Public Debt, Domestic and Foreign: How Much is too Much?

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&

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Preliminary: Please do not quote, but comments are most welcome.

Public Debt, Domestic and Foreign: How Much is too Much?

Lecture Outline

1. Whither Public Debt?
2. Is Public Debt a Burden?
3. Some Salient Features of BGD Debt
4. Debt Sustainability
5. Debt and Welfare
6. Intergenerational Issues
7. Maturity Structure of Debt & its Management
8. Conclusion

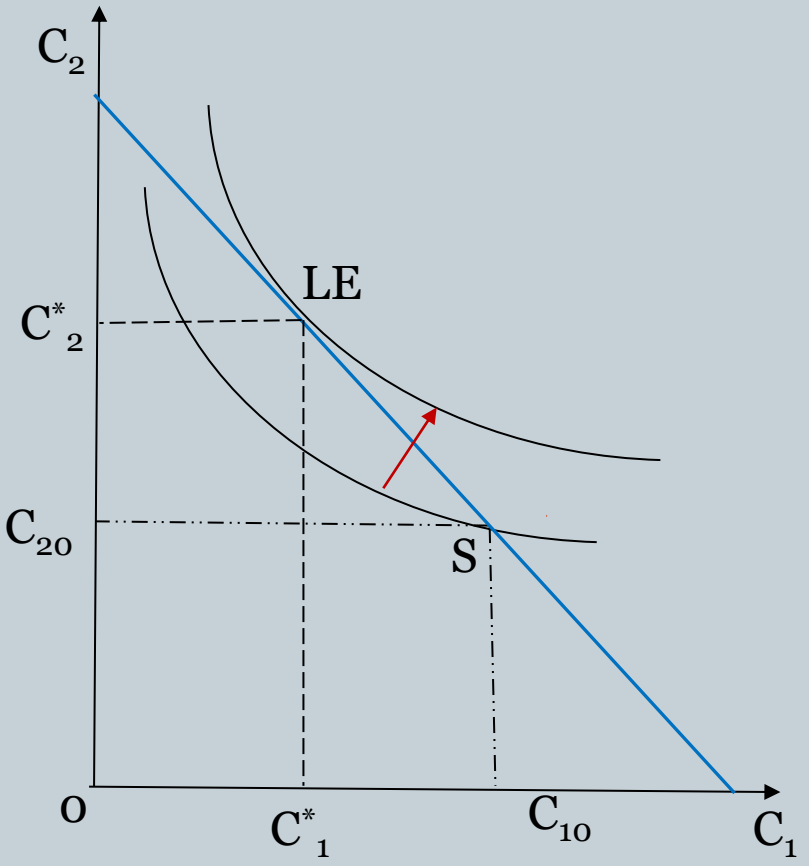
1. Whither Public Debt?

- Public Debt is ideally conceived of as one component of what one can call the '*fiscal policy stance*' (FPS) of the State.
- The rest comprises of (i) the budgetary balance, *deficit or surplus* (R-G), (ii) the depth of the '*fiscal reach*' of the state (e.g., the revenue share), and finally, (iii) the '*financial wealth*' of the state (i.e., total value of its financial assets less the total value of its outstanding liabilities).
- Debt: It is simply the cumulation of past deficits of the government (all levels), which typically has a domestic and a foreign component.
- For reasons that will become evident later, the distinction is important, and hence accounting for the two components should be clearly demarcated so that it is transparent as how each evolves over time.

… Public Debt

- *Private vs Public Debt*: Is each bad, or neither is bad?
- *Polonius of Hamlet* (1603): Advice to son Laertes, "Neither a borrower, nor a lender be; For loan oft loses both itself and friend, And borrowing dulls the edge of husbandry. … ".
- UG (Econ) Students learn of the general falsity of the Polonius advice early in their curriculum (see Fig 1).
- Polonius point: S
- Laertes, the Econ Grad, becomes a lender, and chooses LE, with much higher wellbeing!

Figure 1: Polonius Point



… Public Debt

- What about Public Debt? Good or bad? Inevitable during major recessions.
- Most governments plan to run a small *budgetary deficit* (via borrowing from the public) to smooth out revenue receipts or to fund unforeseen spending programs and pay these off by running surpluses whenever the situation permits (esp OECD countries, e.g., Canada).
- The decline in the ratio by 27 pps between 2020 and 2020 was dramatic, made possible by even more dramatic fall in the market interest rate for government securities (e.g., T-bills), Fig 2 (next slide).
- Similar machinations are not available to LMIEs mainly due to imperfections in the capital market featuring a variety of administered interest rates. Even most multilateral loans rates are non-market.
- Moreover, developing/LMIEs tend to run systematic budget deficits in order to undertake infrastructural investments in part due to inadequate private investments and capital market issues (e.g., lumpiness of public capital).

Canada: 2007-23

Debt-GDP ratio

2019: 97

2020: 129

....

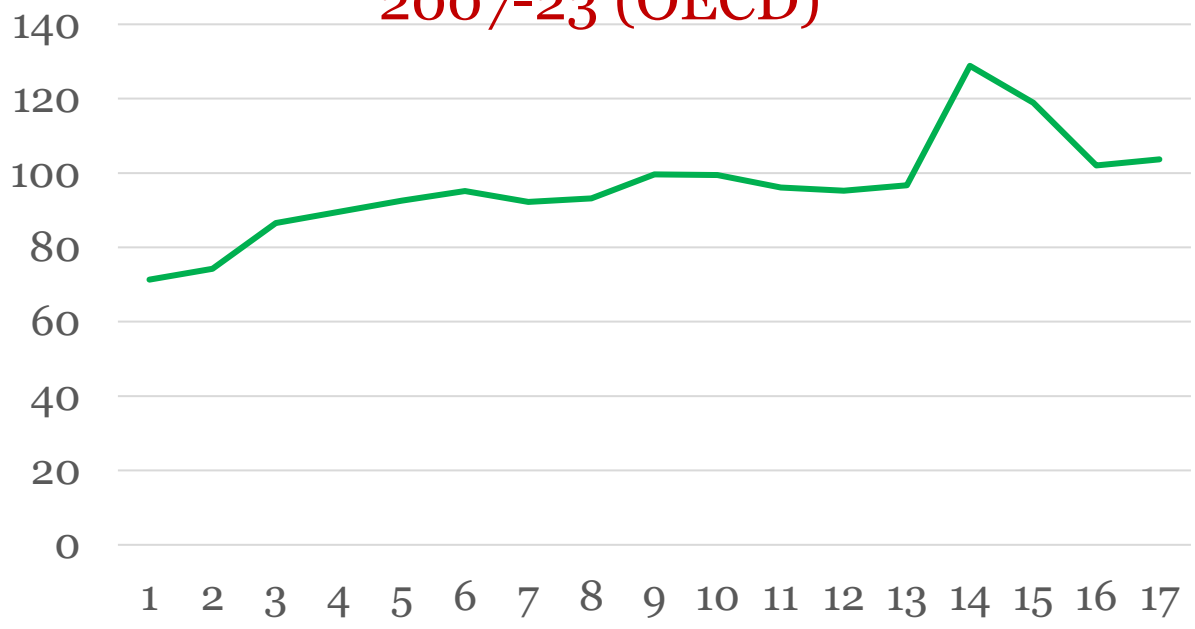
2022: 102

The debt declined even if small deficits were incurred in each year since COVID.

The real int rates in 2021, 22 & 23 were negative or negligible (0.6% in 23), while real growth wasof 5.3, 3.8 and 1.1%, respectively.

More on debt nmanagement below.

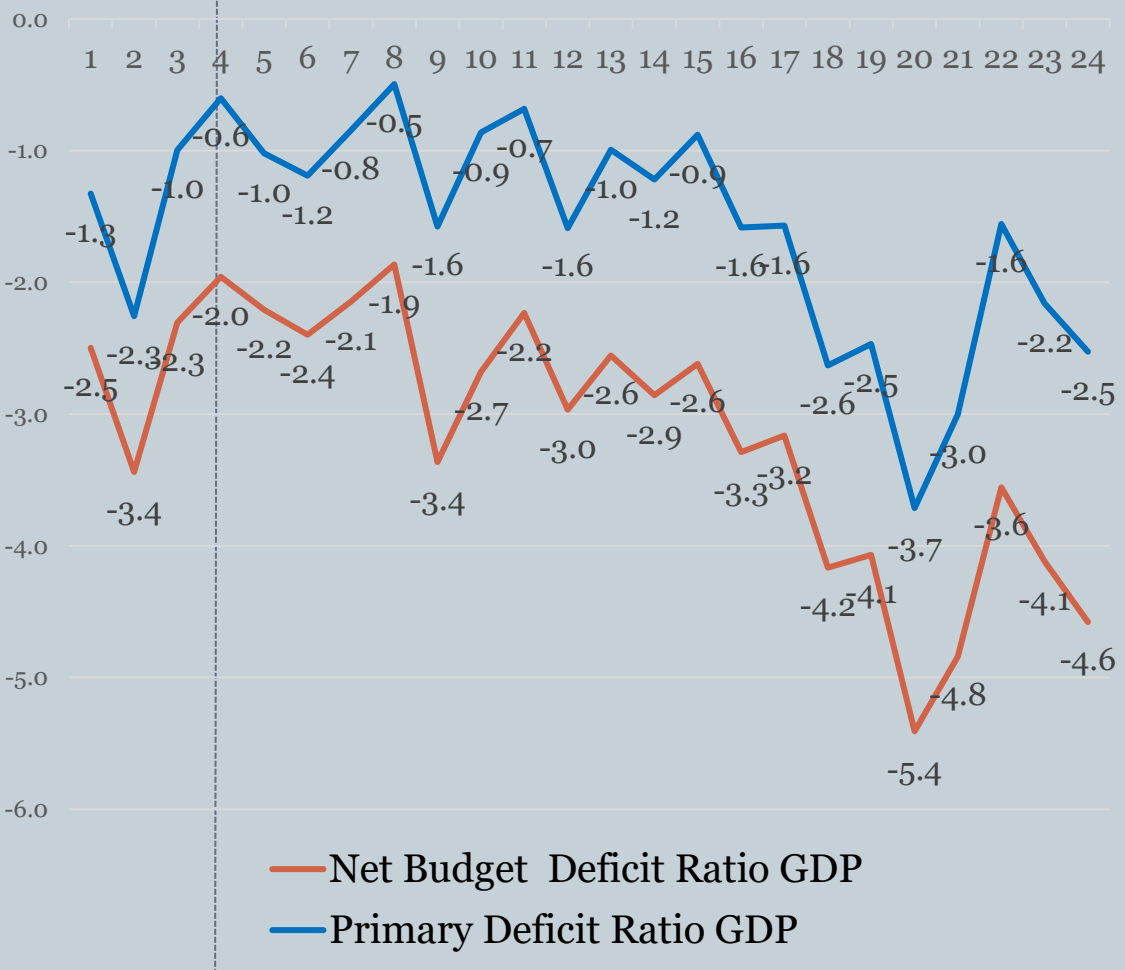
Figure 2: Canadian Debt-GDP, 2007-23 (OECD)



BGD Budget Deficits, FY2000-23

- The plot on the right illustrates that the average deficit ratio has been 3.1 % over the 24-year span, where the min-max rates have ranged between 1.9 to 4.8%, a far cry from the Canadian deficit (FY21: April/March) of 14.9%.
- No major blip during COVID 19!

- Fig 3: BGD Deficits



… Public Debt

- But can a nation keep on adding to debt indefinitely without deleterious consequences? The short answer is, NO.
- Historically, countries have run up large deficits to finance wars.
- UK: Public debt reached double the GDP, had occurred first in 1815 at the end of the Napoleonic wars. Then again, the WWs drove public debt to 238% of GDP in 1947 and fell to 42% by 1980.
- US: Similarly, the US ran large deficits leading up to the Second War; its debt/GDP ratio rose from 44.2% in 1940 to 108.6% in 1946, only to decline to 26.1% by 1980.
- These episodes indicate prudent econ and debt policy (i.e., sustained economic growth, design of budgetary surpluses) as well clever debt management. As Krugman puts it succinctly, ".. the debt from WWII was never repaid; it just became increasingly irrelevant as the US economy grew, and with it the income subject to taxation" (2012).

2. Is Public Debt a Burden?

- There is a large literature that debates whether public debt is a burden that a generation passes on to subsequent ones.
- The discussion has generated more heat than light and we mostly by-pass it presently, except to make a comment or two.
- Classical scholars such as Ricardo held strong views like that (i) most public expenditure was wasteful, and (ii) taxes necessary to service the debt would distort prices badly, lowering welfare.
- Domestic Debt: There is a view that this is benign as it is *owed by 'ourselves' to 'ourselves'* with taxation to pay interest are transactions between groups of citizens within the nation! Dynastic view of a hh?
- Ext Debt is different where debt service drains resources out of the domestic economy? However, these international factor payments too are two-way flows as remittances illustrate the matter in the BDG case most vividly.

… Debt Burden

- William Vickrey had observed, that having too little deficit (& hence debt) would typically imply that the capital stock we leave behind is 'too little'. *We explore the idea further below*.
- He went to claim that "… larger deficits, sufficient to recycle savings out of a growing gross domestic product (GDP) in excess of what can be recycled by profit-seeking private investment, are not an economic sin but an economic necessity" (1996).
- He particularly recommended investing "… in infrastructure, education, research, and the like".
- Such remarks appear closer to views of central plan champions such as Chakravarty!
- Even Blanchard suggests that 'while public debt is probably bad, it is not catastrophic. It can be used but it should be used right.'
- Below we examine the rationale behind such sentiments.

3. Some Salient Features of BGD Debt

- The first issue that confronts and confounds a researcher is the historical lack of consistency of official data compiled by government agencies that show a flagrant disregard for professionalism.
- False/incomplete data persist in the books indefinitely.
- For starters, items that are conceptually straightforward, seem hard to come by: stuff like (a) Time series data on the Stock of Foreign Debt in USD, (b) annual interest payments (USD) etc.
- Data Definitions: Almost nowhere does one see a clear statement of the definitions of categories of data and the exclusions.
- Some examples of anomalies are reviewed below:
- (a) The first deals with Debt-GDP ratios (Table 1),
- (b) The second deals with average interest rates on debt (Table 2).

Table 1: Debt-GDP BB vs IMF

- Here we present the GDP shares of debt (both domestic and external) from BB sources and contrasted with the data from IMF Fiscal Monitor (FY15-23).
- Minimal gaps in FY15-16, widening later; definitional gaps cannot be a reason.
- The last two rows have been obtained from BB just days ago.
- Hopefully we will see more meaningful data in future, an example is evident in a recent upload by BB.

