Argentina: A sustainability assessment

What is needed to restore Argentina to sustainability? An emerging view suggests: (i) domestic law debt—largely held by residents, including the central bank (BCRA)—will carry most of the “sustainability” burden, including through a “haircut” of principal and coupons if necessary; while, related, (ii) foreign law debt—held largely by non-residents—might expect to be repurposed, but no substantial action in terms of coupon or principal haircut is needed.

To this end, the Financial Times recently carried a contribution suggesting that, while the authors had yet to complete their debt sustainability analysis, a repurposing of Argentina’s debt is a reasonable expectation. Cart and horse spring to mind. The argument involves Argentina’s debt falling within the International Monetary Fund’s (IMF) “grey area” for sustainability, whereby reprofiling is recommended per the Fund’s latest Exceptional Access Policy.

However, there is reason for caution—and substantial downside risks to Argentine assets still.

“Sustainability” is not a straightforward concept. Investors narrow during public debt sustainability analysis (DSA) on the narrow fiscal constraint alone, but restoring sustainability is in general more complicated. And in the particular case of Argentina, sustainability means three things.

First, yes, fiscal “sustainability.” But this ought not rely on financial repression if currency stability is to accompany fiscal sustainability.

Second, monetary stability, which means accumulating international reserve assets as a buffer against future external shocks while meeting the central bank’s inter-temporal budget constraint—that is, creating fiscal space for monetary policy through recapitalization of the central bank and “balance of payments” surpluses.

And, third, external sustainability, which means—as with the monetary analysis—allowing for the accumulation of reserve assets through the balance of payments while not driving down domestic absorption to cause depression. Meanwhile, net external interest payments-to-exports should not become unwieldy.

Sustainability thus involves analysis of the consolidated government—in this case Federal government and central bank—budget constraint. And it requires a careful cross-check on the balance of payments—with explicit concern for any external financing gap and the three problem.

And, pre-empting the analysis below, a genuine assessment of Argentina’s debt—a complete monetary-fiscal-external financial program—implies a more substantial contribution from non-resident, foreign law holders of debt than appears currently priced in. This potentially requires both a rescheduling of maturities and maybe 50% coupon and principal haircut. This would require overcoming attendant legal challenges, of course—but focus here is only on the macroeconomics of sustainability not the legal strategy.

All this ought to be factored into the IMF’s “program” beyond simple debt-to-GDP and gross financing needs (GFN) considerations. There is a danger that investors will be blindsided by the IMF’s analytical framework as it emerges.
following negotiations with the Argentine government. While the IMF’s analysis is itself often open to manipulation and flawed reasoning, unlike with Greece—where the Fund could force other official creditors to provide additional debt relief beyond of private sector involvement—this time they are almost exclusively on the hook if they get it wrong. In a country already deeply suspicious of the IMF, in Argentina today the Fund cannot afford to fall short.

1. Consolidated government sustainability: analytics

Standard public debt sustainability analysis (DSA) focuses upon sovereign debt in isolation. Monetary “sustainability” is overlooked since, presumably, central banks earn greater interest on assets than they pay on monetary and near-monetary liabilities—or generate sufficient “seigniorage” as an offset to make up any difference.

In earning positive net interest income, therefore, the central bank can typically be expected to provide transfers to the government. There is no need to call upon fiscal resources to shore up monetary stability; central bank “solvency” and capital can be ignored.

This is not the case for Argentina. Why? Argentina’s central bank (BCRA) has been paying roughly 2% of GDP in interest payments in the past few years on central bank bills and repos. Absent meaningful interest earning assets to fund monetary policy, BCRA has been effectively monetizing these interest payments, subsequently issuing larger amounts of central bank bills to mop up this liquidity in an attempt to prevent ARS depreciation.

The costs of monetary policy necessary for stability ought to be borne by the government. So any assessment needs to consolidate the government and central bank. In which case, the “true” fiscal balance in Argentina is the general government plus central bank balance including overall interest payments—considerably worse than the Federal fiscal balance alone.

Moreover, Argentina’s international reserves are far too low; gross reserves reached USD45 billion late-December (about 12% of GDP) and net foreign assets of BCRA USD28 billion (6% of GDP)—largely netting out the China swap line of USD20 billion and adding some sundry non-reserve foreign assets. The IMF’s reserve adequacy metric suggests Argentina needs at least USD70 billion in gross reserves today, an additional USD25 billion from here. If the Chinese swap line is ever “repaid” then this needs to be provided for also. Moreover, through time reserve adequacy needs will increase.

Were BCRA to increase net foreign assets over the period ahead consistent with a sensible target for reserve assets, the costs of carrying these assets would become even more prohibitive given current interest costs of monetary policy. Once more, action to restore monetary stability has to carry a fiscal cost.

A technical annex (Annex 2) formally consolidates the government and central bank balance sheets within an otherwise standard debt sustainability framework. This requires the primary surplus to finance both government debt (outside the central bank) and the cost of doing monetary policy.
Steady-state assumptions for analytical purposes run as follows:

- Real GDP growth of 2.5%, GDP deflator growth of 6%; nominal GDP grows at 8.7%;
- Nominal exchange rate depreciation of 4.5%; interest rate on BCRA net foreign assets 0.5%;
- Central bank bills begin the period at 5½% of GDP and are eliminated over the forecast horizon;
- Base money is 8½% of GDP—and remain constant in % of GDP;
- Net foreign assets of BCRA begin at 6½% of GDP, increasing to 14% of GDP over the forecast horizon;
- Initial government debt begins at 58.8% of GDP, of which 11% represent T-bills and 15% to the IMF and other official creditors. This means non-official or T-bill debt—that subject to possible “haircut”—is 33% of GDP.
- T-bills remain constant in % of GDP, debt to the IMF is repaid over the forecast horizon though other official debt remains;
- The interest rate paid on T-bills is assumed 20% and official debt at 3.5%;

What is the primary surplus needed to achieve “sustainability”? Figure 1A backs out the primary surplus as a function of the real interest rate on government debt and terminal debt-to-GDP ratio. For 0% real interest rate, the primary balance needed to reach 60% debt-to-GDP in 5 periods is about 2½%, increasing to roughly 5½% for real interest rate at 8%. Since Argentina “needs” a positive real interest rate to stabilize the economy, this implies a steady-state primary balance somewhere above 2½%. My working assumption is that Argentina will need to provide a positive real interest rate in the range 3-4% while debt-to-GDP should be on a downward path—meaning primary surplus over a 5-year horizon within 4½-6% of GDP.

Since the underlying primary balance in 2019 was in my view about -1%, this is a huge adjustment of at least 5½% of GDP—far beyond what can reasonably be expected of the authorities, particularly in light of the squeezed real incomes following recent ARS weakness.

Lengthening the adjustment horizon helps somewhat. An adjustment over 10 years would require the authorities to attain roughly 1½-3½% of GDP primary surplus. But such a lengthy period of adjustment, including an on-going IMF program, is unacceptable.

Alternatively, we can fix the primary surplus at some feasible level and ask what “haircut” on the first period principal and interest payment would be needed to attain the terminal debt-to-GDP ratios, per Figure 1B. We fix the primary surplus at 1½% of GDP, which requires a still considerable (estimated) primary balance adjustment of 2½% from 2019. For 3-4% real interest rate and terminal debt-to-GDP of 60% in 5 years, a “haircut” of about 33-38% is needed. For terminal debt of 55% this increases to a “haircut” in the range 48-52%.

