Aguiar and Amador

Take the Short Route
How to repay and restructure sovereign debt with multiple maturities

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June 2015

Introduction

Food for thought in a tractable model

- Repay short-term debt (first) when de-leveraging
- Thm 1: Short-term debt operations suffice
- Thm 2: Long-term operations may be counter productive

Standard and non-standard assumptions

- $\beta(1+r) = 1$ (non-standard)
- No risk apart from risky default cost (not unusual)
- $\lambda \perp b$ in crisis region of interest (non-standard)
- Social losses of default (standard)

Discussion

- Slicing the results differently

  1. De-leveraging is optimal under commitment to T

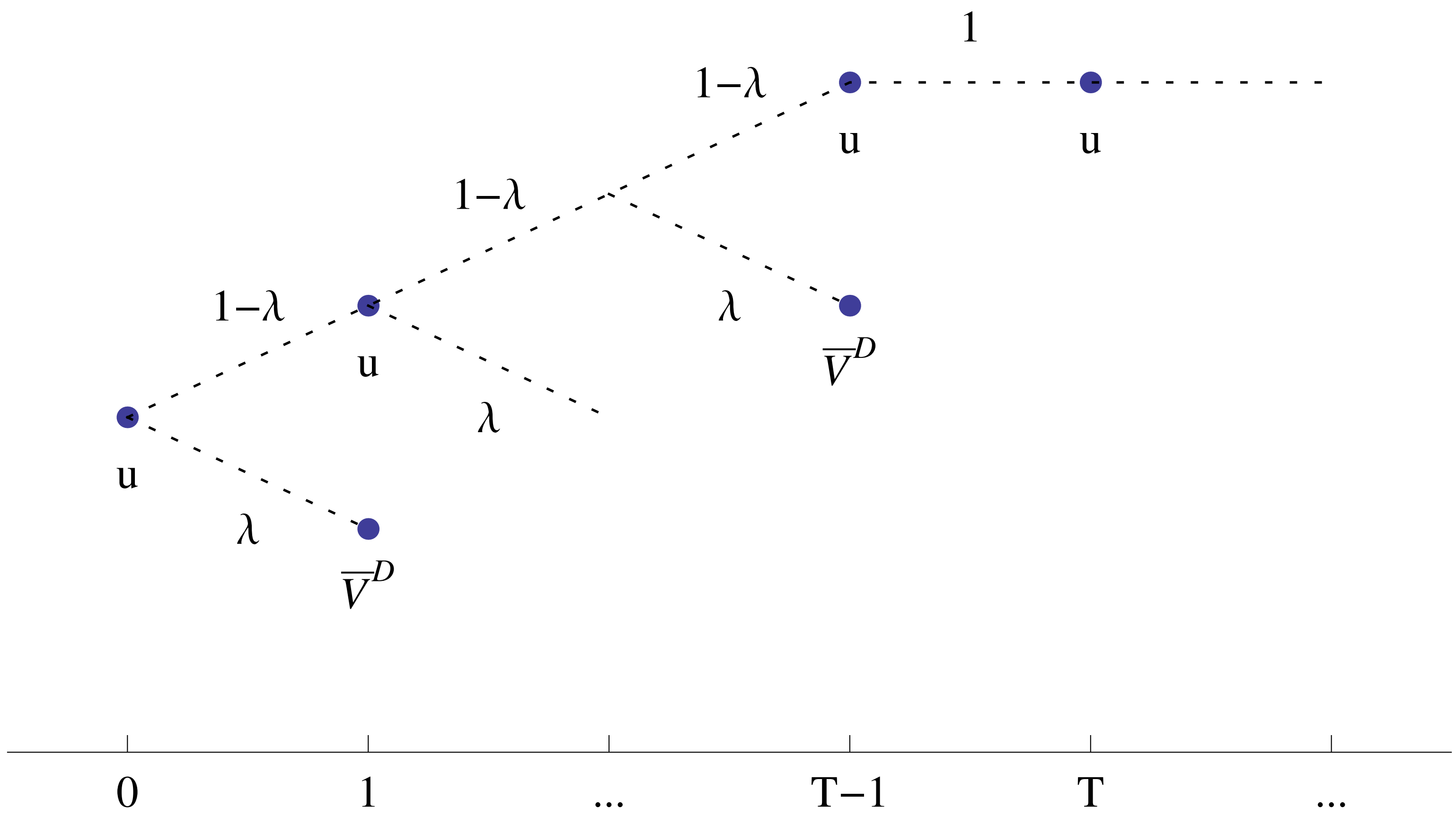
  (Not only without commitment)