	Central Govt		BB Source	IMF Fiscal	Discrepancy
Year	Dom D/GDP	Ext D/GDP	Total	Monitor -2024	IMF-BB
FY00	13.0	33.4	46.4		
FY01	15.0	31.2	46.2		
FY02	16.5	33.4	49.9		
FY03	16.3	32.7	49.0		
FY04	16.4	31.8	48.2		
FY05	16.4	30.5	46.9		
FY06	16.6	30.1	46.7		
FY07	16.6	28.3	44.9		
FY08	17.2	25.5	42.7		
FY09	15.5	20.4	35.9		
FY10	14.7	17.6	32.3		
FY11	15.2	17.2	32.4		
FY12	15.2	16.6	31.8		
FY13	15.5	14.9	30.4		
FY14	15.5	14.1	29.6		
FY15	15.5	12.2	27.7	28.2	0.5
FY16	15.8	11.9	27.7	27.7	0
FY17	15.7	11.3	27.0	28.3	1.3
FY18	13.5	12.2	25.7	29.6	3.9
FY19	14.5	12.5	27.0	32.0	5
FY20	16.8	11.8	28.1	34.5	6.4
FY21	17.0	12.2	29.2	35.6	6.4
FY22	21.3	12.5	33.8	37.9	4.1
FY23	22.0	15.0	37.0	39.3	2.3

Table 2: BD Data Consistency Issue

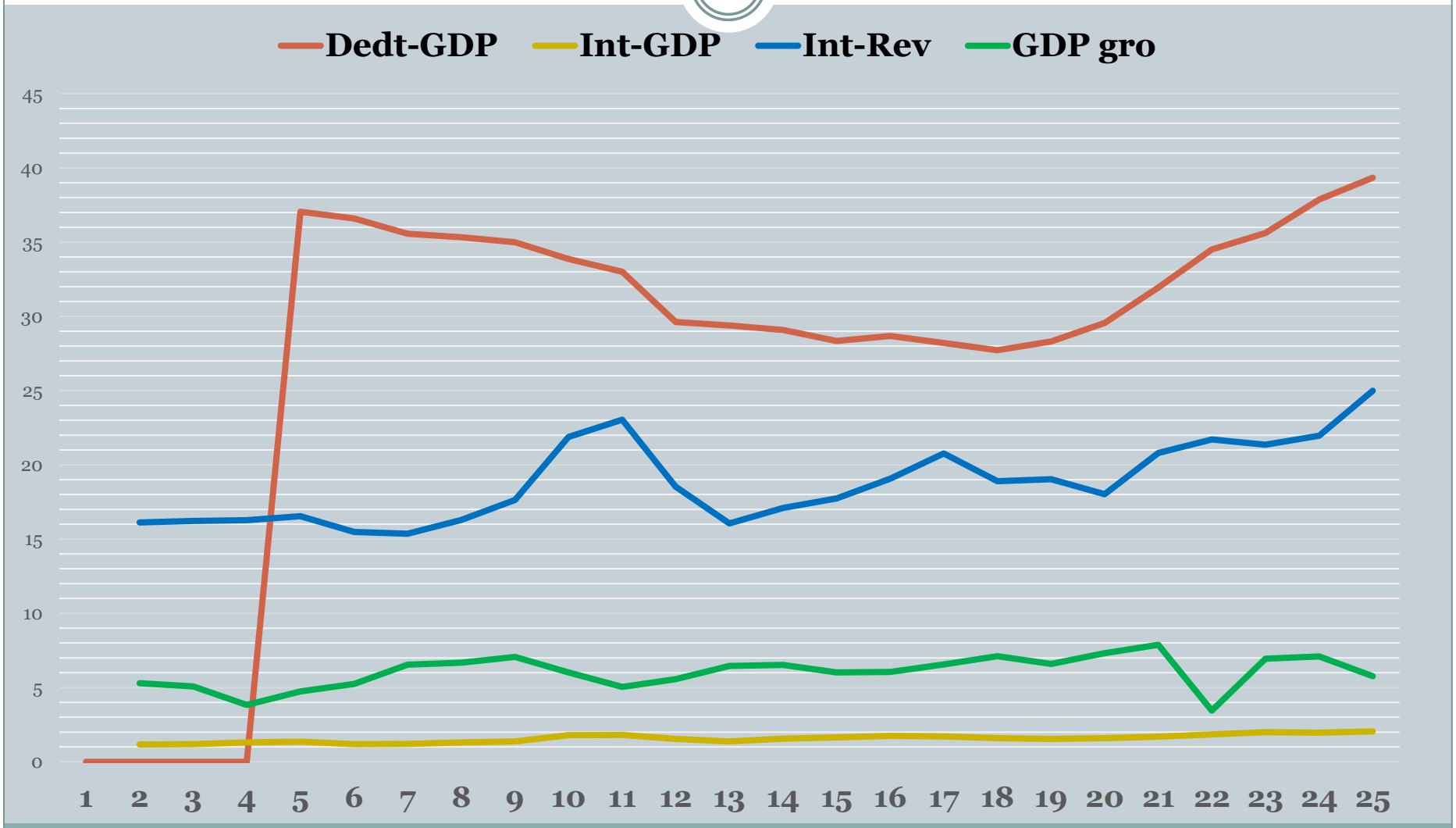
- Several remarks are in order
- (i) *Average* interest rate: Data for FY07-10 (rates between 14-20%) appear anomalous!
- (ii) What about interest on Ext Debt? These are based on BDT values (source: BB), where the ER issues confound the arithmetic.
- Ideally the Ext Debt data ought to be primarily denominated in USD. It warrants scrutiny.
- If nominal rates are suspect, so are the real.

	Nominal Int Rate Dom Debt	Nom Int Rate Ext Debt	Source IMF CPI	Real Int Dom	Real Int Ext
FY06			7.2		
FY07	15.1	1.0	7.2	7.9	-6.2
FY08	20.0	0.9	9.9	10.1	-9.0
FY09	15.5	0.9	6.7	8.9	-5.8
FY10	14.1	0.9	7.3	6.8	-6.4
FY11	9.9	1.0	8.8	1.1	-7.8
FY12	11.9	1.0	8.9	3.0	-7.9
FY13	11.7	0.9	6.8	4.9	-5.8
FY14	11.4	0.8	7.3	4.1	-6.5
FY15	10.8	0.8	6.4	4.4	-5.6
FY16	10.2	0.8	5.9	4.3	-5.1
FY17	10.0	0.9	5.4	4.5	-4.5
FY18	9.1	1.1	5.8	3.3	-4.7
FY19	10.9	1.1	5.5	5.4	-4.4
FY20	9.9	1.5	5.6	4.2	-4.1
FY21	9.3	1.4	5.6	3.7	-4.1
FY22	9.0	1.5	6.2	2.8	-4.7
FY23	9.8	1.9	9.0	0.8	-7.1

… Salient Features

- While we expect better data to come in the near future, we present some key features of the BGD debt profile utilising data from IMF-WDI sources as well as that from MoF-BB.
- The latest period we refer to is FY23.
- (1) *Overall Debt & its Composition*: The overall debt is rather low at about 40% of GDP, i.e., about USD 180**b** (FY23 GDP being about 451.5**b**).
- The external share is also 40% of debt, i.e. about USD 72b.
- A recent upload on BB website cites the value at USD 75b as of Sept 23, rising to 83b by June 2024 (prov).
- (2) *Debt Service*: As ratio of govt revenue (ideally tax rev, since some non-tax items are earmarked in advance), the figure is about 25%, or about 2% of GDP (Fig 1 below).
- The latter is likely to grow quickly in a tighter monetary regime.

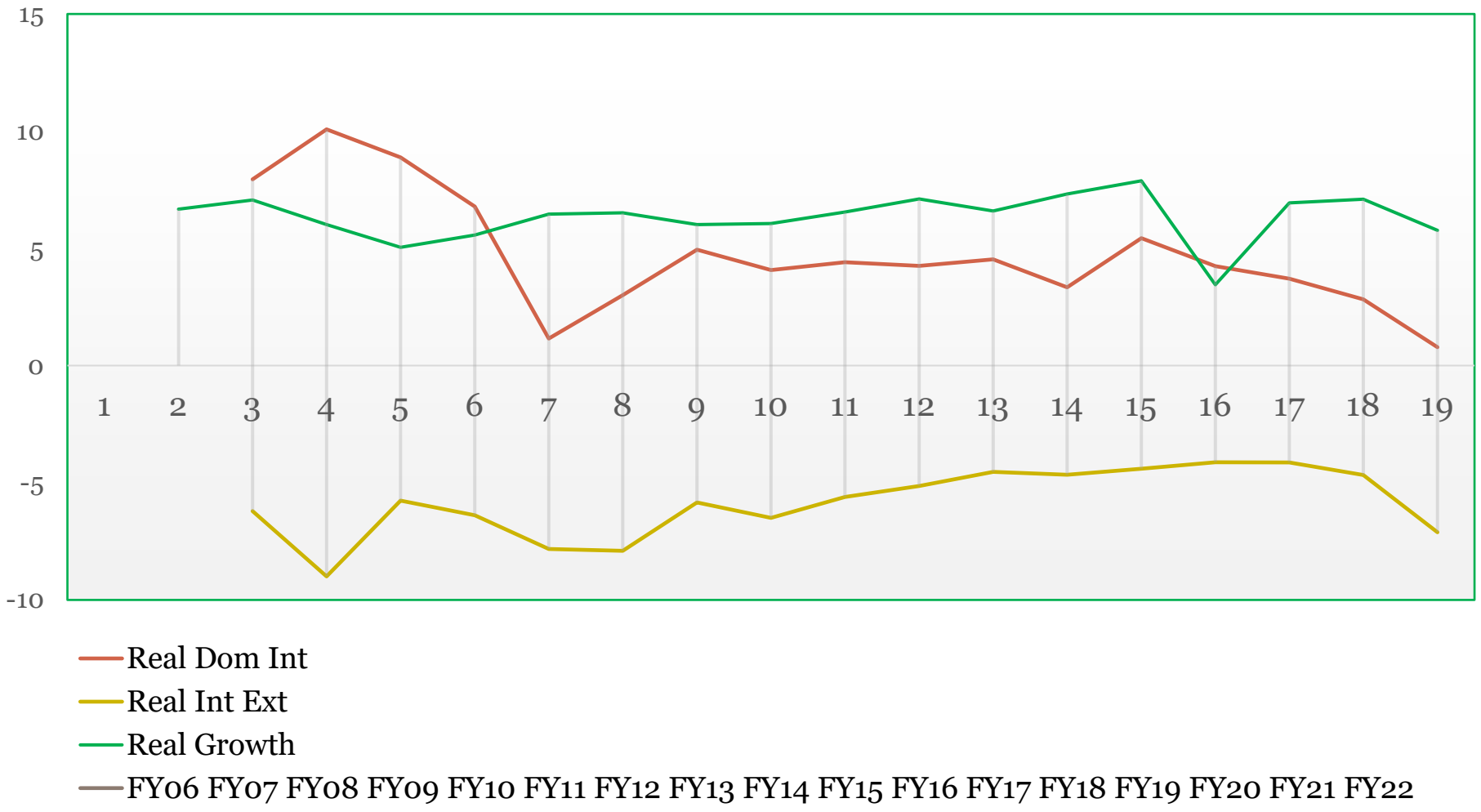
Fig 4: Debt and Related Ratios, FY 00-23
(source: IMF-WDI)



… Salient Features

- (3) *Real Interest Rates*: While the both nominal and real data has been presented in Table 2 above, Fig 2 illustrates the key properties:
- (a) it is seen that r_D <g held for most of the period (except for FY07-10 and FY19).
- (b) Given the low nominal rate of interest on ext debt, r_F <g holds emphatically throughout the entire period.
- As we shall see below that issues of $r_D \leqslant g$ and $r_F \leqslant g$ has played an oversized role in the recent debt sustainability discussion, especially during the ultra-low-interest rate phase.
- Xx
- zzz

Fig 5: BD Data on r_D, r_F and g: FY06-22



4. Debt Sustainability

- 4.1 *The Debt-GDP Ratio*
- In spite of conceptual limitations, the debt-GDP ratio holds the centre stage in most discussions of the debt burden on an economy.
- Popularised by the EU's Maastricht Treaty of the early 1990s, many have championed 60% debt share of GDP as a benchmark to signal stability of monetary policy of a nation.
- Debt Threshold Research:
- *Growth:* Focussing on 24 emerging market economies, Reinhart and Rogoff (2010) find that only at very high level of debt (90% or higher), the median growth rate tends to fall from about 4 to 4.5% annually to less than three percent.
- *Inflation*: Similarly, inflation appears to rise dramatically from about seven to 16 percent as one departs from the low-debt scenario (<30%) to very high levels (≈ 90%).

… Debt-GDP Ratio

- *External Debt*: These same authors find that foreign debt (especially in excess of 60% of GDP) is a more binding constraint on growth for emerging market economies.
- *Debt Defaults*: While the negative results cited above appears to occur only at very high levels debt, many defaults have occurred when the external borrowing levels had been well below the Maastricht guidance.
- The essential point is that the debt-GDP concept is inherently flawed in that it compares the ratio of a stock to a flow.
- Blanchard believes that it is " … of no particular significance without information about the interest on debt. A better concept is the ratio of real debt service to GDP' (2019a, p2). More on that below.

… Debt-GDP Ratio

- *Growth of Debt through Time*: A primary check on the debt ratio may help us examine debt instability in a physical sense, namely whether its growth path is convergent or not (e.g., Blanchard, 2019b, and Eichengreen et al, 2023).
- The underlying debt dynamics can be described by eq (1)
- (1) $b_t = (\frac{1+r_t}{1+g_t})bt_{-1} + d_t$,
- where b_t and b_{t-1} denotes the stock of debt-GDP (i.e., B/Y) ratios at time-t and t-1, g being the growth rate of national output (Y) respectively, 'r' denoting the real interest on debt, and d-denotes the primary balance (d = [G-T]/Y), namely government expenditure excluding interest on debt (G) minus total tax (T), to GDP ratio.

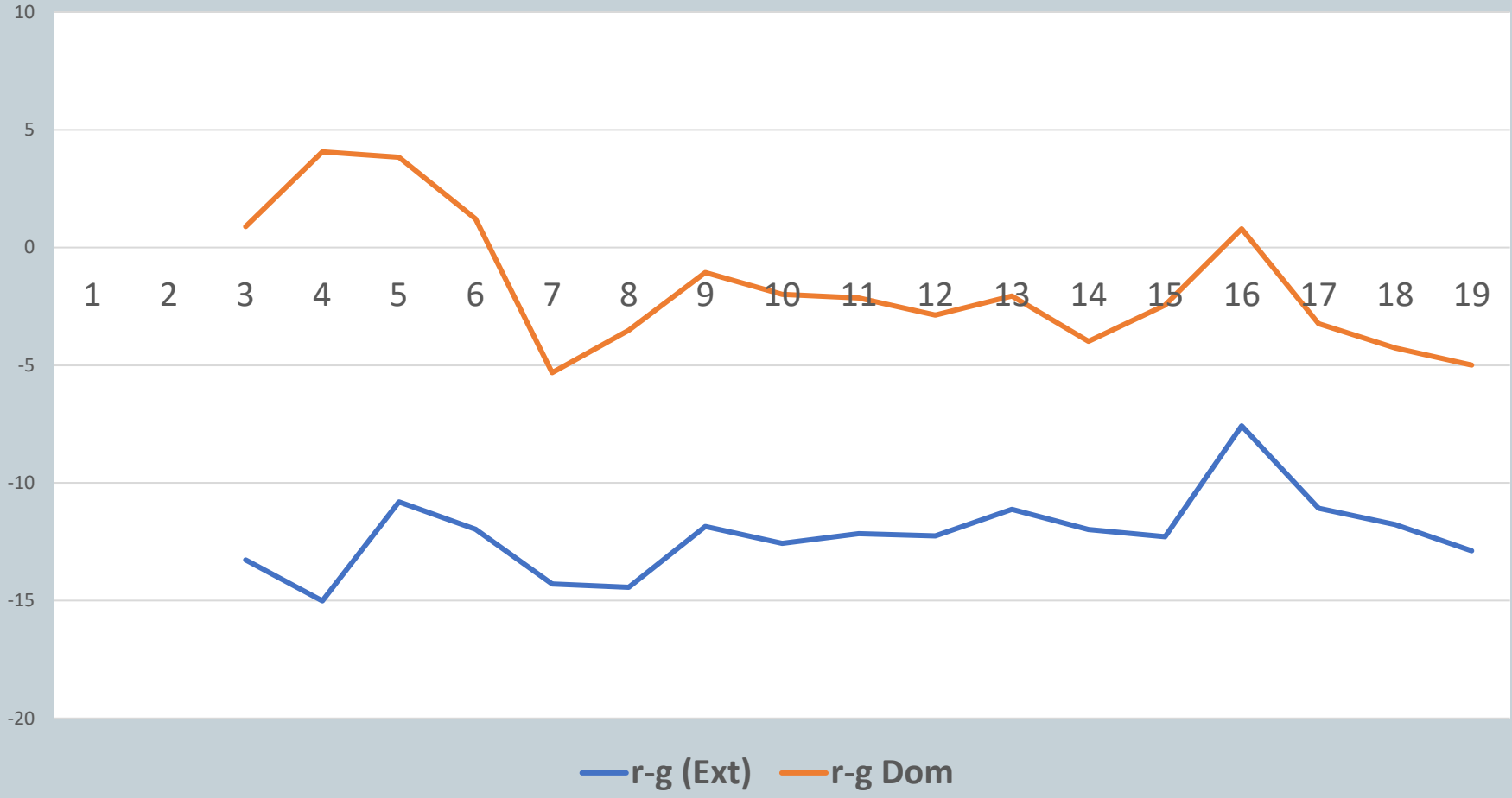
… Debt-GDP Ratio

- In the fortuitous event that

  (1a) $[(1+r_t)/(1+g_t)] < 1$,

- debt growth gets dampened over time.
- It immediately follows that $(r_t - g_t) < 0$ is both necessary and sufficient for the inequality (1a) to hold.
- From (1) it also follows that if $(r_t - g_t) < 0$, as Blanchard et al (2021) observe, the constancy of debt between two adjacent dates, i.e., $b_t = b_{t-1}$, will be consistent with a modest degree of primary deficit i.e., G > T):
- (1b) $b_t \left(\frac{g_t - r_t}{1+g_t}\right) = d_t$
- *Illustration for Bangladesh*: In the BDG context, condition (r-g) < 0 has held in most years since the new millennium Fig 6. Recently IMF (2024) has projected (r-g) to be -0.06, i.e., negative six percent, over 2024-29, presumably for the foreign component only.