Note that, a lower real interest rate and lengthening the adjustment horizon reduces the necessary haircut. At 3% real interest and terminal debt-to-GDP of 55% in 10 years, the haircut is lowered about one-third. But as the real interest rate
increases, the necessary “haircut” eventually exceeds that required under a shorter horizon.

An alternative way of characterizing the challenge of restoring sustainability to the consolidated government is by plotting the trade-off between the steady-state primary surplus and debt “haircut” for different terminal debt-to-GDP targets. This is done in Figure 1C. Unless a substantial steady-state primary surplus above 2% of GDP can be obtained, unlikely in my view, the haircut on principal and coupon needs to be at least 20% of GDP to reduce the debt burden from here.

Finally, as in Figure 1D, we can vary the real interest rate to achieve a debt-to-GDP of 55% in 5 years. Again, for a primary surplus of 1.5-2% of GDP, even with 0% real interest rates offered investors, a haircut of at least 30% is needed. For higher real interest rate—necessary for stability—a larger haircut follows.

2. A financial programming approach

This “pen-and-paper-and-simulate” approach is one way forward. Another is to build a complete stock-flow consistent model of Argentina’s economy—thus, a financial program. In this direction we proceed. Using broadly similar assumptions as above, let’s chip away at the marble to see what lies beneath.

i. Core macro assumptions

Figure 2A walks through some key macro assumptions. Notably, nominal exports grow at 6% per year, ARS depreciation moderates to 4.5% per year; the current account increases gradually to surplus, the primary fiscal balance adjusts at a contained pace to support domestic demand near-term and reach 2% of GDP only in 2025. Notably, limited fiscal adjustment is factored in for 2020-21.

Net international reserves increase rapidly at first, later more measured, to reach above 12½% of GDP by 2030. Base money is restored to 10% of GDP after the recent devaluation-driven dip.

ii. Existing debt redemption profile

The redemption of existing debt and coupons is shown in Figures 3A-3E, which uses the Ministry of Finance data for the debt stock from end-September. This is certainly wrong, but ballpark.

Total debt sums to c.USD310 billion, of which about USD164 billion (53%) is owed to non-residents. Debt to BCRA is about USD58 billion; no interest is expected to be paid upon this debt according to the latest information. This means the interest and coupons paid on debt to residents is a much smaller share of the total (29%). However, as noted, this artificially imposes a quasi-fiscal burden on BCRA.

Moreover, since residents largely hold outstanding T-bills, their “interest” earned through this channel, when rolled over severally during the year, will be higher in projections.
This leaves us somewhat short of the total outstanding reported debt stock of USD325 billion, so we make an arbitrary adjustment to the stock, while also assuming amortizations due late-2019 are rolled into 2020.

The total debt, including BCRA, therefore touched about 71% of GDP when measured in USD or 87% of GDP measured in ARS. The difference owes to the fact that most of the debt is measured in USD, and there is a delayed impact on the denominator of from the depreciation (GDP is a flow measured at year-average exchange rate).

More than 80% of existing debt is falling due by 2030; or greater than 50% within the next 5 years.

iii. New debt assumptions

Figure 4A illustrates the assumptions on new debt financing and interest rates. The interest rate on new debt (both nominal and real) starts elevated to stabilize the currency before drifting down to a real rate of about 4%. In particular, T-bills and BCRA bills begin at 40%, being reduced below new DX debt issuance by the end of the decade.

We assume the IMF provides the remaining funds available under the program over the next 2 years. Figure 4B. Peak IMF exposure touches USD57 billion in 2022 and 2023, with the program extended such that the final repurchases only in 2027. This pushes back the peak related external financing due to the IMF program from 2022-24 (USD40 billion) to 2024-26 (USD46 billion.)

iv. Baseline fiscal-monetary-BOP sustainability

Figures 5A-C provide a baseline for our financial program. Figure 5A shows different debt measures relative to USD and ARS measured GDP, so illustrate the impact of secular exchange rate depreciation. The consolidated debt measure nets out debt to BCRA but adds BCRA non-monetary liabilities (LELIQs.)

Debt-to-GDP drifts up to near 80% of GDP. The consolidated government fiscal balance increases to about 7% of GDP deficit, including due to BCRA net interest of near-2% of GDP, before moderating below 4% of GDP by 2025 as the interest rate moderates.

The external financing gap is nearly USD70 billion cumulative by 2026, after which the external sector is “over-financed” driving cumulative financing gap down to about USD45 billion by 2030. Were this financing gap to be filled by reserve asset sales, more than 100% of gross reserves would be drawn upon by 2026 after which, the balance of payments becomes “over-financed,” some reserve asset accumulation could continue. But still, reserve assets would be about 50% lower by 2030 than otherwise, meaning metrics for BCRA stability would be impaired—and risk of instability heightened. This sits counter to the objective of restoring monetary stability.
The external financing gap is so large because of the need to accumulate gross international reserves (USD40 billion by 2030) and repay the outstanding loans to the IMF (USD44 billion by 2026). Against this, steady growth of exports (6% per year) provides for a modest but growing current and capital account surplus; meanwhile small net private capital inflows provide combine to provide a source of private sector foreign exchange of USD6 billion in 2020, increasing to USD16 billion by 2030.

v. BCRA recap

Upon recap, Figures 6A-C updates for fiscal support for BCRA. No doubt this can be done a number of different ways—each should have the same broad fiscal impact. The approach we take here involves two actions. First, write off the existing BCRA claims on the government, which apparently have zero coupon/interest in any case. Second, provide a 12% of (2019) GDP ARS bond which provides a 7.5% coupon in perpetuity. This is needed to provide the cash flow for BCRA to avoid growing monetary and near-monetary liabilities relative to net foreign assets.

This increases public sector debt-to-GDP, but improves monetary stability by raising the “profitability” of monetary policy—reducing the need for growing central bank liabilities. This is the fiscal cost of monetary sustainability.

To be precise, under the baseline BCRA would make cumulative net interest income losses of ARS5,600 billion through 2030. However, following the recap operations cumulative losses fall to ARS78 billion, with BCRA returning a small profit on interest income by the mid-2020s. The cost of monetary policy in the baseline is implied in Figure 5A by the difference between the overall balance consolidated with BCRA and the Federal government overall balance. This gap is eliminated in Figure 6A.

(Note, we do not factor in the cost of printing ARS notes or administrative costs here, which has been running at just below 0.1% of GDP. By the late-2020s, BCRA is making positive 0.2% of GDP interest income which will cover this expense.)

The ratio of BCRA net foreign assets to domestic liabilities falls much more sharply upon recap, while the ratio of BCRA bills to base money is also markedly lower (Figure 5B versus Figure 6B.) This reflects the fact that the cost of monetary policy has been shifted to the Federal government.