  2. Lack of commitment to T is not binding when relying on short-term debt operations

  (Not only on de-leveraging paths)

- Understand role of assumptions, differences to Niepelt (2014)

Life in the Crisis Zone



De-leveraging

A savings-cum-exit-time problem

- Perfect smoothing before and after T, "jump" at exit time
- Before: Flat consumption due to $\beta(1+r) = 1$, discount factor $\beta(1-\lambda)$, Arrow security return $(1+r)(1-\lambda)^{-1}$
- After: Ditto, with $\lambda = 0$
- "Jump" due to multiplier

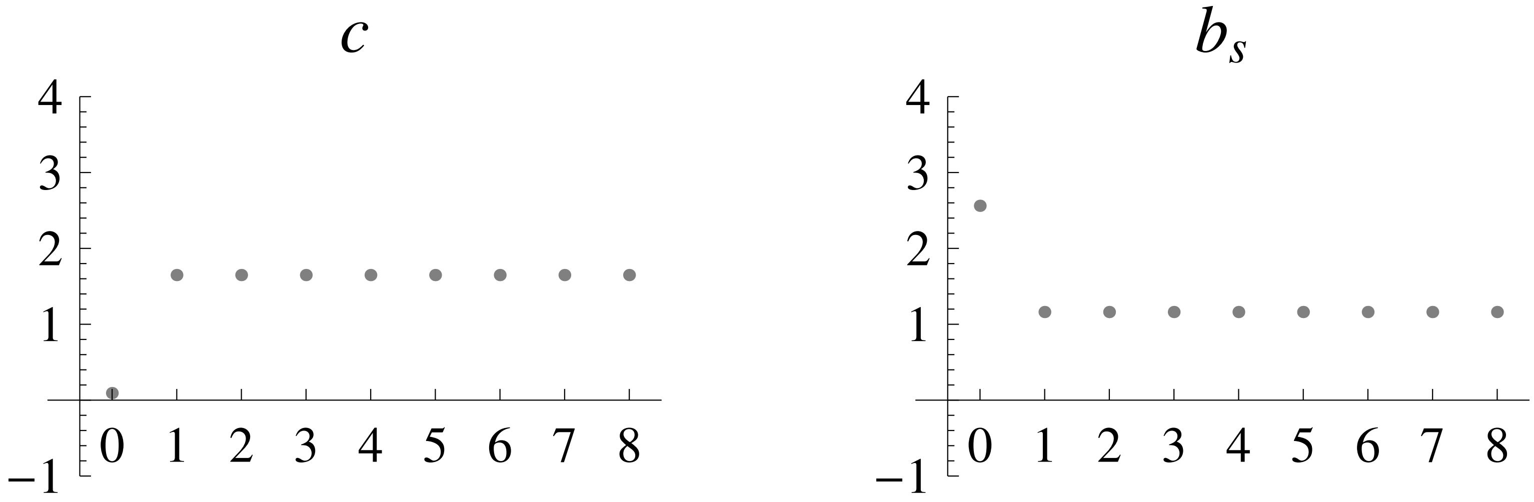
$$\max_{b_{S,T}} u(\ldots + b_{S,T}) + \beta u(\ldots - (1+r)b_{S,T}) \quad \text{s.t. } \bar{B} \geq b_{L,0} + b_{S,T}$$

Why exit the crisis zone?

- Staying put costs $r + \lambda$ per unit of short-term debt per period
- The λ component reflects social losses