Fig 6: (r-g), Domestic and Foreign, FY 07-23



… Debt-GDP Ratio

- Going Forward: Issues of growth in FY25 and 26!
- Given the present debt ratio of less than 40% of GDP, its evolvement through time, as described by (1) above, is likely to remain stable over the foreseeable future.
- We return below to the debt service question

4.2 The Blanchard Framework

- In a series of papers Blanchard (e.g., 2019a, 2019b, 2023) has highlighted two distinct consequences of public debt, (a) fiscal cost, and (b) a welfare cost.
- *Fiscal Cost of Debt*: High debt implies high *distortionary* taxes in the future. Distortionary to mean that the resource cost of raising a taka exceeds one taka on account of DWL of taxation.
- *Welfare Cost*: Debt is presumed to crowd out capital in the portfolios of savers, decreasing capital accumulation and thus likely decreasing future output and consumption. (We take this up in section 5 below)
- Fiscal Cost: Blanchard argued that in a low interest environment, with $r < g$, since output grows at a faster rate than the interest rate, higher debt does not need to lead to higher taxes since the debt-to-GDP ratio will decline over time without the need to ever raise taxes.

… Fiscal Cost of Debt

- Some special cases
- (1) Let the initial stock of debt (b_t) as well as the interest (r_t) payable on debt to remain unchanged over time, i.e., no new primary deficit, d =0.
- The stock of debt at an arbitrary date in the future, i.e., t-periods from now (i.e., period-0) would be,
- (2a) $B_t = B_0 (1+r)^t$, since $r_t = r$, all t (= 0, 1, 2 …).
- the future debt-GDP ratio would evolve as (g being the average rate):
- (2b) $b_t = b_0 \left(\frac{1+r}{1+g} \right)^t$,
- where it is immediate that if (r-g) < 0, $b_t < b_0$. … Further,
- (2c) $\lim_{t \to \infty,} b_t = 0$. […Krugman's remark about the irrelevance of debt]

… Fiscal Cost of Debt

- Numerical: In (2b), since r<g, let r =(-) 0.02, while g = 0.04, thus (1+r)/(1+g) = (0.98)/1.04 = 0.94. Now letting t=20, we get
- (2d) $b_t = b_0\ (0.30)$
- Thus, whatever b_0 was (say, 50 b), in 20-years' time, the new debt value would decrease to about 30% of its original value (i.e., 15 b).

- 2nd Case: Neither r nor g is constant through time.
- Instead of (2a), we get:
- (3a) $B_t = B_0\ (1+r_1)(1+r_2)\ ....(1+r_t),$

where $\{r_t\}$, t =1, 2, … denotes the sequence of interest rates.

… Fiscal Cost of Debt

- Allowing output to behave the same way, i.e., growing at rates $\{g_t\}$, t =1, 2, …, we would instead obtain

- (3b) $b_t = b_0\{(\frac{(1+r1)(1+r_2)....(1+rt)}{(1+g_1)(1+g_2)....(1+gt)})\}$

- Now in (3b) if $(r_t - g_t) < 0$, for all t, a much taller order, much the same conclusion holds, namely that $b_t < b_0$, though the extreme case of a vanishing debt does not quite apply.
- In all these scenarios, public debt would not inflict any fiscal cost to the treasury since taxes do not have to necessarily increase at any time in the future just to meet debt service.
- The discission on slides #25-27 presumes that $d_t = 0$.

4.3 Debt Service and Tax Revenue

- While Blanchard (2019a) suggested that one focus on debt-service to GDP, he did not offer any functional rule.
- What criteria can one invoke to set a value, or even a range to the debt service-to-GDP ratio?
- Recent data indicating that India's (IND) debt service to GDP is about 5.4% to that of 1.8% in Bangladesh (BGD), was BGD was in a superior position (IMF, 2024)?
- Not necessarily; in view of the dramatically lower tax yield in BGD (about 7.5% in FY23 compared to 18% for IND), the true burden on the treasury is not that dissimilar.
- Debt interest used up 30% of tax revenue in India vis-à-vis 24-25% in BDG (Ahsan, 2024).

… Debt Service

- In view of the general paucity of tax revenue in LMIEs, we propose a rule for debt sustainability, namely the slope of the tax-GDP ratio (T/Y) be greater than the ratio of interest on debt (rB) obligation to GDP (Y), i.e., that taxes grow faster than interest on debt.
- If this was met, then one would be assured that fulfilling debt obligations cannot worsen the government's primary deficit/surplus.
- We may state this condition as follows, where the notation is obvious:
- (2) $\frac{d}{dt}\left(\frac{T}{Y}\right) \geq \frac{d}{dt}\left(\frac{rB}{Y}\right)$, i.e.,
- Upon further rearrangement, we have:
- (2a) $T\left[\left(\frac{1}{T}\frac{dT}{dt} - \frac{1}{Y}\frac{dY}{dt}\right)\right] \geq (rB)\left(\left[\frac{1}{r}\frac{dr}{dt} + \frac{1}{B}\frac{dB}{dt}\right] - \left(\frac{1}{Y}\frac{dY}{dt}\right)\right)$

… Debt Service

- Given that most quantities in (2a) are in the nature of growth rates, we restate as follows
- (3) $g_T \geq (g_Y + (\frac{rB}{T})\,[(g_r + g_B) - g_Y])$
- Note that we had earlier denoted growth of output simply as 'g', hereon it is denoted by g_Y. See illustration on the next slide (Table 3)
- Condition (3) is most intuitive; if both interest rate and the stock of debt were to remain constant (i.e., no new debt as we go from time t to t+1):
- (3a) $g_T \geq g_Y\,(1 - \frac{rB}{T})$, where note that $(1 - \frac{rB}{T}) < 0$.
- Thus, taxes do not have to grow as fast as the GDP so long as the interest payments do not exhaust all tax revenue and all other government expenditures grow at the rate of GDP or less.

Table 3: Revenue Growth Compatible with Debt Sustainability

- The illustration below depicts two growth scenarios and a possible upward interest rate hike. The tax rate must always grow faster than output; if output grows at 5%, revenue must grow by about 6 percent, and 4.3 when growth declines to 3%.

Output Growth (g_Y)	Debt Interest ratio: (rB/Y)	Interest Growth (g_r)	Debt Growth (g_B)	Implied Tax Growth (g_T)
0.05	0.02	0.4 (e.g., rising to -0.03 from -0.05)	0.03	0.058
0.03	0.025 (col 3 & 4 imply this)	0.5	0.05	0.043

… Debt Service

- In such a scenario, if the interest on debt used up 30% of all tax revenue, total tax revenue (T) has to rise at 70% of GDP growth rate in order to keep the government's budgetary balance the same as last year's
- Note that the expression [(g_r + g_B)- g_Y] can easily be positive; where all three terms are growth rates, the villain of the piece is the first term, the growth rate of the relevant interest rate (g_r) which can be rather volatile vis-à-vis the other two.
- If the effective interest rate, say on foreign borrowing, were to jump from two to four percent, i.e., implying a value of g_r = 1, even for a constant debt stock, the interest obligations on the foreign content of debt would double.
- The major takeaway from the above exercise is that tax revenue must grow faster than GDP in times of debt.

… Debt Service

- Further Discussion: Note that since in all plausible scenarios, rB < T, let us say that rB = θT, where θ <1. Now, if θ were to be constant through time, it is immediate from (3) that the inequality would have always held so long as the growth in tax effort was positive, even if only minutely so. Setting rB = θT, inequality (2) modifies into

- (2b) $\frac{d}{dt}\left(\frac{T}{Y}\right) \geq \theta \left\{\frac{d}{dt}\left(\frac{T}{Y}\right)\right\}$,

- Dividing through by the left-hand-side, non-zero, and if positive, yields:

(2c) $1 \geq \theta$.

- Thus, even the viability of a constant absolute amount of debt service requires that the tax effort grow over time, even if by just a little.

… Debt Service

- Note that the difference between the interest rate and the GDP growth rate, (r -g_Y) or (r-g), which had a critical part in explaining the evolvement of debt-GDP ratio in equation (1) above, do not play any role in the debt sustainability discussion given by condition (3).
- The criteria proposed above may come across being on the harsh side, since if the tax revenue as a share of GDP had been stagnant, not to speak of even a small decline, debt sustainably would surely falter.
- Condition (3) can still hold (if weakly) even if $g_T = 0$, only if either the interest rate fell (i.e., $g_r < 0$), or the stock of debt fell (i.e., $g_B < 0$), or both:
- (3a) $$o \geq g_Y\left(1-\frac{rB}{T}\right)+\left(\frac{rB}{T}\right)[g_r+g_B]$$
- The requirement of GDP to keep growing at a positive rate is a sufficient condition for the above result to hold, though not necessary.

A Sum-up of Debt Service Analysis

- The policy we examine is that that taxes grow faster than interest on debt, which leads to an operational guidance on how fast taxes must grow.
- First, we see that taxes must generally grow faster than GDP growth.
- Only when debt has stopped growing, can taxes grow slower, but grow it must; if the interest on debt used up 30% of all tax revenue, taxes have to rise at 70% of GDP growth
- An illustration with some viable parameters show (Table 1) that if output grows at 5%, revenue must grow by about 6 percent, and by 4.3 % when growth declines to 3%.
- Finally, if $g_T = 0$, debt service sustainability can be maintained only if either the interest rate fell (i.e., $g_r < 0$), or the stock of debt fell (i.e., $g_B < 0$).

4.4 Debt Implications of DMB Recapitalisation

- The risk of contingent liabilities emanating out of SoE debt and deposit-money-banks (DMB) pose a major threat to debt sustainability, witnessed by the periodic recapitalisations.
- The present state is precarious: At reported values of the size of likely under-capitalisation, about BDT 37,506 crore (or, 375.1b) of 14 banks, about 0.8% of GDP (Daily Star, 02 Dec/2024).
- If one were to add this in one shot to the budget shortfall, the deficit in FY24 would have gone up (from about 5%) by nearly one pp to about 6% of GDP.
- In view of the recent White Paper, the above arithmetic may be just pointing at the tip of the iceberg.

4.5 Miscellaneous Issues

- Debt Management: Debt Rollover and locking-in of interest rates on debt
- The locking in of interest rates on debt idea is largely not applicable to an LMIE like BGD, where an active secondary market does not exist for governments bonds.
- There is no scope of automatic buybacks either, savers load and unload on their own volition.
- Besides the rates on offer (e.g., NSD, wage-earner and various other instruments) have historically been non-market, even when the rates are tweaked from time to time.

5.0 Debt and Welfare

- The focus on 'welfare cost' of debt as commonly framed in the literature presupposes a conclusion that debt has a cost; the remaining question was whether the loss was small or large.
- Blanchard (2019 a,b) posits debt as (i) crowding out private investment, (ii) thereby lowering future output (Y_2), and hence (iii) lowering consumption (C_2).
- In his analysis even the welfare cost depended on the relative size of the interest rate (r) on debt vis-à-vis growth rate, g, much as it did in the assignment of the fiscal cost of debt.
- So long as r<g, there would be a welfare gain due to debt, and he concluded that ' … the welfare effect of public debt is probably negative, but not large.'
- My two cents here is that a theory merely focussed on r≷g appears too much of a reduced form of analysis! What role does the relative productivity of private/public capital play here?

… Debt and Welfare

- Pre-BDK thoughts were that even a debt-induced reduction of current consumption (C_1) amounted to a loss of wellbeing.
- BDK (1961) clarified that the unit of analysis is the change in 'lifetime utility' of a generation. They chided colleagues who used "… the amount of consumption foregone at any one moment of time as some sort of index of the over-all sacrifices made by a generation is misleading" (BDK, 1960, p702).
- They continued: "let us define the real burden of a public debt to a generation as the total consumption of private goods foregone during the lifetime of that generation as a consequence of government borrowing and attendant public spending" (p.702).
- Hence the focus on lifetime utility.

… Debt and Welfare

- There is a strong presumption in advanced market economies that public capital is less productive, otherwise private investors would have taken these over.
- The fact that investment in infrastructure are by nature lumpy. However, in a large economy a consortium of private investors can still handle it.
- A similar argument is harder to make in LMIE context, both because of weak domestic capital markets and weak rating of private investors in international capital markets, compromising its social viability.

5.1 A Preview of the Life-Cycle Model

- The analysis that follows in section 5.2, though long, tells a simple story.
- Two-Period Model features: Now & later, $W(C_1,C_2)$
- Public investment induced debt involves a transfer of current resources into the future, thus lowering C_1.
- Unless public investment were more productive than private investment, question of higher future output and possible higher consumption in future (C_2) does not arise.
- Blanchard and colleagues appear to focus on C_2 alone!
- The point is that even with an increase in C_2, lifetime wellbeing may not necessary increase since the value of additional future comfort may not outweigh the pain suffered early in life.

… Preview

- Models with No debt, Domestic debt & Ext debt: The first question is the credit market implications of debt, namely the tightening of the domestic credit market when debt is introduced.
- Logical that $r_o < r_D \gtrless r_E$. Analysis is easier if $r_o \cong r_E$, presently $r_o < r_E < r_D$. Discussion
- *Domestic vs Ext Debt*: Under domestic debt, tax payments required to payback debt and interest do not affect GDP or GNI. Explain.
- Secondly if taxes were proportional consumption tax, in such a model, there is no DWL, and hence no change in r_D.
- However, with Ext debt, payment to foreigners, international factor payments, we have GNI< GDP. Likely loss of wellbeing.
- Similar tax policy may also have no DWL and leave r_E unchanged.
- Jump to section 5.3.