The gross financing need (GFN) falls following the recap, to level off around 25% of GDP (from about 30% in the baseline.) See Figures 5A and 6A. This is somewhat artificial; the assumed perpetual nature of the BCRA recap bond helps lower the gross financing needs of the government. It might be more realistic to assume these bonds are marketable and with a clear maturity date, allowing them to be used in liquidity operations. If so, GFN would be about 10% of GDP higher throughout, closer to the 35% recommended upper bound.

vi. 4Y maturity reprofiling alone
Figures 7A-B contemplate the impact of debt reprofiling on key sustainability metrics. We drop the monetary charts as they just repeat Figure 6B hereon in. Reprofiling is considered for both residents and non-residents on equal terms.

Debt-to-GDP is reduced about 10 percentage points in the steady state while GFN is reduced to about 10% of GDP in 2020 before being restored closer to 20% of GDP in the late-2020s. The cumulative external financing gap falls somewhat (Figure 7B), to peak at about USD45 billion or close to 80% of projected gross international reserves. While there is “over-financing” in early years from the reprofiling, allowing for more reserve asset accumulation near-term, the peak external financing challenge re-emerges in 2024 at the same time of maximum IMF’s repurchases.

Given that the debt stock remains elevated, the risks to monetary-fiscal-financial stability will be too great to contemplate. More action to reduce the debt stock and external financing gap is necessary.

vii. Reprofiling plus coupon haircut

Turning to Figures 8A-C, we now administer a coupon haircut of 50% alongside the 4Y reprofiling contemplated above. Figure 8A shows a 4Y reprofiling and 50% coupon haircut on resident-held debt only. Figure 8B does the same for both residents and non-residents.

While the domestic coupon haircut contributes marginally to improved stock and flow fiscal metrics, this does nothing to fill the external financing gap. Figure 8C therefore reports the external financing gap for the combined resident and non-resident 50% coupon haircut. In this case, debt-to-GDP remains above 60% throughout the 10Y forecast horizon, though is on a declining path by 2025. The cumulative external financing gap remains high, however, at USD40 billion, or nearly 60% of net international reserves. So while we are slowly moving towards an improved debt-to-GDP profile, it remains too high and external financing pressures look likely to re-emerge.

viii. Reprofiling plus coupon and principal haircut

This leads us to contemplate the impact of principal haircut of 50% on top of the 4Y reprofiling and coupon haircut. Figures 9A-C. Figure 9A contemplates the 4Y reprofiling for all creditors, but haircut only on resident coupon and principal. we contemplate the impact of both a coupon and principal haircut of 50%. This helps bring consolidated government debt-to-GDP below 60%, before it increases to stabilize around 60% of GDP. The fiscal balance increases to 4% in 2021 but improves to about 2% of GDP by 2030 on improved primary balance. Again, this doesn’t fix the external financing gap problem.

A combined resident and non-resident coupon and principal haircut helps further with debt (Figure 9B) and external financing (Figure 9C.) Consolidated government debt-to-GDP falls below 50%, increases to about 55% in 2024, but is returned to a downward path to return below 50% by 2030. GFN remain below 20% of GDP
throughout—so allowing for an alternative treatment of BCRA recap should hopefully keep GFN below 30% of GDP throughout. Most important, the external financing gap now cumulates to only USD30 billion through 2030, although it peaks around USD25 billion in 2026. This is still about 45% of gross international reserves, so the external financing challenge remains—although reserves could be managed to repay the IMF in the mid-2020s before reserve asset accumulation continues into the late-2020s. In the event risks re-emerged, perhaps the IMF could extend the program repurchases to the late-2020s, when the external sector is “over-finances.”

In other words, this scenario presents the best possibility of restoring monetary stability, accumulating an external buffer, and putting public debt on a downward trajectory to below 50% of GDP by 2030 while allowing fiscal policy to attempt to stabilize the economy in the next few years.

ix. Scenarios contemplated and the external financing gap

Figures 10A-D present these scenarios side-by-side for key stability metrics. Only with a principal haircut on both residents and non-residents can sustainability be hoped to be attained. This allows net external interest payments to fall from about 40% of exports of goods and services today to below 30% in 2030, with immediate relief up front—something not considered so far. Figure 10B.

Two sets of tables present detailed balance of payments, net IIP, and monetary accounts for the baseline and final scenario contemplated here.

3. Implications for asset prices

Argentine assets continue to look richly priced by this analysis. It may be that the Greece PSI experience has lulled markets into believing that the “fiscal only” approach to debt sustainability is the correct framework for thinking about Argentina. However, this partial-equilibrium analysis has to be cast in a more complete framework, including ensuring sustainability of monetary policy and—related—forming a view on the balance of payments constraint and external financing gap.

Consider the USD bond maturing 22 April 2026, with 7.25% coupon. After falling to 38.3 in September, the current price is about 50.4. With a 4Y reprofiling, coupon haircut of 50%, and an exit yield of 12.5%, the bond should be priced at about 42. Alternatively, with a 3Y reprofiling and 30% haircut, the bond should be prices around 52. So at the moment, the market appears to accept the need for a reprofiling and modest coupon haircut.

How should the bond be priced for a 4Y reprofiling and 50% coupon and principal haircut? 26.7. That’s 47% below today’s pricing. Since the upside from a favorable debt operation is small (maybe +3%) and since the probability of the IMF’s overall program emerging with a more substantial external financing gap that requires a more generous NPV loss to investors, playing Argentina from the short side looks sensible still.
4. Conclusions

Admittedly, IMF macroe!omics is in a state of flux. True fi!ancial programming, as outlined above, is seldom employed with the clarity and precision needed to achieve macro-fi!ancial stability. Moreover, fi!cal-only DSA, employed in the case of Greece, is not a good guide to overall sustainability or the external constraint. For Greece, the IMF could later lean on offi!cial creditors to provide NPV debt relief by driving offi!cial interest rates low. Argentina does not have such a luxury.

If the IMF and Argentine authorities want to achieve long lasting sustainability allowing the IMF to be on a disengagement path by mid-2020s, in time for the next election, without the re-emergence of external fi!ancing pressures, then a far greater contribution than a 4Y reprofiling and modest coupon haircut is needed by offi!cial creditors. The importance of not ending up in a prolonged engagement with Argentina, given the relations between the two, means getting this right at this early stage of the new administration.

This means the authorities can play good cop in any engagement with creditors—while the IMF can play bad cop. The authorities can signal they are constrained by the needs of offi!cial creditors whose analysis supersedes their own views in order to unlock program funds.