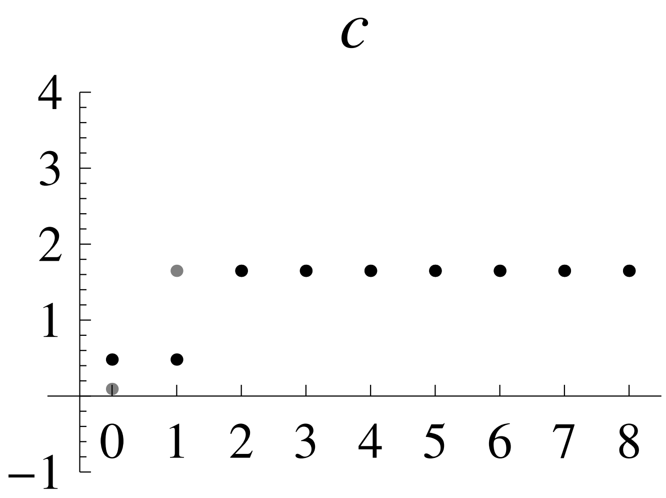
  It compensates for risk of default when lenders receive zero *although borrower bears cost*
- Exiting the crisis zone and eliminating the λ component is worth it, unless finite T strongly undermines consumption smoothing

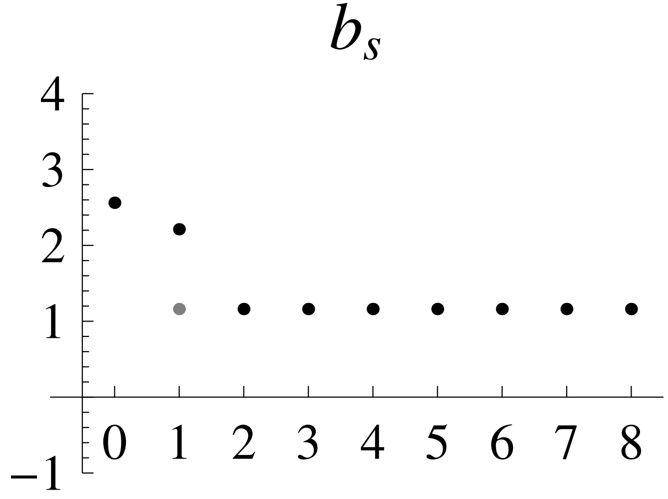
$\Rightarrow$ Social losses are key