5.2 Debt in a Two-Period Model

- This section is devoted to an exploratory, though microscopic, analysis of the welfare consequences of debt in a two-period life-cycle framework.
- The proposed analysis is entirely qualitative under rather general conditions but assumes a closed economy.
- Initially we model pure domestic debt and then extend the analysis to model external debt, without at this stage combining both.
- Why a two-period model? "The life-cycle model provides a convenient vehicle to discuss the *alternative* notion of the 'burden' of the debt being the reduction in lifetime utility" (Atkinson-Stiglitz, 1980).
- We start with an economy with no debt and then examine how the social welfare changes as we allow an episode of debt to be repaid within the generation's lifetime.

… Debt and Welfare

- In our framework, the young in period-1 of life buy the debt (i.e., bonds), which are invested by the State, while the debt is to be retired in period-2 when they are old.
- The simplest interpretation is that the government has no other expenditures except infrastructure. Then public investment proceeds (e.g. road tolls) accruing to the State can be directly used to pay off bondholders.
- In case of domestic debt, the bondholders (now old) receive principal and interest, while others pay taxes, which would have no consequences on GDP except for DWL entailed by tax rules.
- In case of foreign debt, literally all of it, the budget suffers due to the payment to foreigners, and the GNI becomes the economy's budget. Here again one must contend with DWL.

… Debt and Welfare

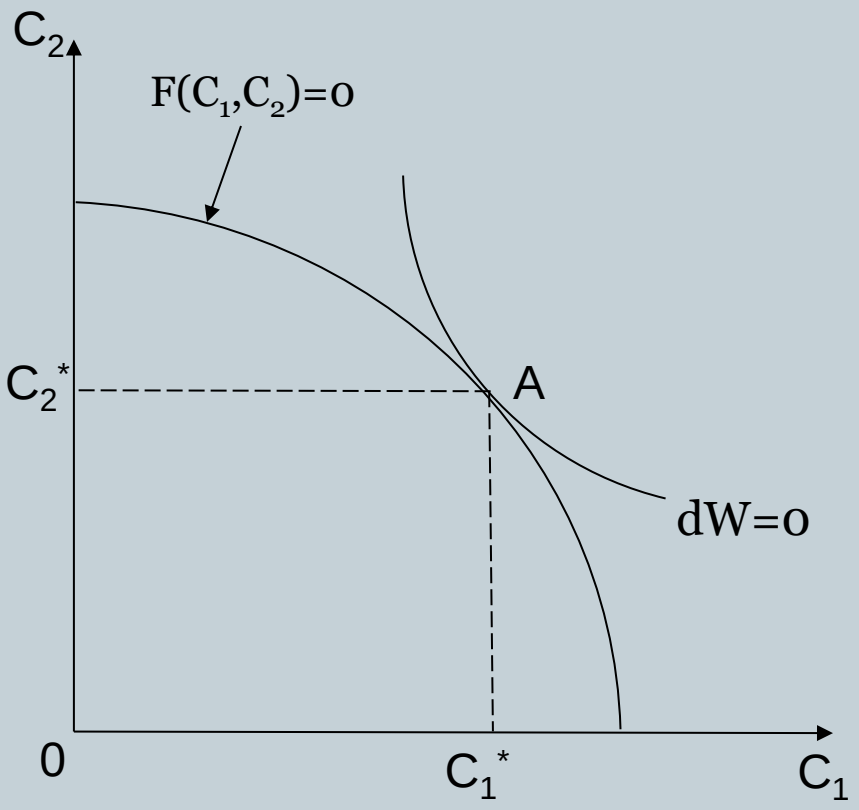
- In the life-cycle context adopted here, the idea of debt burden is crystallised as the possible loss in lifetime utility by the generation witnessing the public expenditure, where the debt is retired during their own lifetime.
- Of course, there are distributional issues that we abstract from presently, namely between large and small savers, which may be further amplified if taxation is to be resorted upon to help defray the debt.

Fig 4a. Consumption Allocation Over Time

The No-Debt: Real Economy

- Production Frontier $F(C_1,C_2)=0$, where $(-)(dC_2/dC_1) = (F_1/F_2)$, denotes the growth factor, $(1+g)^{-1}$.
- SWF: $W(C_1,C_2)$.
- If no capital market (Autarky): Production and consumption choices get coordinated such that both are at A (C_1^*,C_2^*).
- From SWF, setting $dW=0 = W_1dC_1 + W_2dC_2 \Rightarrow$
- $(-)\ (dC_2/dC_1) = (1+\rho)^{-1}$, society's rate of time preference, $\rho > 0$.

A Two-period model



… Consumption allocation Over Time

The No-Debt: Real Economy

- *Interpretation*: Equilibrium process can be described by producers seeking to maximise the value of output,
- (1) $(-)(dC_2/dC_1) = (F_1/F_2) = (1+g)^{-1}$, while society adjusts its time preference to choose consumption mix optimally so that
- (2) $(-)(dC_2/dC_1) = (W_1/W_2) = (1+\rho)^{-1}$.
- The mutual tangency defines the implicit equilibrium values.

A Two-period model

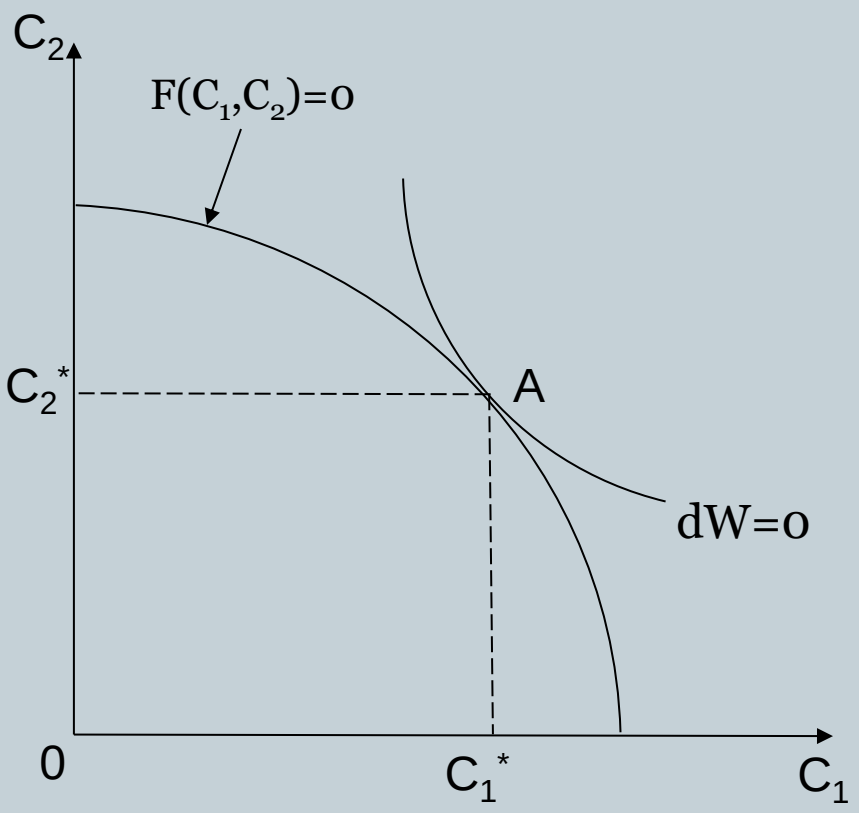


Fig 4b. Production Choice with a Capital Market

- We can write the GDP value, Y, as the present value of lifetime consumption as:

$$Y = (p_1C_1 + p_2C_2).$$

- Letting $p_1 = 1$, p_2 [$\equiv p = (1+r)^{-1}$] has the interpretation of period-2 price of consumption.
- Thus, $Y = (C_1 + pC_2)$. Setting $dY=0$, $dC_1 + pdC_2 = 0 \Rightarrow$

$$(-)\ (dC_2/dC_1) = (1/p)$$

- Given p, or equivalently, r, producers would maximise GDP at B.

A Two-period model

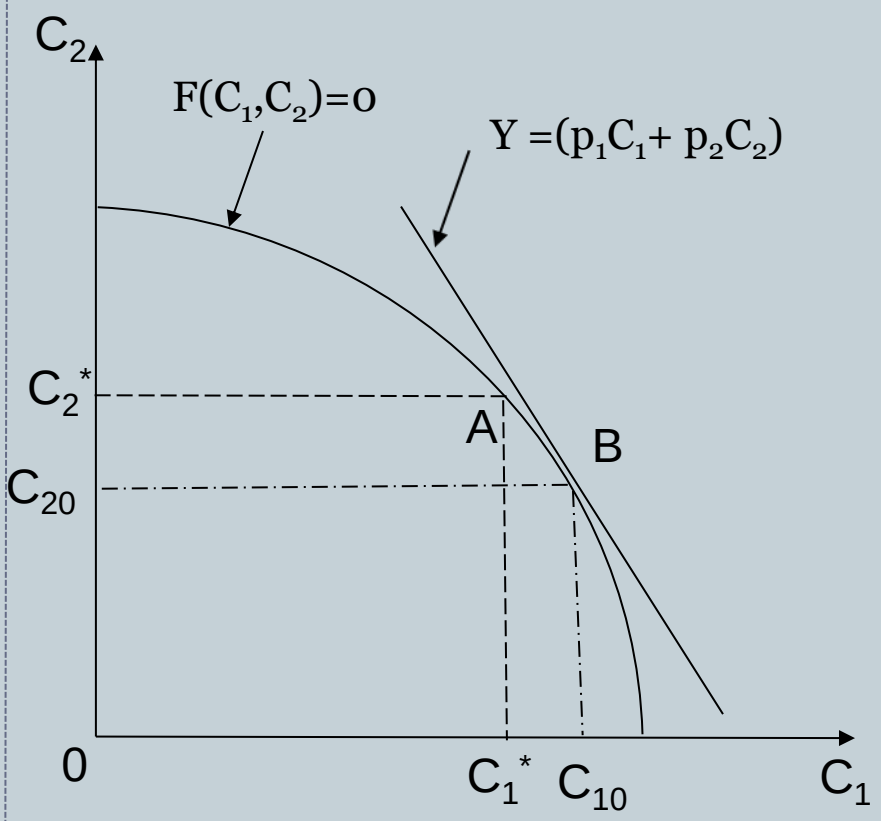
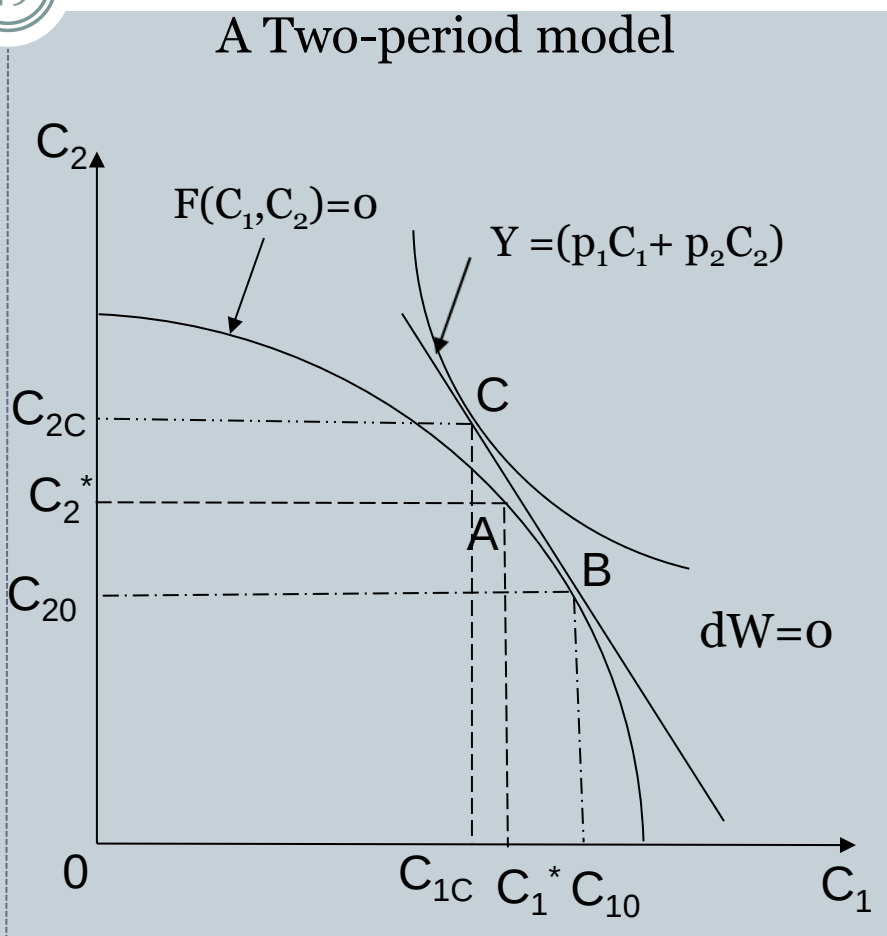


Fig 4c: Consumption with a Commodity Market

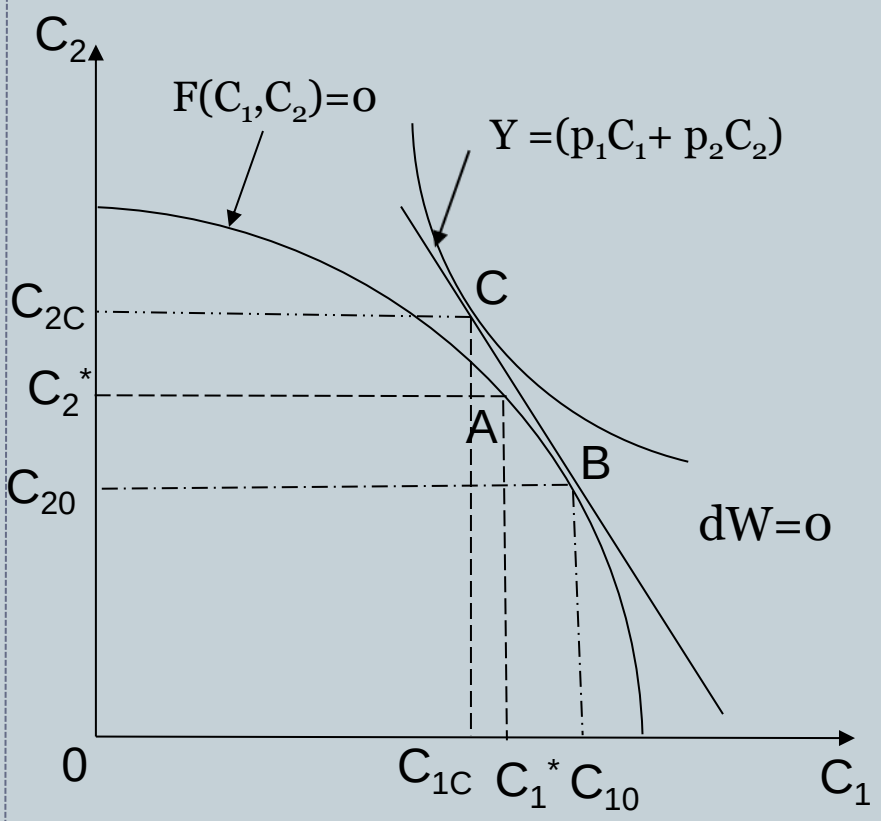
- The consumption outcome would generally differ from one under autarky.
- One possible outcome, point C in Fig 4c, requires the functioning of an active commodities market that trade in futures. [Note that we are effectively dealing with a one-good grain/corn economy!]
- In a strict 2-period model, if production takes place at B, consumption cannot lie to the right of B on the GDP line. Thus, no borrowing of grains is possible in period-1 .



