assuming a spread elasticity typical for an EM at 5.75[1] and normalizing GDP at 1, we iterate numerically for each crisis probability starting from 1.

Dollarization Channel:

Let D (R) ϵ [0,1] denote the degree of private dollarization declining with reserves:

D′(R) <0

Crisis consumption losses depend positively on dollarization:

$$\Delta C\ (D)\ with\ \Delta C'\ (D) > 0$$

Thus, the GDP-loss channel is reserve dependent:

$$\Delta C(R) = \Delta C(D(R))$$

The social planner maximizes expected welfare where the opportunity cost is further reduced from the higher reserves-lower dollarization channel:

$$W(R) = -\ 1(-\pi)\ (\rho + \delta)R\ -\ \pi\Delta C(D(R))$$

[1] This corresponds to a conservative mid-range calibration of a 50 basis point reduction per 10 pp of higher reserves, (Edwards 2004; IMF 2015; Bianchi et al. 2018): $\Delta s\ \approx k\ log\ (\ (1 + 0.20)\ /\ 1 + 0.10)\ )$

Taking the derivative of the welfare function with respect to reserves yields the first-order condition:

$$dW / DR = - 1(-\pi) (\rho + \delta) - \pi\Delta C'(D'(R)) = 0$$

Rewriting, the planner equates the marginal benefit of reserves to their effective cost:

$$\frac{\pi}{1-\pi} \frac{\Delta C\,(R)}{R} = \rho + \delta - \frac{\pi}{1-\pi} \Delta C'\,(D)D'(R)$$

The left-hand side is the expected marginal loss in a crisis; the right side includes both the baseline opportunity cost and the dollarization benefit. Now, we can incorporate the work above on reduced borrowing cost to rewrite the effective opportunity cost:

$$\frac{\pi}{1-\pi} \frac{\Delta C\,(R)}{R} = \rho + \delta\,(R) + R\delta'(R) - \frac{\pi}{1-\pi} \Delta C'\,(D)D'(R)$$

Now, the right-hand side includes net cost of holding reserves, reduced by dollarization benefits and the endogenous spread compression.

$D(R) = \overline{D} - \eta\ log\ (1 + R), \eta > 0$

$$\overline{D} = 0.6\ (baseline\ private\ dollarization)$$
$$\eta = 0.10\ (reserve\ responsiveness)$$

And for crisis loss amplification, we define:

$$\Delta C(D) = \overline{\Delta c}\ (1 + \lambda D)$$

And where:

$$\overline{\Delta c} = 10 percent of GDP (baseline GDP loss)$$
$$\lambda = 0.5\ (dollarization\ amplification\ parameter)$$

Thus, the dollarization term in the first order condition becomes:

$$\delta D(R) = \frac{\pi}{1-\pi}\ \lambda\overline{\Delta c}\ \frac{\eta}{1+R}$$

Finally, putting everything together, and substituting terms to our first order condition, we can re-calibrate for different probability levels with the same parameters as used in the lower borrowing cost extension but endogenizing the dollarization channel through lower GDP loss and also a lower opportunity cost.