$T = 1$

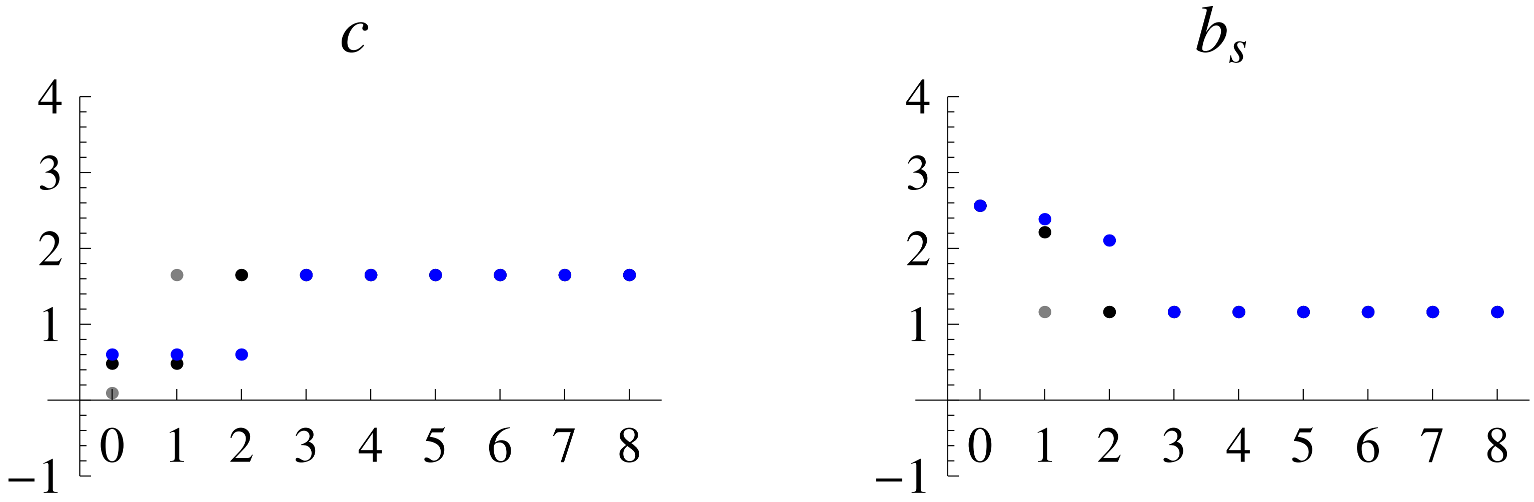
$W(b_{L,0}, b_{S,0}, T) = 2.12662$





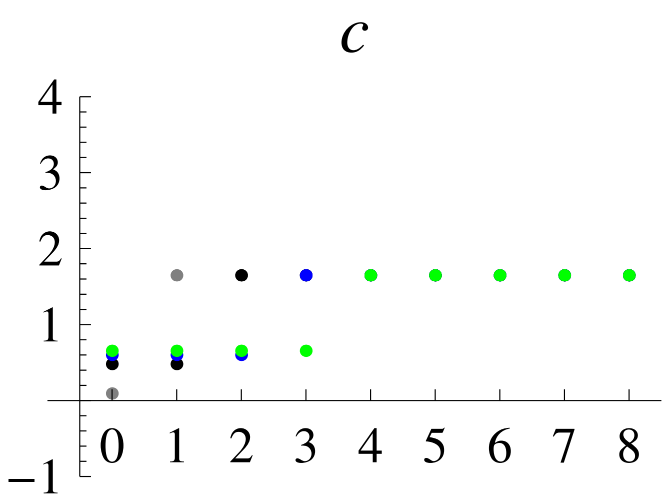
$$T = 1, 2$$

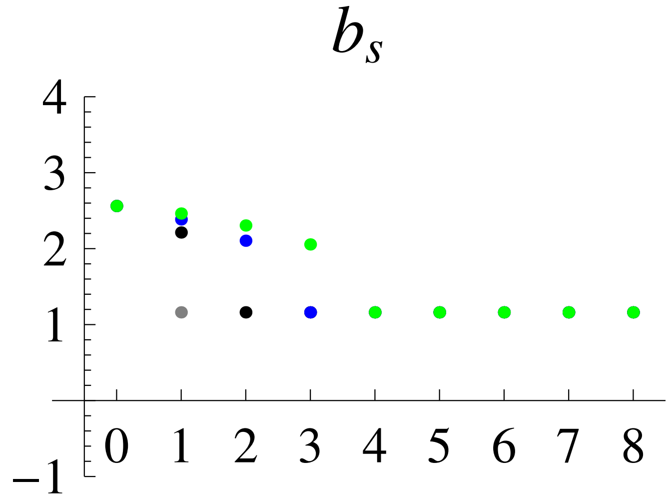
$$W(b_{L,0}, b_{S,0}, T) = 2.12662, 2.99073$$



$$T = 1, 2, 3$$

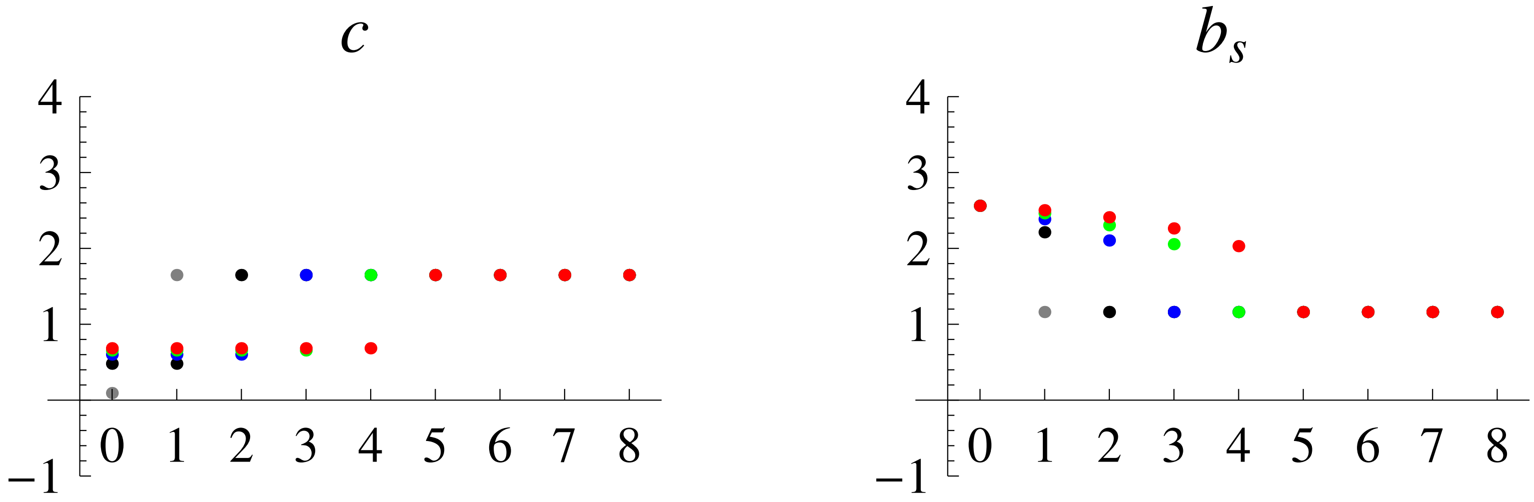
$$W(b_{L,0}, b_{S,0}, T) = 2.12662, 2.99073, 2.95469$$