… Consumption with a Commodity Market

- Thus, society would lend the amount ($C_{1C}C_{10}$) amount in period-1 in exchange for a larger amount in the future, ($C_{20}C_{2C}$).
- Society could have stayed at B, but given market opportunities, it would be better off at C.

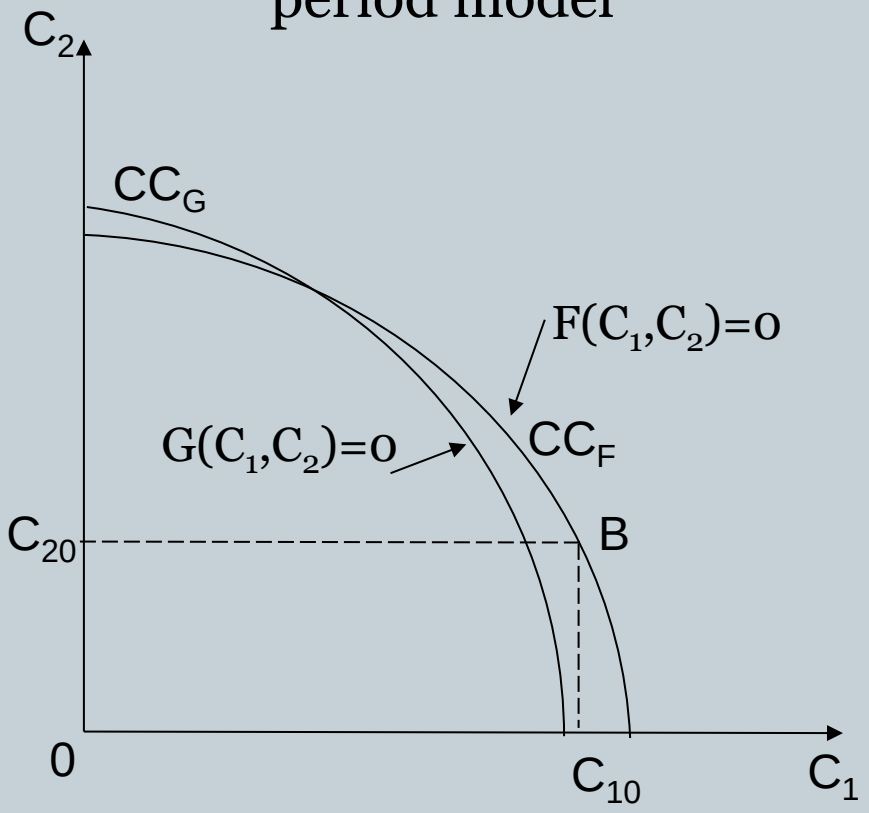
A Two-period model



… Possible Impact of Debt on Output

- Production Frontier, $F(C_1,C_2)=0$
- Given prices, let the private economy continue to produce at B (c_{10},c_{20}) as Fig 4b.
- If *new* public debt is created by public borrowing, it lowers the net availability of current goods.
- If the 'money' was used in infrastructure (as in Sukhomoy Chakravarty's view private economy did not save enough), max future output may even increase at the new frontier, $G(C_1,C_2)=0$, drawn as CC_G!

Fig 5a. Public Debt in a Two-period model



… Possible Impact of Debt on Output

- Alternatively, if the planning authority was less astute than Chakravarty would have demanded, the production frontier may have shifted down to CC_G as in Fig 5b on the right.
- The initial private economy outcome is the same as in the previous slide, choice at $B(c_{10},c_{20})$. With CC_G, no matter where production takes place; there is a welfare loss, a no-brainer.
- Note that the new production frontier with debt, both in Figs 5a & 5b, starts to the left of the original frontier on the x-axis. It can be in either side of C_{10}.

Fig 5b: Public Debt in a Two-period model

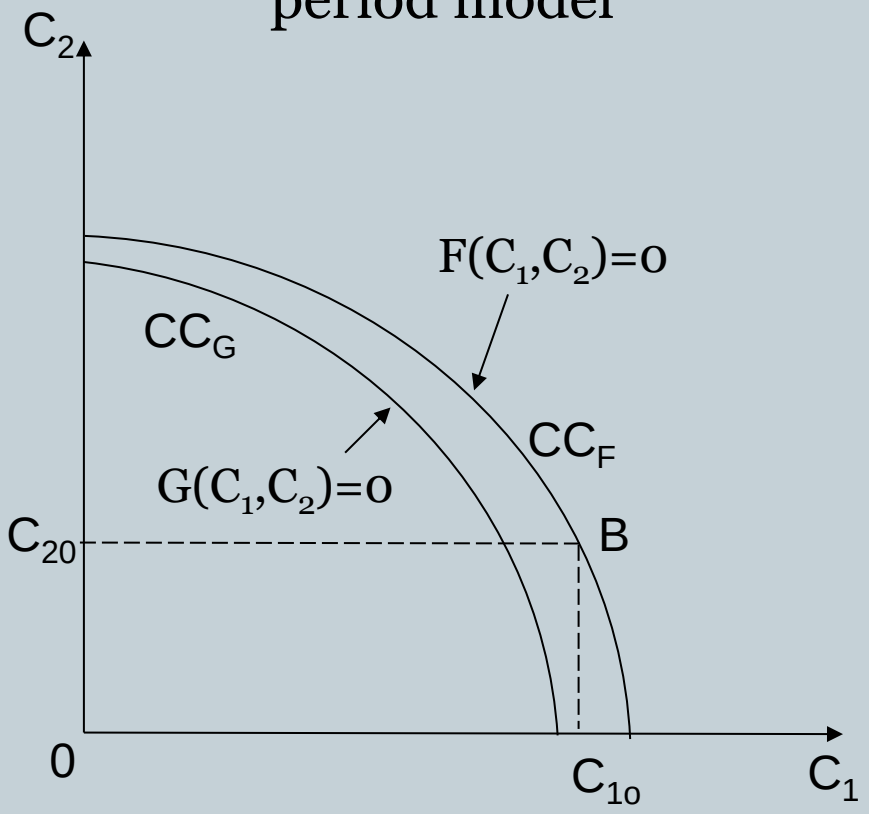
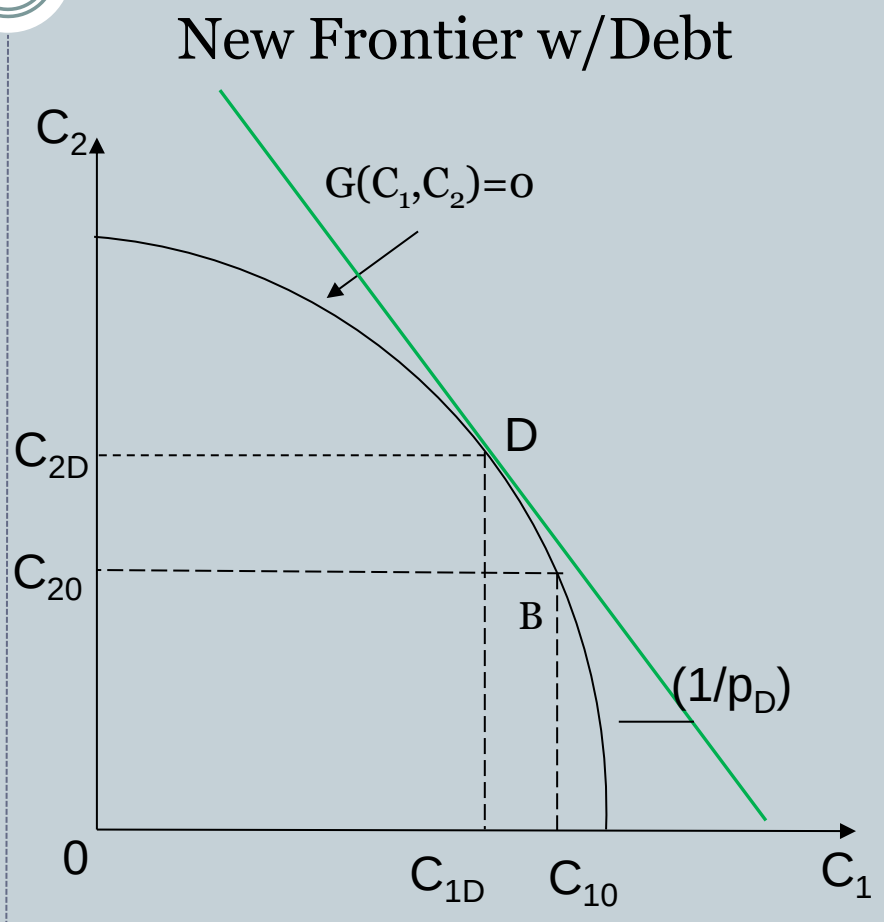


Fig 6a. Production Choice under Debt

- Let us focus on the virtuous case (higher productivity of public capital) with the new output frontier with debt $G(C_1,C_2)=0$, steeper at each level of C_1 than the original one, indicating a higher growth rate, $g_D>g$ at each C_1.
- First note that in order to retain comparability we allow point B, the production point pre-debt PPF (as in Fig 4b) to be available on the post-debt frontier, G. (Debt size is not too dramatic, see below!)
- Next, given the relative scarcity of current goods, its price is expected to rise.



… Production Choice under Debt

- Equivalently, the economy would face a higher interest rate post-debt, yielding a steeper GDP line than in Fig 4b.
- We have an immediate observation on the comparability of the outcome pre-and-post debt.
- Theorem: So long as the pre-debt production mix (at B) remains available in the post-debt scenario, on frontier G, welfare cannot fall in the new equilibrium.

New Frontier w/Debt (Fig 6a)

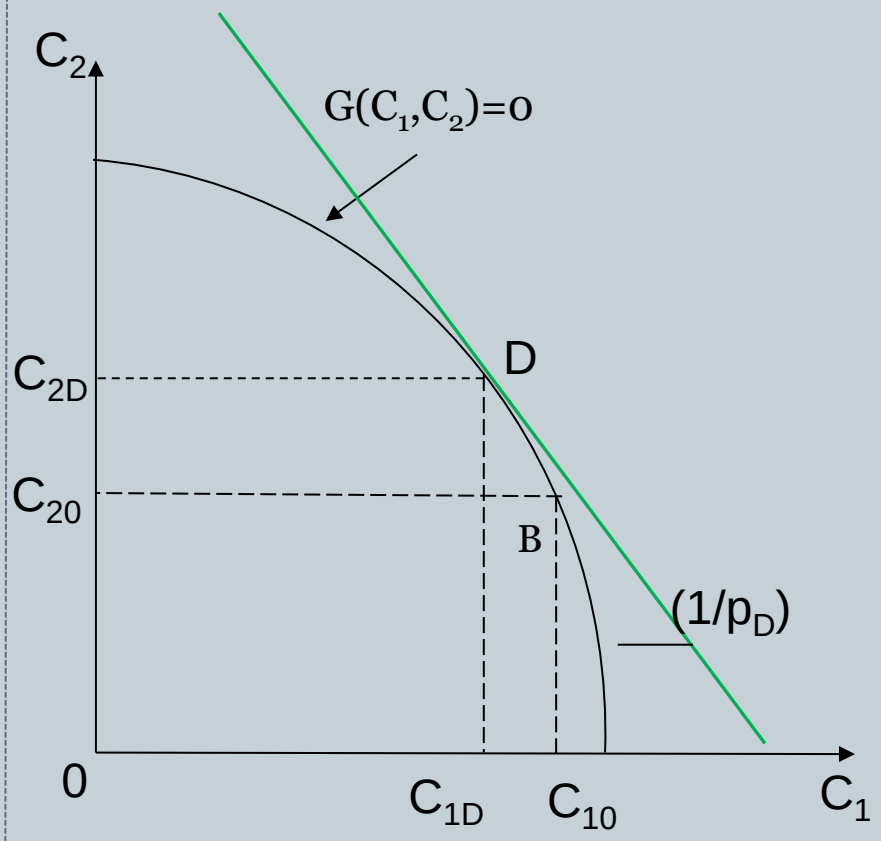


Fig 6b. Production Choice under Debt

- Argument: Since the original GDP-line through B is flatter than the new one through D (see Fig 6b), and points to the right of B are infeasible, the result is immediate.
- We do not even need to utilise the social indifference curves to make the point.
- See figure on the right: The blue GDP-line from B to its left is entirely below the line through D. The monotonicity of preferences is sufficient to sustain the result: For every point on line-B, there are points on line-D that each have more of everything.

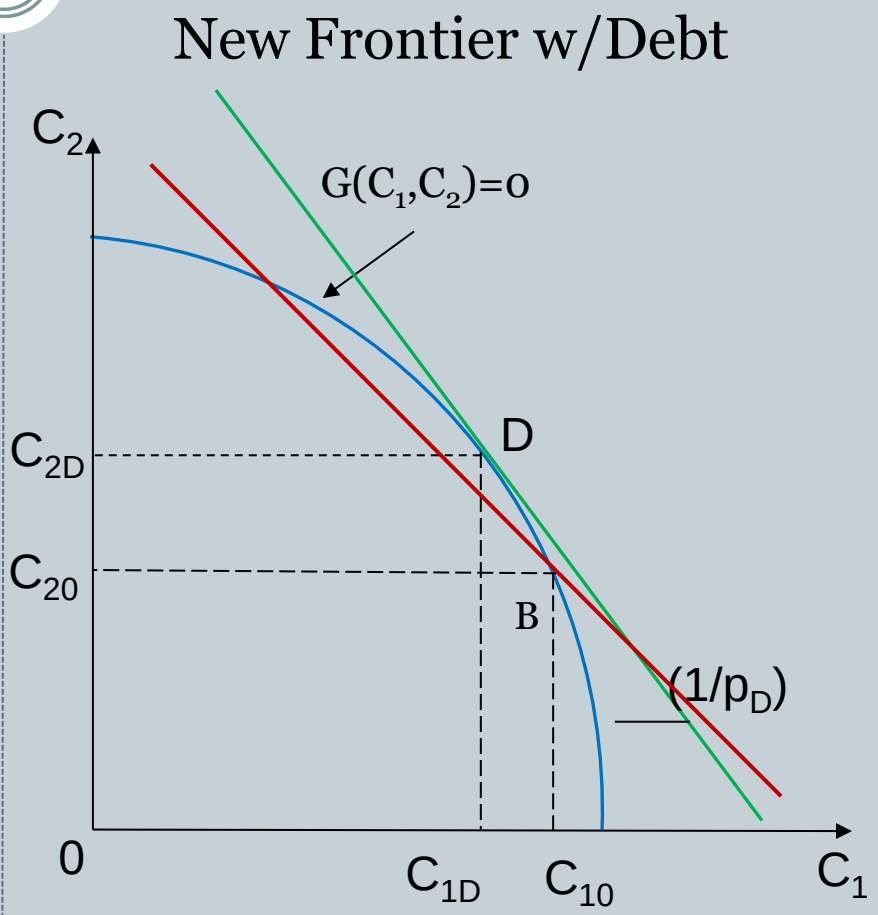


Fig 6c: … Production Choice under Debt

- It is seen that given p_D, the value of output at D exceeds that at B.
- We now superimpose the former pre-debt PPF in Fig 6a.
- What about the consumption choice on the GDP line?
- Again, given production at D, the consumption choice involves only lending possibilities as before, i.e., to points to the left of D.