On the other hand, the IMF could fudge the analysis once more, fail to restore stability, and Argentina can swing to the brink of crisis again in only a few years. In which case, maybe Macro can make a comeback. As such, the hole in BCRA balance sheet will remain unplugged, quasi-fi!cal operations continue, the true fiscal position opaque, and external fi!ancing challenges unaddressed. Exchange rate weakness will continually reveal the debt-to-GDP less favorable than hoped. And any rally in asset prices in the event of a favorable debt operation will likely be short lived, therefore.
### ANNEX I: Tables and slides

**Argentina: Table 1: Federal Government Balance Sheet (end-Sept. 2019)**

<table>
<thead>
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<th>(Type of instrument)</th>
<th>(ARS bilions)</th>
<th>(USD bilions)</th>
<th>(% USD GDP)</th>
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<tr>
<td>Assets</td>
<td>Liabilities</td>
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<td>Liabilities</td>
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<td>BCRA deposits</td>
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<td></td>
<td>o/w BCRA (DX)</td>
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**Memo items:**
- GDP (ARSbn, 2019): 22,000
- GDP (USDbn, 2019): 454
- ARS (ytd average): 48.5
- ARS (end period): 59.9

**Argentina: Table 2: BCRA Balance Sheet (end-Dec. 2019)**

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**Memo items:**
- GDP (ARSbn, 2019): 22,000
- GDP (USDbn, 2019): 454
- ARS (ytd average): 48.5
- ARS (end period): 59.9
**Figure 1A:** Real interest-primary surplus combinations that deliver terminal debt-to-GDP ratios over different adjustment horizons*

*Assumptions: Steady state: RGDP growth = 2.5%; GDP deflator inflation = 6%; initial non-central bank debt-to-GDP = 58.8%; average nominal interest on debt begins at 5.5%, graduating upwards at 50bp intervals, meaning the real interest rate begins at -50bps; "haircut" set to zero throughout.

**Figure 1B:** "Haircut" needed to reach terminal debt-to-GDP ratios over different adjustment horizons given a 2% of GDP primary surplus*

*Assumptions: As Figure 2A but primary surplus set to +1.5% and haircut adjusted to meet terminal debt targets.
**Figure 1C**: “Haircut” needed to reach various terminal debt-to-GDP ratios as a function of primary surplus for fixed real interest rate

*Assumptions: as Figure 2B but target debt-to-GDP in 5 years and primary surplus adjusted.*

**Figure 1D**: “Haircut” needed to reach 55% terminal debt-to-GDP ratio in 5 years as a function of primary surplus for varying real interest rates

*Assumptions: as Figure 2C.*
Figure 3B: Residency of outstanding Federal government debt (%)

- Principal:
  - Resident: 53%
  - Non-resident: 47%

- Coupons:
  - Resident: 29%
  - Non-resident: 71%

Figure 3C: Amortisation profile of outstanding debt (USD billions)
Figure 3D: Coupon payment profile of outstanding debt (USD billions)

Figure 3E: Aggregate principal and coupon by creditor residence and denomination (USD billions)
Figure 4A: Financing assumptions for new private debt (%)

Figure 4B: Argentina: IMF external financing (USD billions)
**Figure 6B**: BCRA recap: Base money, BCRA bills, and net foreign assets (%GDP)

**Figure 6C**: BCRA recap: External financing gap and rollover rate (USDbns and %GIR)
Figure 7A: 4Y reprofiling: Debt, gross financing need, and consolidated fiscal balance (%GDP)

Figure 7B: 4Y reprofiling: External financing gap and rollover rate (USDbn and %GIR)
Figure 8A: 4Y reprofiling 50% resident coupon haircut: Debt, gross financing need, and consolidated fiscal balance (%GDP)

Figure 8B: 4Y reprofiling 50% coupon haircut: Debt, gross financing need, and consolidated fiscal balance (%GDP)
Figure 8C: 4Y reprofiling 50% coupon haircut: External financing gap and rollover rate (USDbns and %GIR)

Figure 9A: 4Y reprofiling 50% resident coupon and principal haircut: Debt, gross financing need, and consolidated fiscal balance (%GDP)
Figure 9B: 4Y repurposing 50% coupon and principal haircut: Debt, gross financing need, and consolidated fiscal balance (%GDP)

Figure 9C: 4Y repurposing 50% coupon and principal haircut: External financing gap and rollover rate (USDbns and %GIR)
Figure 10A: Consolidated public sector accounts: Scenarios compared (%USDGDP)

Figure 10B: Net external primary deficit: Scenarios compared (% exports of goods and services)
### Baseline: Balance of payments, NIIP, and BCRA balance sheet

**Argentina: Baseline: Balance of payments (US$ billions, 2016-30)**

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**Argentina: Baseline: Net international investment position (US$ billions, 2016-30)**

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**Argentina: Baseline: Net international investment position (US$ billions, 2016-30)**

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### Argentina: Balance of Payments, NICP, and BCRA balance sheet

#### Argentina: BCRA recap, 4/4 reprising plus 50% coupon and principal haircut: Balance of payments (USD billions, 2016-30)

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#### Argentina: BCRA recap, 4/4 reprising plus 50% coupon and principal haircut: Net international investment position (USD billions, 2016-30)

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ANNEX II: Consolidated government debt sustainability

1. Standard government debt sustainability with haircuts and senior debt

Employing the standard analytical approach, assuming the entire debt stock is rolled over each period, with the interest rate some analogy to some average paid on all outstanding maturities, the change in nominal government debt in period t can be written, assuming no asset sales or deposit accumulation:

$$\Delta B_t = -S_t^p + i_t B_{t-1} - \varphi_t (1 + i_t) B_{t-1}$$

where \( S_t^p \) is the local currency primary surplus, \( B_{t-1} \) local currency value of debt entering the period, \( i_t \) the interest paid on that debt. New here, \( \varphi_t \geq 0 \) represents a combined “haircut” on period t interest and principal carried into time t—a metaphor for a more complicated restructuring. Dividing by nominal GDP, we get:

$$\frac{\Delta B_t}{Y_t} = -s_t^p + \frac{i_t b_{t-1} - \varphi_t (1 + i_t) b_{t-1}}{(1 + g_t)}$$

where lower case letters, as usual, represent variables relative to GDP, \( g_t \) the nominal growth rate of GDP. The debt evolution relation for \( b_t \) becomes:

$$b_t = -s_t^p + \frac{(1 - \varphi_t) (1 + i_t)}{(1 + g_t)} b_{t-1}$$

If \( \varphi_t = 0 \) this represents the standard flow budget constraint for the government. Since this haircut is (assumed) a one-off, \( \varphi_{t+j} = 0 \) for \( j > 0 \) and, for example, the next period flow constraint is:

$$b_{t+1} = -s_{t+1}^p + \frac{(1 + i_{t+1})}{(1 + g_{t+1})} b_t$$

Rearranging the first flow budget constraint in terms of \( b_{t-1} \):

$$b_{t-1} = \frac{(1 + g_t)}{(1 + i_t)} s_t^p + \varphi_t b_{t-1} + \frac{(1 + g_t)}{(1 + i_t)} b_t$$

the debt stock at \( t-1 \) can be “met” through a net period NPV primary surplus \( (s_t^p) \), a haircut \( (\varphi_t) \), or carried forward in NPV terms to be serviced in the future \( (b_t) \). Using the equivalent expression for later periods and iterating forward \( N \) periods—where steady-state outcomes are denoted by dropping the \( t \) subscript—we get:

$$b_{t-1} = \left(\frac{1 + g}{1 - g}\right) \left(1 - \frac{(1 + g)\ N^{+1}}{1 + i}\right) s^p + \varphi_t b_{t-1} + \left(\frac{1 + g}{1 + i}\right)^{N+1} b_{t+N}$$

which we can write in terms of the primary surplus needed to hit a particular debt stock by period \( t+N \):

$$s^p = \left(\frac{i - g}{1 + g}\right) \left(1 - \frac{(1 + g)\ N^{+1}}{1 + i}\right) b_{t-1}$$