$$T = 1, 2, 3, 4$$

$$W(b_{L,0}, b_{S,0}, T) = 2.12662, 2.99073, 2.95469, 2.89935$$



$$T = 1, 2, 3, 4, 5$$

$$W(b_{L,0}, b_{S,0}, T) = 2.12662, 2.99073, 2.95469, 2.89935, 2.85761$$

Long- vs. short-term debt

- Servicing long-term debt costs just r per period
- Price effect due to default risk materializes at issuance
- With outstanding long-term debt, price effect is a bygone

$\Rightarrow$ De-leveraging incentives only are present with short-term debt exposure

$\Rightarrow$ More generally, initial debt *composition* affects *de-leveraging incentives* (return to this later)

Robustness of the de-leveraging result

- Additional, "intermediate" maturities don't make a difference

  The shorter the duration, the larger the need for rollovers and thus, the default risk/social loss component that gets "re-priced" and induces de-leveraging

- Smaller β (standard assumption) does make a difference

  Extreme case: $\beta = 0$ (top of debt-Laffer curve)

$\Rightarrow$ The de-leveraging result is not general, but it is interesting precisely because it holds when $\beta(1+r) = 1$

Time Consistency

Initial debt *composition* affects *de-leveraging incentives*

Standard sovereign debt model

- Debt affects default risk directly and indirectly, through subsequent rollover decisions
- Price effects reflect default risk/social losses
- They vary by maturity, inducing an optimal composition

This model

- Price effects only work through T (since $\lambda \perp b$) which is endogenous to debt composition

Consequences of lack of commitment

Standard sovereign debt model

- Fully aligning ex-ante and ex-post incentives is impossible

This model

- *Alignment is possible*
  Only need to render choice of T time consistent

$\Rightarrow$ Crucial $\lambda \perp b$ assumption

How to render choice of T time consistent?

- Ex-ante choice internalizes all future price effects
- Ex-post choice no longer internalizes bygones
- To guarantee consistency, "not-bygones" ex ante should remain "not-bygones" ex post

  Fully relying on short-term debt operations achieves this

  Relevant default risk/social losses get "re-priced" in each period (at each rollover)

$\Rightarrow$ Scant intuition in paper

Why are long-term debt operations counter productive?

- Swapping long- for short-term debt undermines alignment

  But it triggers appreciation of long-term debt

  Mutual gains could be realized—but *not in the market*, due to holdup

  Cf. debt overhang literature

$\Rightarrow$ Social losses are key

- Swapping short- for long-term debt undermines alignment

  It also dilutes long-term debt, but at *no gain* for borrower

$\Rightarrow$ Social losses are key

Other Comments

The theorems

- Theorem 1: $V(b) = \sup_T W(b, T) = W(b, T(b))$
  Equal budget sets in V and W with short-term debt only
- Theorem 2: $V(\tilde{b}) \leq V(b)$ if b and $\tilde{b}$ have same market value
- Theorem 2 not proved for many maturities case?

Minor points

- How did we get here if $\beta(1 + r) = 1$?
- More generally, empirical relevance?
- Run extension; acceleration assumption

Conclusion

A deep paper

- Makes several points that are partly connected
- Standard and non-standard assumptions are key

Sometimes only scant intuition (proofs don't help)

Links to literature should be discussed

- Debt overhang
- Prop. 5 in Niepelt (2014): With risk neutrality, only short-term debt issuance (although $\lambda \not\perp b$)

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References

Niepelt, D. (2014), 'Debt maturity without commitment', *Journal of Monetary Economics* **68**(S), 37–54.