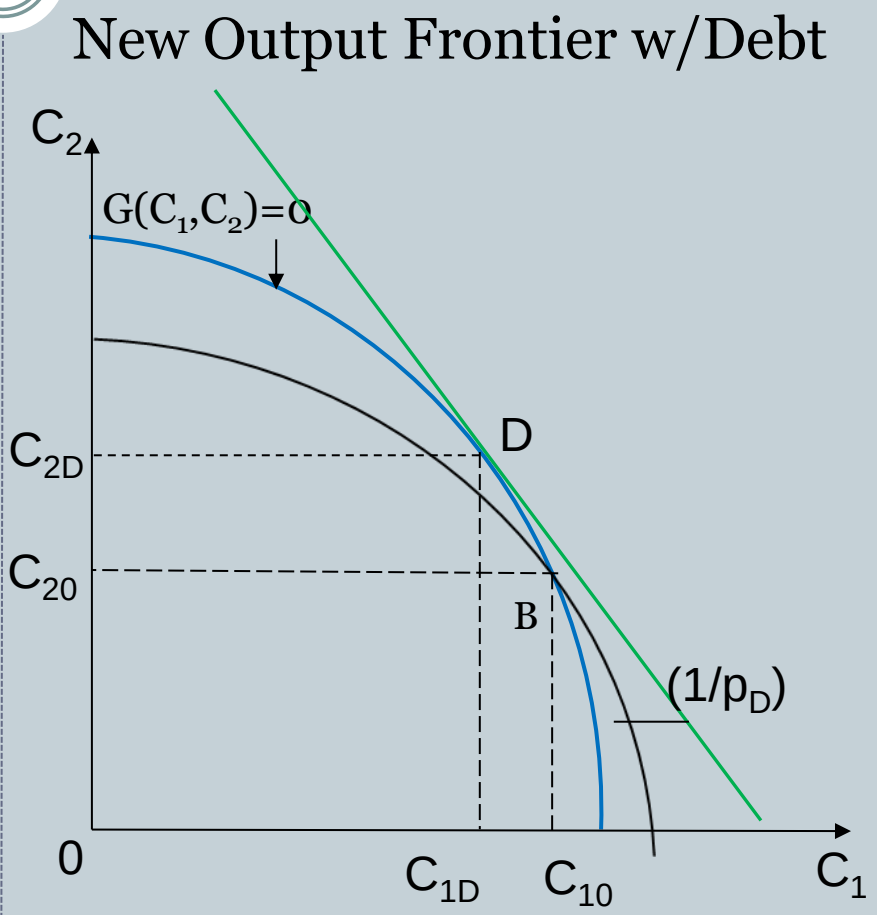
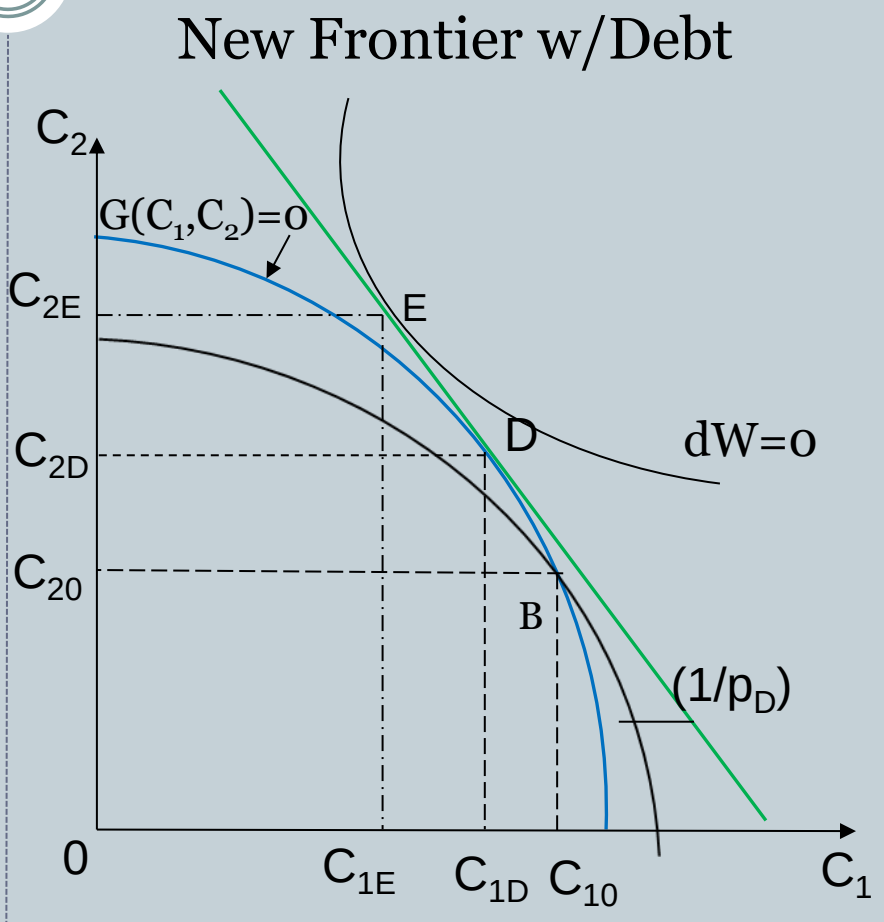


Fig 6d: Consumption Choice under Debt

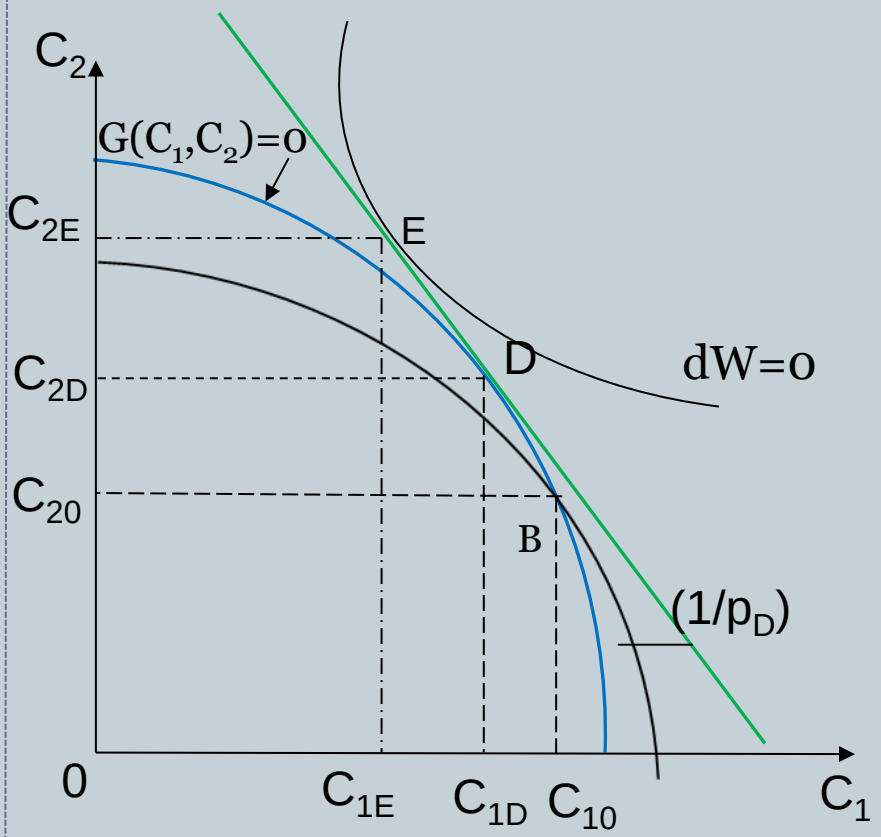
- A plausible new equilibrium is shown by point E in Fig 6d.
- In the entire discussion above, current consumption always falls, which is consistent with the goal of issuing a debt.
- The treasury withdraws resources depleting private capital and reinvesting the same for future goods of higher productivity.
- Thus, future consumption would always rise as these are more plentiful.



… Welfare Consequences of Debt

- What conclusions can we draw on the welfare implications in this 2-period analysis in a closed economy?
- The first is an obvious remark where the production frontier shrinks to reside entirely inside that of the pre-debt economy as public investment is less productive than private capital (Fig 5b). Debt is a terrible idea in such a case.
- In the virtuous case, public investment is productive, and it is entirely plausible to reap welfare gain (as in Fig 6b-6d) so long as debt is not too dramatic in size.

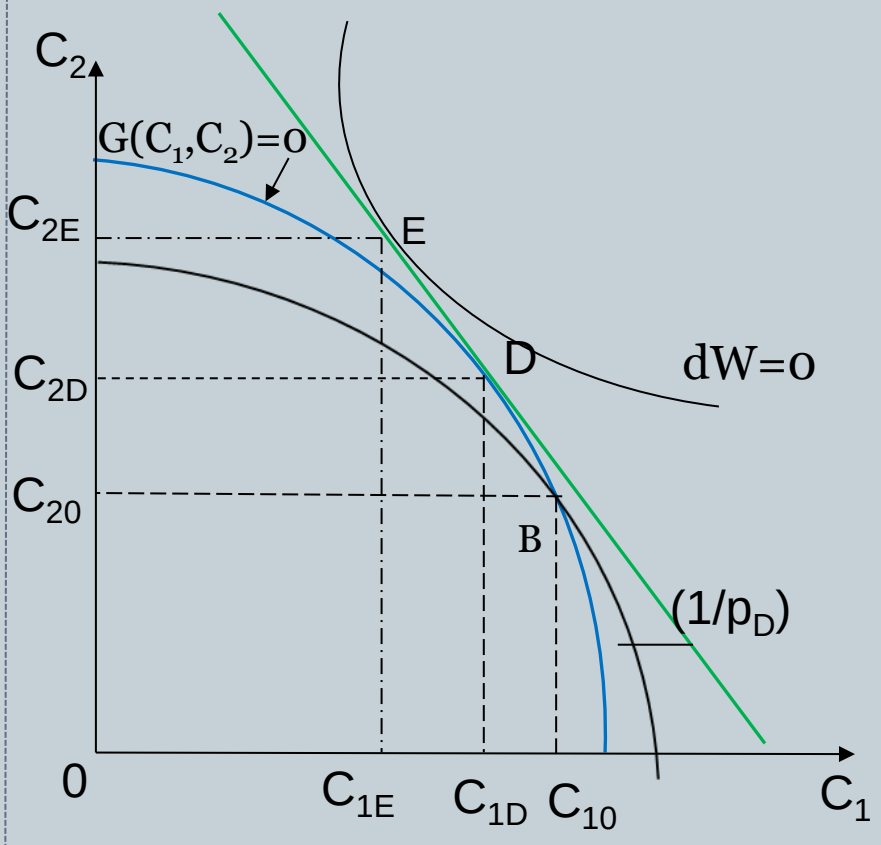
New Frontier w/Debt (Fig 6d)



… Welfare Consequences of Debt

- On the role of markets, we note that effectively in a one-good model, the exchange activities resemble commodity trades.
- But since one cannot offer to trade what they do not have, limits the range of activities to lending only.
- In an OLG framework, there may be additional exchange possibilities since inventories may be carried by young agents allowing borrowing.
- The key issue appears to be the relative productivity of capital.

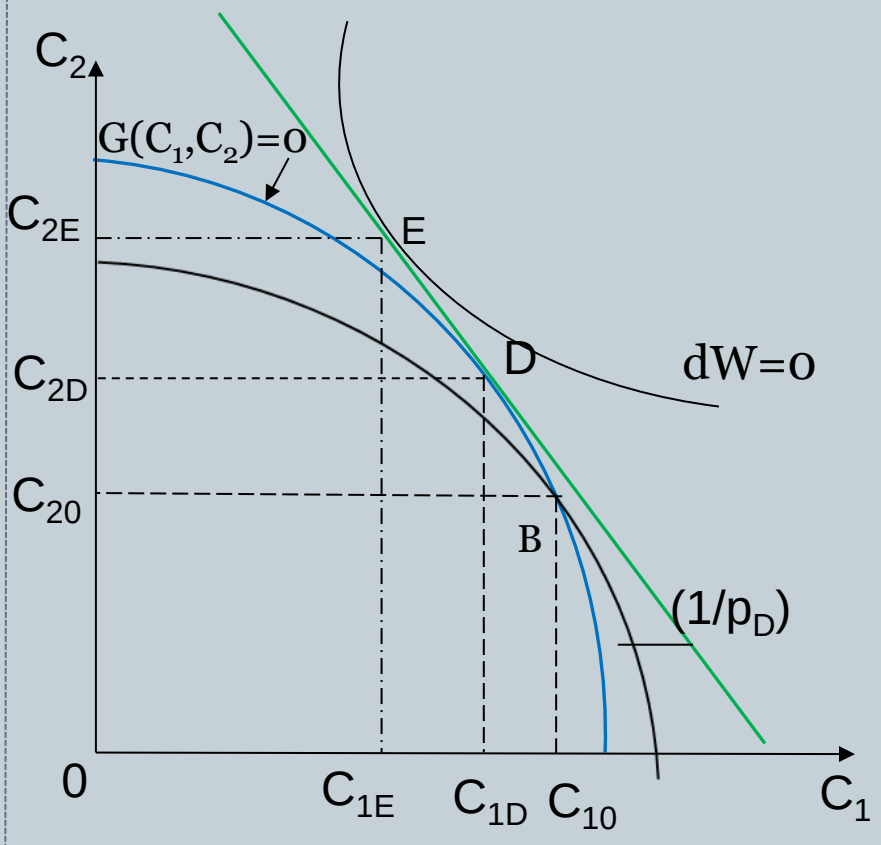
New Frontier w/Debt (Fig 6d)



What about Foreign Debt?

- So far, the discussion has been of domestically issued debt, which is why the interest/principal payments have not been modelled explicitly.
- Such transactions are internal within the domestic economy, from non-savers to savers, which does not affect GDP or GNI. "… we owe it to ourselves!" [Ignoring DWL of taxation …]
- The welfare depends on entirely the value of lifetime consumption.

New Frontier w/Debt (Fig 6d)



Modelling External Debt

- We continue to assume that all foreign resources will be earmarked for investment yielding output only in the second period in a more productive manner than (domestic) private capital just as before.
- Also assume no technological factors at play here, i.e., any initiative on the production of future goods are equally productive, whether funded domestically or externally.
- For comparability we of course assume an identical amount of debt in both contexts, although in most LMIE context there has complaint of leakages from external resources; (see below).
- What would be the shape of the new PPF? Clearly, maximum future output on both G(.,.) and H(.,.) frontiers would be identical.
- Hierarchy $p_D > p_E > p$, where D denotes domestic debt, E, the external debt environment, and p, merely the pre-debt relative price of future consumption.

Fig 7a: Output Frontier with External Debt

- Notation
- No-debt PPF, $F(C_1,C_2)=0$; CC_F
- Dom Debt PPF, $G(C_1,C_2)=0$; CC_G
- Ext Debt PPF, $H(C_1,C_2)=0$; CC_H
- Properties of $H(.,.) =0$
- First note ext debt size = F_1H_1
- The max future output $H_2 = G_2$, but while in principle a larger current output were feasible, the resource flow being earmarked implies that the portion of PPF, KH_1 would not be available.