Alternatively, we can write the “haircut” needed to restore sustainability, given the steady-state primary balance, etc., assessed as reaching some target \( b_{t+N} \), thus:

$$\varphi_t = \left(1 - \frac{(1 + g)\ N^{+1}}{1 + i\ b_{t-1}}\right) - \left(1 - \frac{(1 + g)\ N^{+1}}{1 + i\ b_{t-1}}\right) \left(\frac{1 + g}{1 - g}\right) s^p$$

which, for the case where debt-to-GDP is expected to remain unchanged \( (b_{t+N} = b_{t-1}) \), becomes:

$$\varphi_t = \left(1 - \frac{(1 + g)\ N^{+1}}{1 + i\ s^p}\right) \left(1 - \frac{(1 + g)}{(1 - g\ s^p)}\right)$$
which illustrates, perhaps, why debt sustainability concerns are strange when the interest paid on government debt is below the nominal growth rate of GDP—a real world example apparently just discovered by the macroeconomics fraternity. In such a case, the expression inside the first parentheses approaches \( \text{minus infinity} \) when \( i < g \) since the economy grows faster, in nominal terms, than the interest rate. The overall resource base of the economy—corresponding savings—grows faster than the interest needed to service the existing stock of debt.

But this is a digression. Argentina is instead a reasonable candidate for imposing the No Ponzi Condition, since \( i > g \), when reflecting upon fiscal sustainability. And since the nominal interest rate in Argentina needs to be driven above the inflation rate to to re-establish monetary stability, imposing the No-Ponzi Condition, we get:

\[
\varphi_t = 1 - \left( \frac{1 + g}{1 - g} \right) s_T^{b_t}
\]

The second term in the parenthesis now represents the deviation of the NPV of primary surpluses to the existing debt stock. If \( \left( \frac{(1 + g)}{(1 - g)} \right) s_T^{b_t} < b_{t-1} \), the community is unable to generate, over an infinite horizon, the resources necessary to service the existing debt stock. A haircut is needed today to bring the stock of debt in line with the NPV of available fiscal resources. If, for example, \( s_T^{b_t} = 0 \) a 100% haircut is necessary as there are no real resources available to service the existing debt stock. More realistically, we would insist on some fiscal adjustment.

But what if some part—or parts—of the debt stock cannot be subject to haircuts? For example, traditionally T-bills have been exempt from restructuring operations; moreover, the IMF (perhaps official support?) is treated as de facto senior. This implies the standard debt sustainability relations, when manipulated to allow for a debt haircut, ought to carve out certain creditor claims for special treatment.

Consider the following elaboration on the above. Suppose the total stock of debt is divided into three classes: \( B_t = B_t^T + B_t^H + B_t^{IMF} \); \( B_t^T \) being private debt not subject to haircuts, such as T-bills; \( B_t^{IMF} \) being official de facto senior debt, such as the IMF; while \( B_t^H \) represents the remaining private debt subject to restructuring operations, such as a haircut.

In this case we have a new expression for the change in government debt between period \( t-1 \) and \( t \): \( \Delta B_t = -s_T^{b_t} + i_t^T B_{t-1}^T + i_t^{IMF} B_{t-1}^{IMF} + i_t^H B_{t-1}^H - \varphi_t (1 + i_t) B_{t-1}^H \), and can write an elaboration on the flow constraint-to-GDP:

\[
b_t = -s_T^{b_t} + \left( \frac{1 + i_t^T}{1 + g_t} \right) b_{t-1}^T + \left( \frac{1 + i_t^{IMF}}{1 + g_t} \right) b_{t-1}^{IMF} + \left( 1 - \varphi_t \right) \left( \frac{1 + i_t}{1 + g_t} \right) b_{t-1}^H
\]

Rearrange as:

\[
\left( \frac{1 + i_t}{1 + g_t} \right) b_{t-1}^H = s_T^{b_t} + \left( \frac{1 + i_t^T}{1 + g_t} \right) \varphi_t b_{t-1}^T + \left( \frac{1 + i_t^{IMF}}{1 + g_t} \right) b_{t-1}^{IMF} + \left( \frac{i_t - i_t^{IMF}}{1 + g_t} \right) b_{t-1}^H + b_t
\]

and once again iterate forward for steady-state values of macroeconomic variables. Let’s pause. This would allow us to write the inter-temporal budget constraint once more. However, an additional complication emerges here due to the fact that the structure of government liabilities through time matters as the interest rate on each class of creditor can be different (that is, \( i_t, i_t^T \) and \( i_t^{IMF} \)). This therefore raises the question of assumptions surrounding the evolving liability structure from period-to-period.

Focus on the evolution of T-bills and official debt (IMF). Start with the IMF. Let:

\[
\begin{align*}
b_t^{IMF} &= b_{t-1}^{IMF} + \lambda_{t}^{IMF} \\
b_{t+1}^{IMF} &= b_{t}^{IMF} + \lambda_{t+1}^{IMF} \\
\vdots \\
b_{t+N-1}^{IMF} &= b_{t+N-2}^{IMF} + \lambda_{t+N-1}^{IMF}
\end{align*}
\]

Assume the change in \( b_t^{IMF} \) is constant relative to GDP in each period, then we can write through iteration on the above:

\[
b_{t+N-1}^{IMF} = b_{t-1}^{IMF} + N \lambda_{t}^{IMF}
\]
As such, as we iterate forward on the flow budget constraint in the steady-state, focusing on the terms relating to \( b_{i-1}^{IMF} \), we now get:

\[
\left( \frac{1 + g}{1 + i} \right) \left( \frac{1 + i^{IMF}}{1 + g} \right) b_{i-1}^{IMF} + \left( \frac{1 + g}{1 + i} \right)^2 \left( \frac{i^{IMF}}{1 + g} \right) (b_{i-1}^{IMF} + \lambda^{IMF}) + \left( \frac{1 + g}{1 + i} \right)^3 \left( \frac{i^{IMF}}{1 + g} \right) (b_{i-1}^{IMF} + 2\lambda^{IMF}) + \ldots
\]

\[
+ \left( \frac{1 + g}{1 + i} \right)^{N+1} \left( \frac{i^{IMF}}{1 + g} \right) (b_{i-1}^{IMF} + N\lambda^{IMF})
\]

And so, for a constant change in IMF debt-to-GDP in each period, any impact in the first period has twice the impact in the next period—the previous change plus a change in the second period, and so forth. And we need to trace the impact of changing exposure to the IMF cumulated through time.