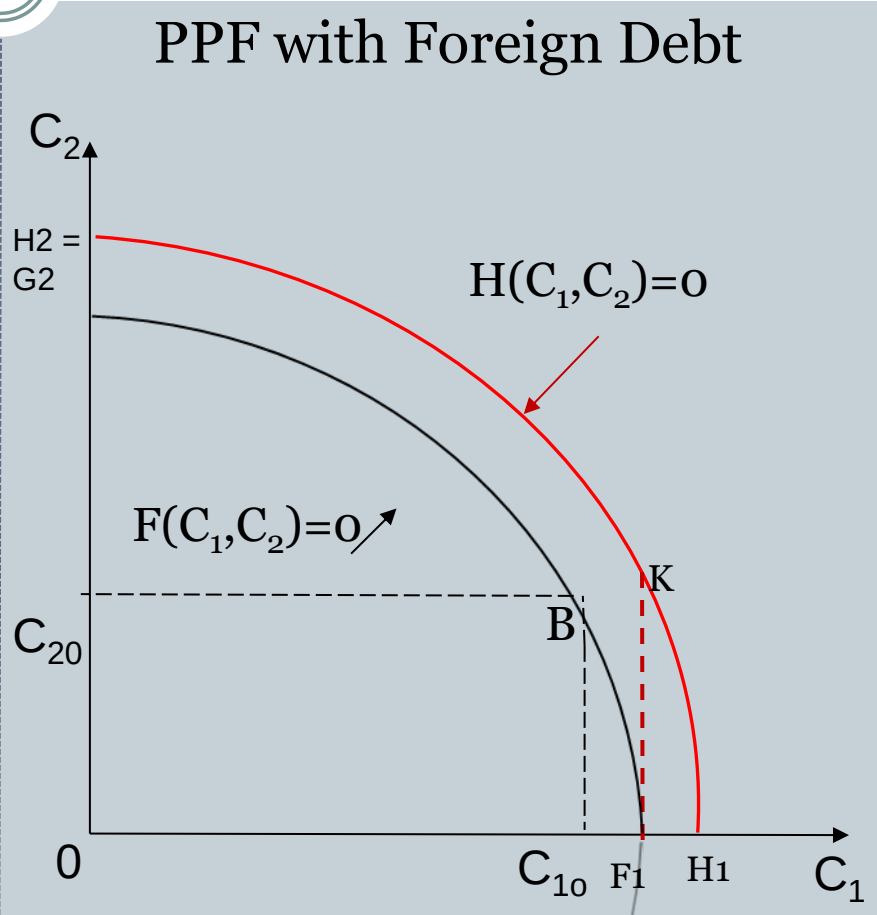


Fig 7b: Output Choice with External Debt

- Next, given the convexity of the production set, the new frontier CC_H), while steeper than the pre-debt frontier, would be a little flatter at each C1-level than was the case with domestic debt, CC_G.
- The tangency point, H, denotes the new production choice, where the new relative price of future goods of $p_E < P_D$.
- We note that the entire eligible frontier on CC_H lies above CC_G as to be expected since $\lim_{C1 \to o} CC_H = CC_G$ (CC_H converges on CC_G asymptotically).

PPF with Foreign Debt

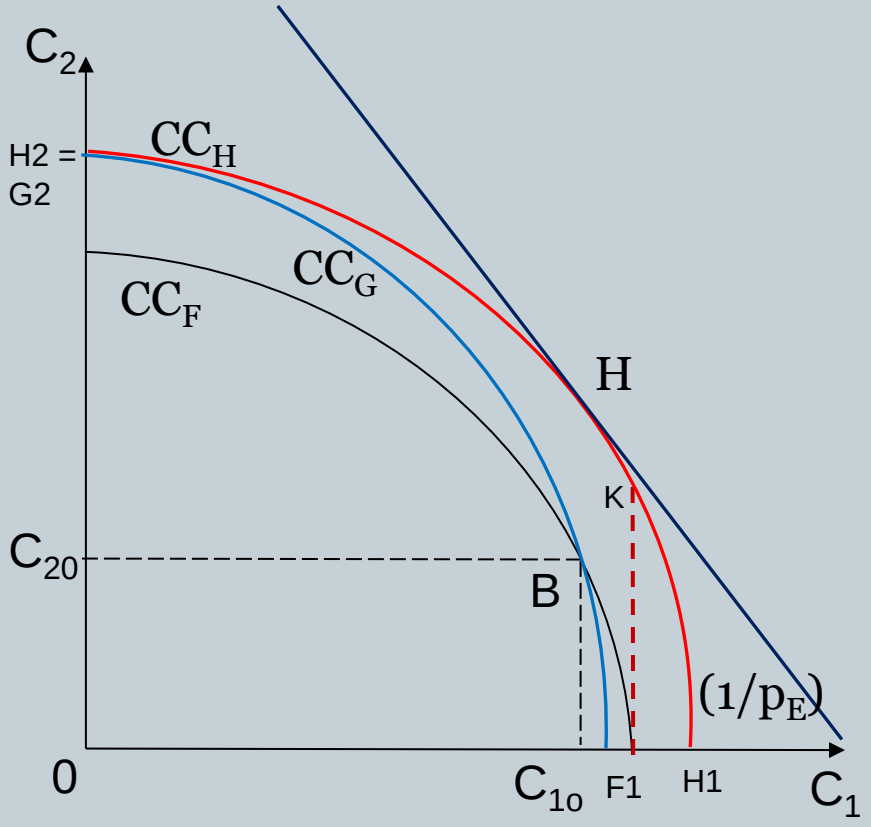


Fig 7c: GDP with External Debt

- Thus, we see that the GDP value at the point of output choice $H(C_{1H}, C_{2H})$ would generally be higher than was the case with domestic debt:

$$Y_H = C_{1H} + P_E C_{2H}.$$

- The GDP-line output choice with domestic debt through point D is entirely inside the line through H:
- $$Y_D = C_{1D} + P_D C_{2D}.$$
- Even though $P_D > P_E$, $Y_H > Y_D$ is likely in most scenarios.
- The corresponding consumption choice is shown by C_H, which would typically imply a higher level of lifetime utility than achievable on the GDP-line through D.

PPF with Foreign Debt

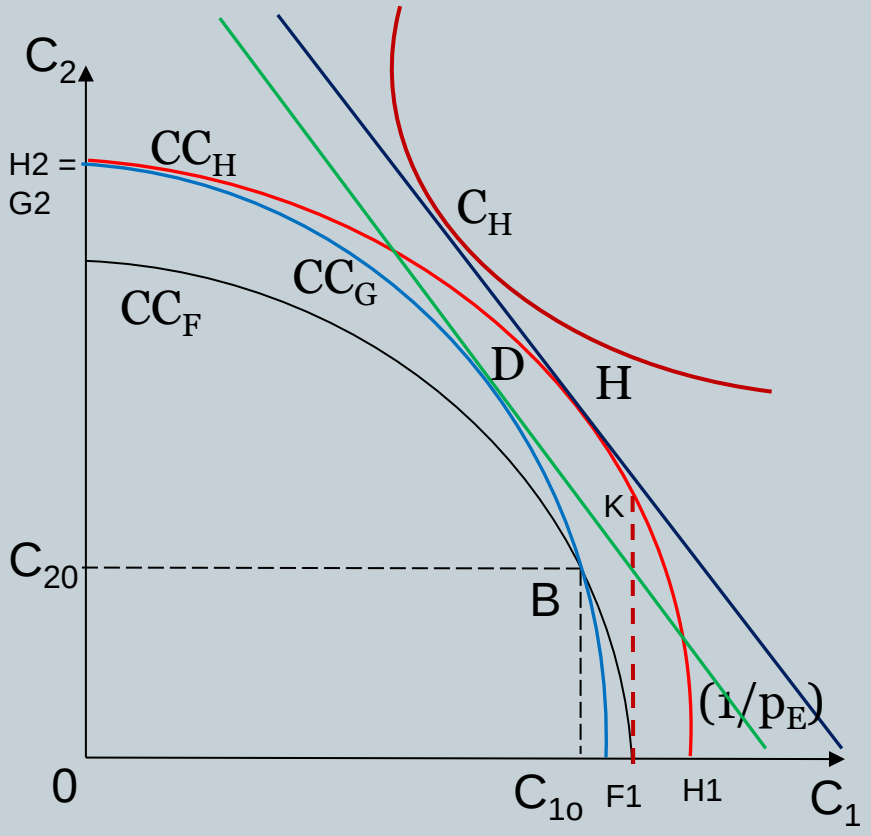


Fig 7d: Debt Retirement

- The principal amount of debt is shown by the base of the orange rectangle at the bottom right of the graph, F_1H_1, already identified above.
- The principal plus interest component is also denoted here by the vertical distance, MK_1, where note that the point K_1 lies above K.
- Both K and K_1 lie on the vertical line through F_1, with K reaching the PPF, while K_1 goes on to meet the GDP-line.

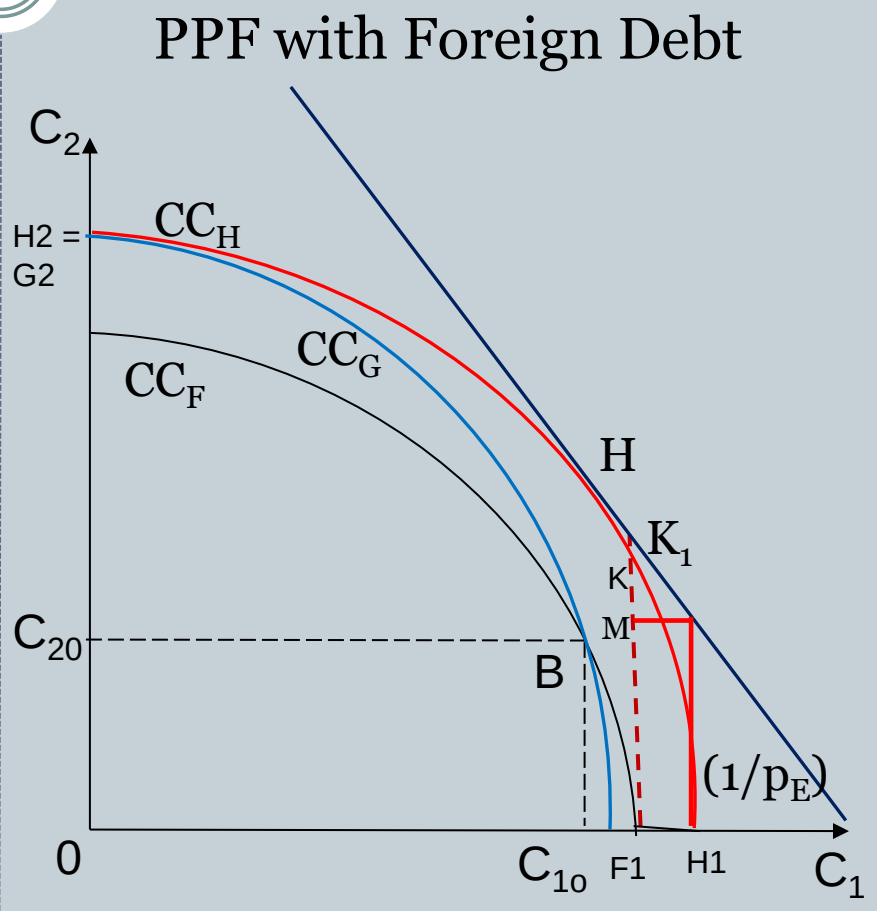


Fig 7e: The GNI line

- The GNI-line is drawn as the purple line of slope $(1/p_E)$ through point M.
- First, we compare welfare between the foreign debt welfare level with that obtaining in the pre-debt economy.
- Since the pre-debt GDP line (tangent at point B) on CC_F frontier, is flatter (though drawing on the right is bad) than the purple GNI-line, it must lie entirely below the latter.
- Regardless of the consumption choice, welfare is higher post-debt than pre-debt. (SICs not drawn for clarity.)

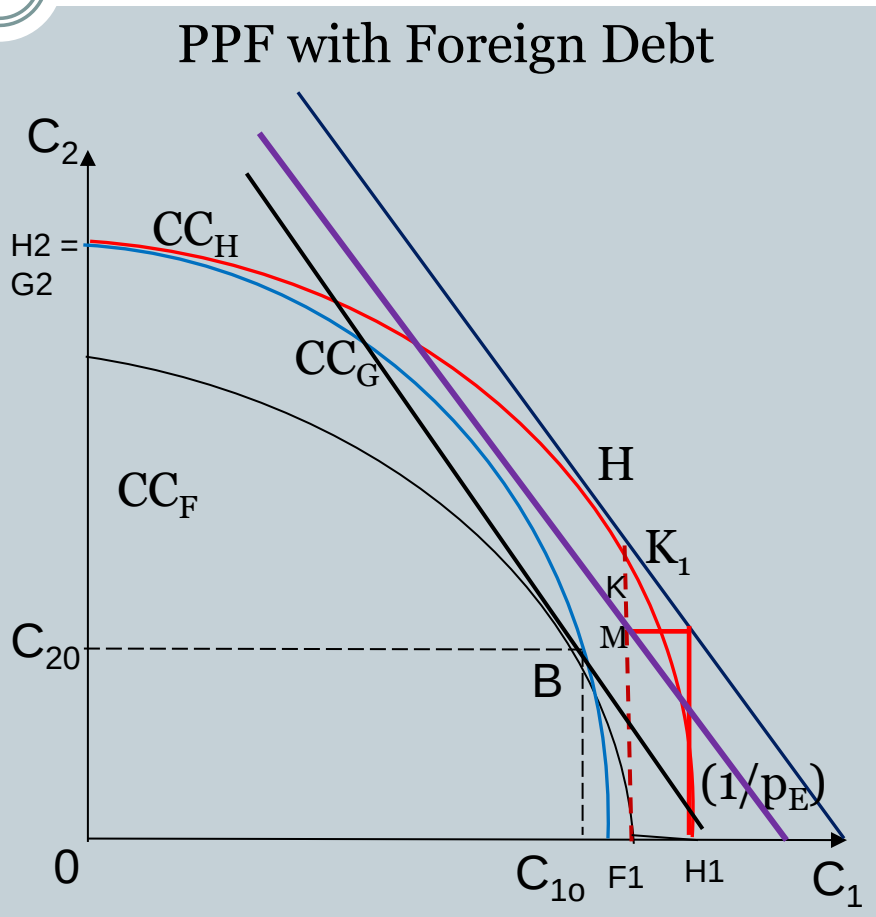
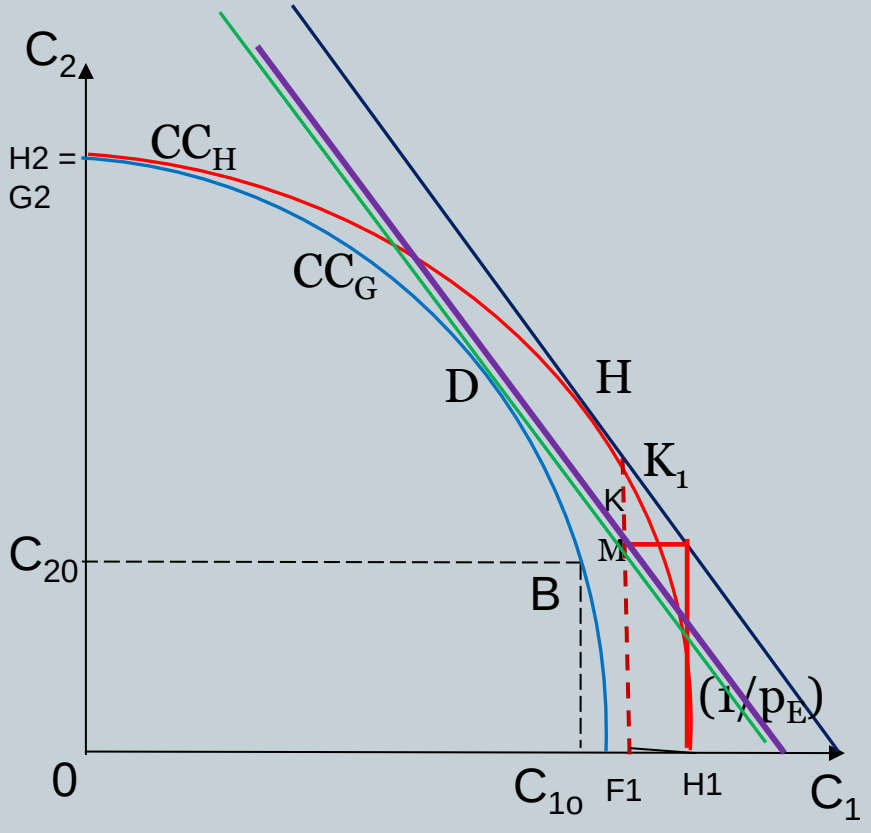


Fig 7f: Domestic vs Foreign Debt

- Is there anything one can say on the comparability of domestic vs foreign debt?
- First, after removing some drawings, let us focus on the GDP-line under domestic debt (shaded green here), where D is the point of production.
- Given that the above GDP line is steeper than the purple GNI line, the former may indeed contain a segment that lies above the orange line, signalling the scope of higher welfare with domestic debt.

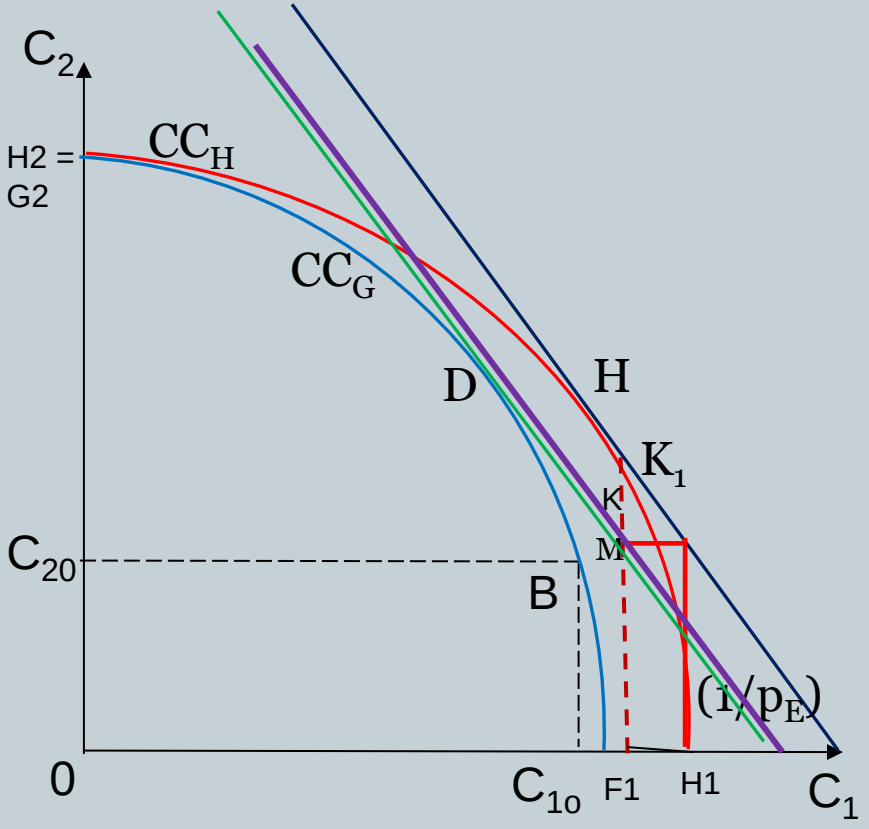
PPF with Foreign Debt



… Domestic vs Foreign Debt

- Given all that has been presented above, one cannot read too much into the fact the GNI line (under foreign debt) appear to lie above the GDP-line (domestic debt).
- Welfare may well be higher under foreign debt, but no logical statement can be made except the one relating to the slope.
- The latter ultimately is an empirical matter: the relative credit market tightness as the govt withdraws domestic resources for building infrastructure etc.

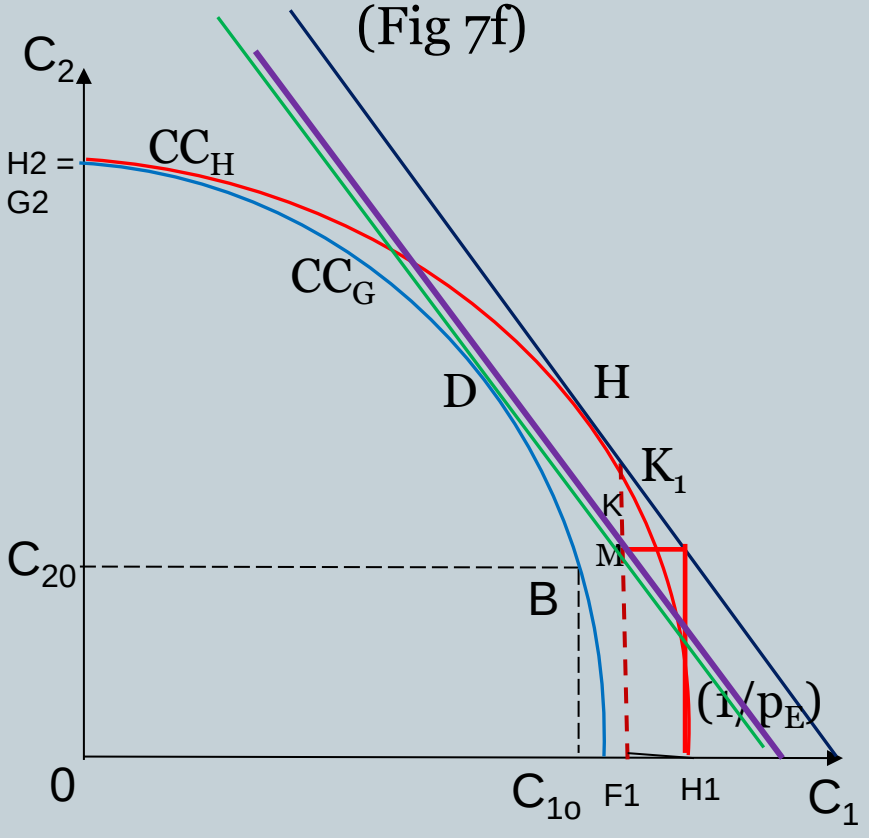
Foreign Debt Equilibrium (Fig 7f)



Foreign Debt with Corruption

- There are complaints of pervasive corruption in multilateral debt financing of public investment in LMIEs.
- In such an event, the output frontier would lie wholly inside CC_H graph on the right (at both ends), simply because not all resources are in play.
- The foreign-debt GDP line would also shift inside the line at H, thus pushing the GNI-line (purple) also further inward, making it highly plausible that welfare will be reduced in this mode of financing than for domestically financed investment.

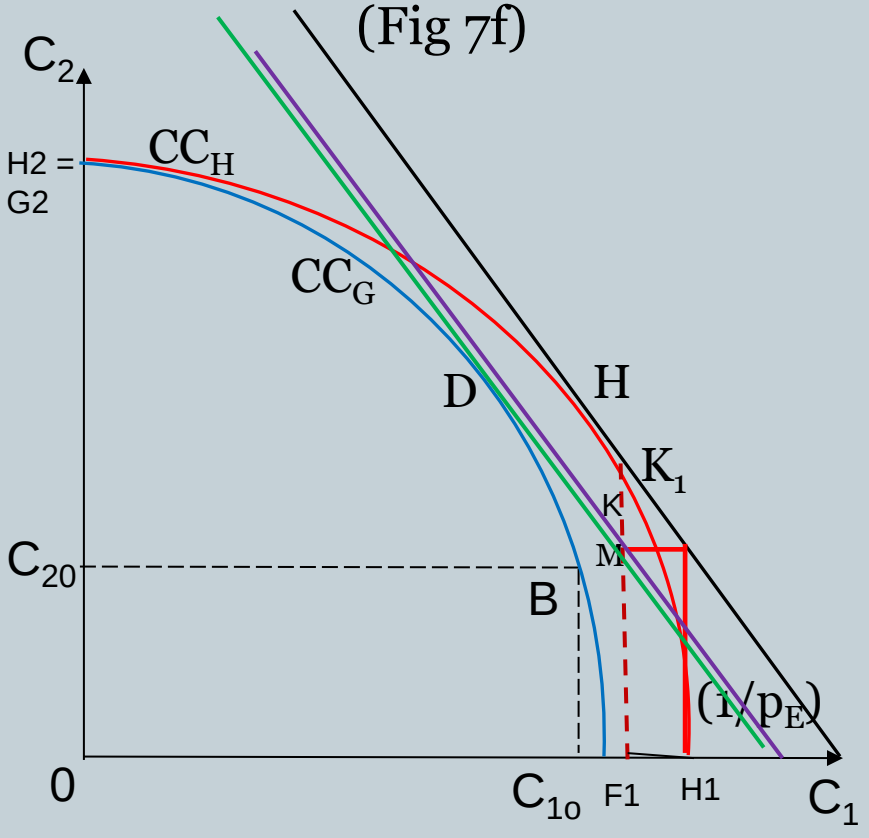
Output choices with Foreign Debt (Fig 7f)



Foreign Debt with DWL

- Further, if we take into consideration the significant DWL of taxation necessary to amass resources to pay the foreigners, the GNI line would suffer a further shift inward, and not necessarily be of the same slope.
- This would raise the odds that welfare may well decrease under foreign debt financed public investments.
- We have said nothing about technological innovations/better monitoring that may be associated with foreign debt which may offset some of the distractive forces cited above.

Output choices with Foreign Debt (Fig 7f)



5.3 The Life-Cycle Model: A Sum Up

- (1) Within the limitations of the life-cycle model, the analysis clarifies that only when the public investment is productive, i.e., more so than that of incremental private investment, can we entertain the question of whether a welfare gain can occur.
- (2) (Theorem) We see that for domestic debt, if the debt size is not too large (i.e., point B in Fig 6a), the society is better off with debt than no debt.
- (3) For domestic debt, its retirement enriches the lenders, but GDP remains unaffected by such transfers, especially when the returns from the investment can be monetised easily (road/bridge tolls) which would obviate the necessity to raise taxes, which entails DWL.

… A Sum Up

- (4) If the debt were entirely domestic, the process of debt retirement involves transactions that are within the same generation, between non-savers and savers, that do not affect GDP nor aggregate social welfare; society's wellbeing is determined by level of lifetime consumption.
- (5) Foreign vs Dom Debt: In foreign-debt financed public investment of identical productivity, the value of GDP and gross social welfare (pre-repayment) will be higher than under domestic debt in most scenarios.
- (6) *No Debt vs Foreign Debt*: Social welfare would be unambiguously higher post-debt than pre-debt.
- (7) Welfare may well be higher under foreign debt post repayment (vis-a-vis domestic debt), but no logical statement can be made without empirical research.

… A Sum Up

- *Corruption*: Given the reported leakage of resources in foreign-debt financed investments, while the true investment level is lower, when it comes to repayment, the entire debt and interest thereon has to be fully met.
- This raises the odds that welfare may well decrease under foreign debt financed public investments vis-à-vis domestic financing.
- Recourse to taxation in repayment also entails DWL further dampening the benefits of debt.

6. The Inter-Generational Issues

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- 7. Term Structure of Debt and Debt Management
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- Would require more detailed data than is publicly available.

8. Conclusion

- While our current total debt is modest at about 40% of GDP, with the interest charges using up about 25% of scarce State tax revenue posing a significant share.
- The latter is not much smaller than state spending on health and education combined (about 2.4% of GDP).
- But this is no time for complacency; in the present tight monetary stance of the central bank, the domestic cost of debt finance is likely to increase significantly in the next 24 months or so.
- On external debt (40 % of total), which is rising steadily, the long-term bond yields in the global capital market are still way above the post-pandemic lows and show little sign of moderation.
- While average interest costs have been cited above, in forecast work one needs the rates at the margin, say new debt of last 24 months.

… Conclusion

- The above concerns assume special significance as we continue to be hobbled by our stubbornly low tax effort. Then there are the issues of DWL of taxation, on which we had not paid due attention.
- At the same time, the nation has to forge ahead and invest in measures to mitigate global warming, build human capital, and upgrade public infrastructure, not to speak of research, that are believed essential to the goal of reaching UMI status sometime in the future.
- *Threat of Inequality*: Large debt & financing thereof can create *inequality* in society between those with and without excess liquidity to benefit from the process.
- Finally, let me reiterate, without a more complete, timely, and transparent data, policy relevant research cannot simply be carried out.

Appendix

Debtor Classification of External Debt of Bangladesh

In Million USD

Debtor Classification	Outstanding as at end of			
	Sep'23[R]	Dec'23[R]	Mar'24[R]	Jun'24[P]
Public Sector	75269.20	79693.86	79009.00	83214.06
General Govt.	64417.95	67919.46	67822.22	71044.08
Short Term	0.00	0.00	0.00	0.00
Long Term	64417.95	67919.46	67822.22	71044.08
Govt. Loan	63408.78	66967.11	66906.98	70172.71
Govt. Bond	1009.17	952.35	915.24	871.37
Other Govt. Corp.	10851.25	11774.40	11186.78	12169.98
Short Term	1665.89	2438.03	1899.31	2789.71
Central Bank	546.31	1300.45	769.55	1440.44
Nationalized Commercial Bank	447.73	498.23	441.63	569.22
State Owned Enterprises	671.85	639.35	688.13	780.05
Long Term	9185.36	9336.37	9287.47	9380.27
Central Bank	2804.61	2997.41	2899.27	3248.73
Nationalized Commercial Bank	0.00	0.00	0.00	0.00
State Owned Enterprises	6380.75	6338.96	6388.20	6131.54
Private Sector	21280.88	20946.09	20299.51	20574.82
Short Term	12429.65	11793.08	11042.82	11400.51
Short Term Trade Credit	8552.43	8116.03	7469.69	7627.80
Buyer's Credit	6923.00	6241.18	5690.25	5762.12
Deferred Payment	865.22	867.34	824.32	766.86
Export Bill Discounting	0.00	0.00	0.00	0.00
Foreign Back to Back LC	764.21	1007.51	955.12	1098.82
Other	0.00	0.00	0.00	0.00
Short Term Loan	3281.49	2886.24	2931.10	3109.89
Of Which offshore Banking Unit (OBU)	*2367.27*	*1996.98*	*2060.67*	*2252.96*
Other Short Term Debt Liabilities	595.73	790.81	642.03	662.82
Long Term	8851.23	9153.01	9256.69	9174.31
Private Commercial Bank	1196.86	1107.27	998.84	1064.48
Of Which offshore Banking Unit (OBU)	*1153.57*	*1063.88*	*955.45*	*1024.04*
Private Sector Enterprises	7617.16	8010.32	8228.48	8084.83
Of Which trade credit	*230.96*	*234.88*	*230.27*	*246.23*
Non-Bank Depository Corp.	37.21	35.42	29.37	25.00
Gross External Debt Position	**96550.08**	**100639.95**	**99308.51**	**103788.88**

Note: Other short term debt liabilities -- Currncy & Deposits and Money Market Instrument

References

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