The terms relating to \( b_{i-1}^{IMF} \) above can be straightforwardly summed and simplified as the NPV relation:

\[
\left( \frac{1 + g}{1 - g} \right) \left( 1 - \left( \frac{1 + g}{1 + i} \right)^{N+1} \right) \left( \frac{i^{IMF}}{1 + g} \right) b_{i-1}^{IMF}
\]

which is the adjustment in servicing debt needed due to interest payments on the IMF being (presumably) less than the average rate when that owed to the IMF remains constant (in % of GDP) through time. The term relating to the cumulated flow of IMF debt per period, \( \lambda^{IMF} \), is a little more complicated. Writing out as:

\[
\left( \frac{1 + g}{1 + i} \right)^2 \left( \frac{i^{IMF}}{1 + g} \right) \lambda^{IMF} \left[ 1 + 2 \left( \frac{1 + g}{1 + i} \right)^{N+1} \left( \frac{1 + g}{1 + i} \right) + \ldots + N \left( \frac{1 + g}{1 + i} \right)^{N+1} \right]
\]

The following compact expression for the term in square brackets will be applied on other occasions below, so we write it out here in some detail. Let:

\[
Z(N - 1) = \left[ 1 + 2 \left( \frac{1 + g}{1 + i} \right)^{N+1} \left( \frac{1 + g}{1 + i} \right) + \ldots + N \left( \frac{1 + g}{1 + i} \right)^{N+1} \right]
\]

and

\[
S(N) = \left[ 1 + \left( \frac{1 + g}{1 + i} \right)^{N+1} \left( \frac{1 + g}{1 + i} \right) + \ldots + \left( \frac{1 + g}{1 + i} \right)^{N+1} \right]
\]

then it is possible to show that

\[
Z(N) = S(N) + \left( \frac{1 + g}{1 + i} \right) Z(N - 1)
\]

and

\[
Z(N) = Z(N - 1) + (N + 1) \left( \frac{1 + g}{1 + i} \right)^{N+1}
\]

allowing us to solve for:

\[
Z(N - 1) = \frac{1 + N \left( \frac{1 + g}{1 + i} \right)^{N+1} - (N + 1) \left( \frac{1 + g}{1 + i} \right)^N}{\left( 1 - \left( \frac{1 + g}{1 + i} \right)^N \right)^2}
\]

and therefore write the NPV due to the cumulative flow of debt owed to the IMF over \( N \) periods as:

\[
\left( \frac{1 + g}{1 - g} \right) \left( \frac{i^{IMF}}{1 + g} \right) \left[ 1 + N \left( \frac{1 + g}{1 + i} \right)^{N+1} - (N + 1) \left( \frac{1 + g}{1 + i} \right)^N \right] \lambda^{IMF}
\]

Finally, suppose we wish for the debt owed to the IMF at period \( N \) to be zero—which is to say, we want the IMF program over the forecast horizon to end—and to be repaid in a “straight-line,” \( \lambda^{IMF} = -b_{i-1}^{IMF} / N \), not always a reasonable assumption, then the term relating to the stock of IMF debt outstanding now becomes:

\[
\left( \frac{1 + g}{1 - g} \right) \left( \frac{i^{IMF}}{1 + g} \right) \left[ 1 - \left( \frac{1 + g}{1 + i} \right)^{N+1} - \left( \frac{1 + g}{1 - g} \right) \left( \frac{1 + g}{1 + i} \right)^N \right] b_{i-1}^{IMF}
\]
which is a capsule summary of the NPV flow interest payment “savings” because of the existence of an IMF program, adjusted for the need to accumulate new private debt to replace the IMF over the horizon contemplated. The latter impact can be seen by setting \( N \to \infty \) in the last expression brackets within the square parentheses, which is the same as assuming the IMF program is perpetual. This expression is zero in this case, meaning the economy consistently benefits from favorable IMF financing.

With respect to T-bills, we simply assume the stock remains constant as a percent of GDP.

Together, these assumptions allow the the debt sustainability relation/NPV intertemporal budget constraint, after the necessary iterations, to become:

\[
b_{t+1} = \left( \frac{1 + g}{1 - g} \right) \left( 1 - \frac{(1 + g)^{N+1}}{1 + i} \right) s^p + \varphi_t b_{t+1}^H + \left( \frac{1 + g}{1 - g} \right) \left( i - \frac{1 + g}{1 + i} \right) b_{t-1}^T + \frac{(1 + g)^{N+1}}{1 + i} b_{t+1}^{IMF} + \left( \frac{1 + g}{1 + i} \right) \varphi_t b_{t+1}^H
\]

relating the time \( t+N \) debt stock to that entering the period, the attainable (steady-state) primary balance, interest rates, etc. This now allows for a haircut (\( \varphi_t \)) on the relevant part of the debt stock, while T-bills are untouched, as is the IMF—though the stock of IMF debt has to be replaced over time by private debt giving rise to an apparently garbled expression pre-multiplying this term. The relative interest rate on T-bills and the IMF versus “haircuttable” debt becomes crucial. If the “non-haircuttable” interest rates were both exactly the same as “haircuttable” debt (\( i^T = i^{IMF} = i \)) then their stock would be of no importance except insofar as they impact the ratio of “malleable” debt, which is to say: \( b_{t+1}^H / b_{t+1} \). If the interest on IMF borrowing is concessional, however, then the availability of this borrowing facilitates a smaller haircut or primary surplus.

This inter-temporal constraint we can again rearrange in terms of the primary surplus required to deliver a particular debt stock at time \( t+N \), a generalization of (*) above, as:

\[
s^p = \left( \frac{1 + g}{1 + i} \right) \left( 1 - \frac{(1 + g)^{N+1}}{1 + i} \right) s^p + \varphi_t b_{t+1}^H = \left( \frac{1 + g}{1 + i} \right) \left( i - \frac{1 + g}{1 + i} \right) b_{t-1}^T + \frac{(1 + g)^{N+1}}{1 + i} b_{t+1}^{IMF} + \left( \frac{1 + g}{1 + i} \right) \varphi_t b_{t+1}^H
\]

or, for given attainable primary balance, we can solve for the haircut needed to achieve some particular debt-to-GDP target in period \( t+N \):

\[
\varphi_t = \left( \frac{1 + g}{1 + i} \right) \left( 1 - \frac{(1 + g)^{N+1}}{1 + i} \right) s^p + \left( \frac{1 + g}{1 + i} \right) \left( i - \frac{1 + g}{1 + i} \right) b_{t-1}^T + \frac{(1 + g)^{N+1}}{1 + i} b_{t+1}^{IMF} + \left( \frac{1 + g}{1 + i} \right) \varphi_t b_{t+1}^H
\]

itself a generalization of (\( \lambda \)).

2. Consolidated government sustainability including haircuts and seniority

The analysis above contains (at least) two considerable short-comings.

First, we ignore the currency of denomination of government debt—simply assume it is held in local currency and ignore changes in the (real) exchange rate.

Second, we treat government debt in isolation from the central bank financial position. While this assumption is in general innocuous—under normal circumstances, where the interest paid on central bank liabilities is lower
than that on its earnings on assets—for Argentina it is crucial. Of late, BCRA is essentially bankrupt and is being forced to run a Ponzi scheme—by which they can only monetize their interest burden. And while this contributes to the illusion of government debt sustainability, since a decent chunk of Federal government debt is at minimal interest to BCRA, this rather contributes to monetization of the central bank interest bill, monetary instability, and—through loss of exchange rate control, given foreign currency liabilities—a larger value of government debt correctly measured in local currency at devalued exchange rates.

Put another way, there is a fundamental tension between sustainability of BCRA and the Federal government. The latter demands real exchange rate appreciation to take the pressure off necessary fiscal adjustment—as in recent programs. The former requires real exchange rate depreciation to revalue net foreign assets and avoid domestic currency liabilities unreasonably overtaking the value of foreign assets. This tension will be revealed and avoided here.

We therefore proceed to consolidate the government and central bank—while being mindful of the currency of denomination of assets and liabilities.

Let the Federal Government (FG) flow constraint measured in local currency be:

\[
\left( b_{D,t} + b_{D,t}^* \right) + \left( b_{E,t} + b_{E,t}^* \right) + b_{IMF,t}^* + (b_{BCRA,t} + b_{BCRA,t}^*) - (d_t + d_t^*) + \left( \frac{1 + i_{E,t}}{1 + g_t} \right) b_{D,t-1} + \left( \frac{1 + i_t^*}{1 + g_t} \right) b_{E,t-1}
\]

where debt is owed to domestics in local (\(b_{D,t}\)) and foreign (\(b_{E,t}^*\)) currency, non-residents ("external" being here a residency concept, \(b_{E,t} + b_{E,t}^*\)) and to the central bank (\(b_{BCRA,t} + b_{BCRA,t}^*\)) while there are deposits in local and foreign currency (assumed) at BCRA (\(d_t + d_t^*\)). While \(s_t^p\) represents the primary fiscal balance-to-GDP, \(tr_t\) represents transfers to BCRA which, if negative, represents receipts from the central bank for the purposes of running the government.

There are various interest rates paid on each component of the debt stock, as illustrated on the right hand side here, that need not be spelled out more. The only additional complication is the role of the exchange rate in impacting foreign currency denominated liabilities. Here \(1 + \varepsilon_t = E_t/E_{t-1}\), which is to say \(E_t\) is the local currency value of a unit of foreign currency and a positive value of \(\varepsilon_t\) represents nominal exchange rate depreciation. It ought also be understood that where for domestic currency variables, say, \(d_t = D_t/Y_t\), for foreign currency denominated variables-to-GDP lower case letters are those measured in local currency: \(d_t^* = E_t D_t^*/Y_t\).

The BCRA flow constraint, meanwhile, takes the following form:

\[
(bm_t + cb_t + d_t + d_t^*) - (nf a_{BCRA,t} + b_{BCRA,t} + b_{BCRA,t}^*)
\]

\[
= -tr_t + \left( \frac{1 + i_{BM,t}}{1 + g_t} \right) bm_{t-1} + \left( \frac{1 + i_{CB,t}}{1 + g_t} \right) cb_{t-1} + \left( \frac{1 + i_t^*}{1 + g_t} \right) d_{t-1} + \left( \frac{1 + i_t^*}{1 + g_t} \right) d_{t-1}^*
\]

where similar conventions apply. Here \(bm_t\) represents base money, \(cb_t\) the value of central bank bills-to-GDP, \(nf a_{BCRA,t}\) is net foreign assets (measured in foreign currency). In particular, of the constellation of interest rates facing the central bank, \(i_{BM,t}\) is the interest rate on (net) foreign assets—assumed entirely held in foreign currency. Here, government transfers (\(tr_t\)) take the opposite sign in the flow constraint as they represent transfers from the government that can be issued to service central bank liabilities for the purpose of monetary stability. On the other hand, if these transfers were negative—as they have been for much of the recent past in Argentina—they would represent transfers from the central bank to the government, requiring either growing BCRA liabilities, interest earned elsewhere, larger primary fiscal surpluses, or their sterilization by running down net foreign assets.
Summing the two flow constraints gives the consolidated flow budget constraint, where the intra-government claims cancel:

\[
(bm_t + cb_t) + (b_{DL} + b_{EL}) + (b_{E} + b_{E}) + b_{MIF} - nf a^*_{BCRA}\]

\[
= -s^* + \left(1 + i_{BM} \right) \frac{1}{1 + g_t} b_{m-1} + \frac{1 + i_{CB}}{1 + g_t} \frac{1}{1 + g_t} b_{b-1} + \frac{1 + i_{DL}}{1 + g_t} \frac{1}{1 + g_t} b_{DL-1} + \frac{1 + i_{EF}}{1 + g_t} \frac{1}{1 + g_t} b_{EF-1} + \frac{1 + i_{MF}}{1 + g_t} \frac{1}{1 + g_t} b_{MF-1} - \frac{\left(1 + i_{Ef}(1 + \varepsilon_t)\right)}{1 + g_t} \frac{1}{1 + g_t} \frac{nf a^*_{BCRA-1}}{1 + g_t}
\]

In this consolidation, transfers between government and central bank, as well as the intra-government debt and deposit positions, become irrelevant. From the perspective of the domestic and non-resident private (and official) sectors, the consolidated position is all that should matter as it represents the total resources under the command of the State—through the primary balance flow through time—available to service the entire net financial liabilities of the public sector for particular base money demand.

Thus, to recapitulate, a particular primary surplus is needed not only to service Federal debt, but also to provide real resources to ensure the central bank’s balance sheet is sustainable—avoiding monetary disorder. Typically, this consolidation can be overlooked. For Argentina it is crucial.

Simplify by assuming the interest rate on domestic and externally held debt is equal, regardless of the currency of denomination, except for the IMF and T-bills, such that \(1 + i_t = 1 + i_{DL} = (1 + i_{DL}) (1 + \varepsilon_t) = 1 + i_{EF} = (1 + i_{EF})(1 + \varepsilon_t)\) and let \(b_t = (b_{DL} + b_{EL}) + (b_{E} + b_{E})\) then the budget constraint can be written:

\[
(bm_t + cb_t) + b_t - nf a^*_{BCRA}
\]

\[
= -s^* + \left(1 + i_{BM} \right) \frac{1}{1 + g_t} b_{m-1} + \frac{1 + i_{CB}}{1 + g_t} \frac{1}{1 + g_t} b_{b-1} + \frac{1 + i_{DL}}{1 + g_t} \frac{1}{1 + g_t} b_{DL-1} + \frac{1 + i_{EF}}{1 + g_t} \frac{1}{1 + g_t} b_{EF-1} + \frac{1 + i_{MF}}{1 + g_t} \frac{1}{1 + g_t} b_{MF-1} - \frac{\left(1 + i_{Ef}(1 + \varepsilon_t)\right)}{1 + g_t} \frac{1}{1 + g_t} \frac{nf a^*_{BCRA-1}}{1 + g_t}
\]

where we reintroduce \(g_t\) reflecting the “haircut” on non-central bank, non-T-bill, and non-IMF liabilities. Rearrange in terms of the change in base money, central bank bills, and net foreign assets:

\[
b_t = -s^* - \Delta bm_t + \left(\frac{i_{BM} - g_t}{1 + g_t}\right) b_{m-1} - \Delta cb_t + \left(\frac{i_{CB} - g_t}{1 + g_t}\right) b_{b-1} + \Delta nf a^*_{BCRA}
\]

\[
- \left(\frac{1 + i_{Ef}(1 + \varepsilon_t) - (1 + g_t)}{1 + g_t}\right) \frac{1}{1 + g_t} \frac{nf a^*_{BCRA-1}}{1 + g_t} + \frac{1 + i_{EF}}{1 + g_t} \frac{1}{1 + g_t} b_{b-1} + \frac{1 + i_{MF}}{1 + g_t} \frac{1}{1 + g_t} b_{MF-1} - \frac{\left(1 + i_{Ef}(1 + \varepsilon_t)\right)}{1 + g_t} \frac{1}{1 + g_t} \frac{nf a^*_{BCRA-1}}{1 + g_t}
\]

setting \(i_{BM} = 0\) and, to rule out continuous monetization of the consolidated government position, \(\Delta bm_t = 0\) and rearrange in terms of \(b_{t-1}\):

\[
(1 + i_{EF}) b_{t-1} = s^* + \left(\frac{g_t - bm_{t-1}}{1 + g_t}\right) b_{b-1} + \left(\frac{i_{CB} - g_t}{1 + g_t}\right) b_{b-1} + \Delta nf a^*_{BCRA}
\]

\[
+ \left(\frac{1 + i_{Ef}(1 + \varepsilon_t) - (1 + g_t)}{1 + g_t}\right) \frac{1}{1 + g_t} \frac{nf a^*_{BCRA-1}}{1 + g_t} + \left(\frac{1 + i_{EF} - (1 + \varepsilon_t)}{1 + g_t}\right) b_{b-1} + \frac{1 + i_{MF}}{1 + g_t} \frac{1}{1 + g_t} b_{MF-1} - \frac{\left(1 + i_{Ef}(1 + \varepsilon_t)\right)}{1 + g_t} \frac{1}{1 + g_t} \frac{nf a^*_{BCRA-1}}{1 + g_t}
\]

Iterating forward \(N\) periods, once more assuming a steady state for macro variables, thus dropping the \(t\) subscript where appropriate:
As such, we can substitute into the above to give:

\[ b_{t-1} = \theta \cdot s^p + \theta \left( \frac{g}{1 + g} \right) b_{m_{t-1}} - \left[ \theta - \sigma \left( \frac{(1 + i)^s (1 + \epsilon) - (1 + g)}{1 + g} \right) \right] \Delta n a_{BCRA}^t \\
+ \theta \left( \frac{(1 + i)^s (1 + \epsilon) - (1 + g)}{1 + g} \right) n f a_{BCRA_{t-1}}^t + \left[ \theta - \sigma \left( \frac{c b - g}{1 + g} \right) \right] \Delta c b - \theta \left( \frac{i c b - g}{1 + g} \right) c b_{t-1} \\
+ \theta \left( \frac{i - i^T}{1 + g} \right) b_{t-1}^T + \theta \left( \frac{(1 + i) - (1 + i_{IMF}) (1 + \epsilon)}{1 + g} \right) b_{IMF_{t-1}}^* \\
+ \sigma \left( \frac{(1 + i) - (1 + i_{IMF}) (1 + \epsilon)}{1 + g} \right) \Delta b_{IMF}^* + \phi_i b_{IMF_{t-1}}^N + \left( \frac{1 + g}{1 + i} \right)^{N+1} b_{t+N} \]

whence \( \theta = \left( \frac{1 + \sigma}{1 - g} \right) \left( 1 - \left( \frac{1 + \sigma}{1 + \epsilon} \right)^{N+1} \right) \) and \( \sigma = \left( \frac{1 + \sigma}{1 - g} \right)^2 \left( 1 + N \left( \frac{1 + \sigma}{1 + \epsilon} \right)^{N+1} - (N + 1) \left( \frac{1 + \sigma}{1 + \epsilon} \right)^N \right) \).

We require the stock of central bank bills-to-GDP to be withdrawn at a constant pace throughout the period, until there are zero outstanding after \( N \) periods, then \( \Delta c b = -c b_{t-1}/N \), replaced by Federal debt. Meanwhile, if the stock of BCRA net foreign assets to GDP is expected to increase at a constant pace to add an additional multiple, \( \gamma \), of \( n f a_{t-1} \) by period \( N \), then \( \Delta n f a_{BCRA_{t-1}} = \gamma n f a_{BCRA_{t-1}}/N \) whereby if \( \gamma = 0 \) there is zero net foreign asset accumulation—the stock remains constant in percent of GDP. Finally, the outstanding debt to the IMF and other official sectors should be reduced to some \( \Delta b_{IMF} = -\delta b_{IMF_{t-1}} / N \), where \( \delta \) be less than 1 reflecting some steady-state value of non-IMF official borrowing (such as the World Bank).

As such, we can substitute into the above to give:

\[ b_{t-1} = \theta \cdot s^p + \theta \left( \frac{g}{1 + g} \right) b_{m_{t-1}} - \left[ \frac{\gamma \theta}{N} - \sigma \left( \frac{(1 + i)^s (1 + \epsilon) - (1 + g)}{1 + g} \right) \right] n f a_{BCRA_{t-1}}^t \\
- \left[ \frac{\theta}{N} - \sigma \left( \frac{c b - g}{1 + g} \right) \right] c b_{t-1} + \theta \left( \frac{i - i^T}{1 + g} \right) b_{t-1}^T \\
+ \sigma \left( \frac{(1 + i) - (1 + i_{IMF}) (1 + \epsilon)}{1 + g} \right) \Delta b_{IMF}^* + \phi_i b_{IMF_{t-1}}^N + \left( \frac{1 + g}{1 + i} \right)^{N+1} b_{t+N} \]

which we can rearrange in terms of the necessary primary balance to generate a sustainable consolidated government fiscal position:

\[ s^p = \left( 1 - \left( \frac{1 + g}{1 + i} \right)^{N+1} b_{t+N} \right) \frac{b_{t-1}}{b_{t-1}} - \phi_i \frac{b_{IMF_{t-1}}^N}{b_{t-1}} b_{t-1} \left( \frac{1 + g}{1 + i} \right) b_{m_{t-1}} - \left( \frac{i - i^T}{1 + g} \right) b_{t-1}^T \\
+ \left[ \frac{\gamma \sigma}{N} + 1 \right] \left( \frac{(1 + i)^s (1 + \epsilon) - (1 + g)}{1 + g} \right) n f a_{BCRA_{t-1}}^t + \left[ \frac{1}{N} - \sigma \left( \frac{c b - g}{1 + g} \right) \right] c b_{t-1} - \left( \frac{\sigma}{N} \right)^2 \left( \frac{(1 + i) - (1 + i_{IMF}) (1 + \epsilon)}{1 + g} \right) b_{IMF_{t-1}}^* \]

alternatively, we can express terms of the the “haircut” needed, given attainable primary surplus:

\[ \phi_i = \left( 1 - \left( \frac{1 + g}{1 + i} \right)^{N+1} b_{t+N} \right) \frac{b_{t-1}}{b_{t-1}} - \phi_i \left( \frac{1 + g}{1 + i} \right) b_{m_{t-1}} - \left( \frac{i - i^T}{1 + g} \right) b_{t-1}^T \\
+ \sigma \left( \frac{(1 + i) - (1 + i_{IMF}) (1 + \epsilon)}{1 + g} \right) \Delta b_{IMF}^* + \phi_i \left( \frac{1}{N} - \sigma \right) \left( \frac{c b - g}{1 + g} \right) c b_{t-1} - \sigma \left( \frac{\sigma}{N} \right)^2 \frac{(1 + i) - (1 + i_{IMF}) (1 + \epsilon)}{1 + g} b_{IMF_{t-1}}^* \]

Notice, the size of the “haircut” is (likely) increasing in the accumulation of NFA as well as the stock of outstanding central bank bills, though decreasing in IMF support should this be concessional enough.