When Fiscal Consolidation Meets Private Deleveraging

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Outline

Motivation

- Many countries face lengthy *private* and public debt consolidation processes, amid low growth and inflation, and binding ZLB.
- The links between ZLB and fiscal policy have been extensively studied, but much less so between public and private debt consolidation.
- Placing private and public debt consolidation under the same umbrella helps understand better
  - the costs of alternative fiscal consolidations in high private-debt environment, and,
  - the fiscal determinants of the length, depth and costs of private deleveraging.
- **This paper develops a framework to analyze this "missing" link in a context of endogenous slow private deleveraging**.

What we do

- Provide a model of small open economy in a monetary union with private and public debt.
- Standard macro-financial structure, with borrowing constraints, except:
  - households and firms issue long-term nominal debt
- Large negative shocks (financial, fiscal) trigger a slow and costly deleveraging process
  - KEY: exit from deleveraging (duration, intensity and macro impact) is endogenous
- We analyze how the **size, speed** and **composition** of fiscal consolidations affect the economy, including (and specially) through its impact on private deleveraging.

The core questions and preview of the main results

- How does the **size** of the consolidation shape fiscal multipliers in the presence of private deleveraging?
  - Larger consolidations imply a lower multiplier in the short run, due to the cushioning effect of long term debt on private consumption...
  - ...but a higher multiplier over the medium run, due to the increase in the length and intensity of private deleveraging.

- How does the **speed/gradualism** of the consolidation affect the welfare cost of consolidating?
  - Frontloading consolidations leads to longer and deeper private deleveraging and to higher welfare costs.

- How does the **composition** of the consolidation effort (expenditure cuts vs tax hikes) shape its macroeconomic impact ?
  - Consolidations based on either expenditure-cuts or capital-tax hikes prolong private deleveraging wrt VAT or labour tax hikes.

Recent literature

- Before the crisis: extensive literature on the effects of consolidations.
  - Front-loaded adjustments more effective and less costly.
  - Adjustments in public spending, rather than tax hikes, more effective, lasting and less costly.

- The crisis has called these results called into question.
  - Christiano et al. (2011), Woodford, 2011 and Eggertsson (2010): at the ZLB the output effect of spending cuts is higher than that of tax rate hikes;
  - Erceg and Lindé (2014): the fiscal multiplier depends on the incidence of fiscal shocks on the duration of the ZLB regime.

- Scarce work on the interaction between private debt and fiscal consolidations:
  - Batini, Melina and Villa (2015) is one exception, although not a proper framework of endogenous & protracted deleveraging

Outline

Model structure

- Small open economy in a monetary union
  $\Rightarrow$ monetary policy exogenous $\approx$ ZLB.
- Four main agents
  - Patient households (lenders)
  - Impatient households (borrowers)
  - (Impatient) entrepreneurs (borrowers)
  - Government: consumes, sets taxes and issues debt.
- Three production sectors
  - Consumption goods (entrepreneurs + retailers)
  - Equipment capital producers
  - Construction.
- Trade with rest of MU: consumption goods and foreign debt.
- Standard real and nominal frictions: investment adjustment costs, nominal price and wage rigidities

Impatient households

- Maximize

$$E_0 \sum_{t=0}^{\infty} \beta^t \left\{ \log c_t + \vartheta \log h_t - \chi \int_0^1 \frac{n_t^C (i)^{1+\varphi}}{1+\varphi} di \right\}, \text{ s.t.}$$

$$\begin{aligned} (1+\tau_t^c) c_t + p_t^h \left[h_t - (1-\delta_h) h_{t-1} \right] &= b_t - \frac{R_{t-1}}{\pi_t} b_{t-1} - T_t \\ &\quad + (1-\tau_t^w) \int_0^1 \frac{W_t (i)}{P_t} n_t^C (i) di. \end{aligned}$$

and an asymmetric debt constraint...

$$b_t \leq \begin{cases} \frac{1}{R_t} m_t E_t \pi_{t+1} p_{t+1}^h h_t, & \frac{1}{R_t} m_t E_t \pi_{t+1} p_{t+1}^h h_t \geq \gamma \frac{b_{t-1}}{\pi_t} \\ \gamma \frac{b_{t-1}}{\pi_t}, & \frac{1}{R_t} m_t E_t \pi_{t+1} p_{t+1}^h h_t < \gamma \frac{b_{t-1}}{\pi_t} \end{cases}$$

Debt constraint (I)

- We assume long-run debt $\Rightarrow$ A constant fraction $1-\gamma$ of outstanding (nominal) principal is amortized each period (Woodford, 2001).

- Then the dynamics of real outstanding debt:

$$\underbrace{b_t}_{\text{final debt}} = \underbrace{\frac{b_{t-1}}{\pi_t}}_{\text{initial debt}} - \underbrace{\frac{1-\gamma}{\pi_t} b_{t-1}}_{\text{amortization}} + \underbrace{b_t^{new}}_{\text{new gross flow}} = \frac{\gamma}{\pi_t} b_{t-1} + b_t^{new}.$$

- Debtors cannot be forced to prepay faster than at the contractual rate:
  - In equilibrium, no voluntary early payments: $b_t^{new} \geq 0$.

Debt constraint (II)

- New borrowing is subject to a collateral constraint

$$b_t^{new} \leq \max\left\{0, \underbrace{m_t \frac{1}{R_t} E_t \pi_{t+1} p_{t+1}^h h_t - \frac{\gamma}{\pi_t} b_{t-1}}_{\text{EXCESS COLLATERAL}}\right\}$$

- An asymmetric debt-regime:
  - **High collateral regime** (excess collateral > 0) $\Longrightarrow b_t^{new} > 0$ and b_t satisfies

$$b_t = m_t \frac{1}{R_t} E_t \pi_{t+1} p_{t+1}^h h_t$$

  - **Low collateral regime** (excess collateral < 0) $\Longrightarrow b_t^{new} = 0$ and b_t follows the contractual amortization path:

$$b_t = \frac{\gamma}{\pi_t} b_{t-1}$$

Calibration

- Parameters not pinned down by targets are set to standard values within NK-DSGE literature.
- Initial tax rates $\bar{\tau}^x$, $x = c, w, k$, set as in FiMod model (Stähler & Thomas, 2011).
- Initial gov't debt ratio: $\bar{b}^{gy} = 80\%$
- Parameters affecting debt constraints
  - LTV ratios: $m = 0.85$, $m^e = 0.698$
  - Amortization rates: $1 - \gamma = 0.02$, $1 - \gamma^e = 0.03$
    $\Rightarrow$ average age outstanding debt: $\gamma / (1 - \gamma) = 12$, $\gamma^e / (1 - \gamma^e) = 8$ years

Fiscal consolidations: Targets and rules

- **Fiscal consolidation**: At $t = 0$ (SS), the govn't announces a lower long-run target for the public debt / GDP ratio and sets its fiscal instrument(s) according to

$$fi_t = fi_{t-1} + \phi_b \left(b^{gy}_{t-1} - \bar{b}^{gy} \right) + \phi_{\Delta b} \left(b^{gy}_t - b^{gy}_{t-1} \right),$$

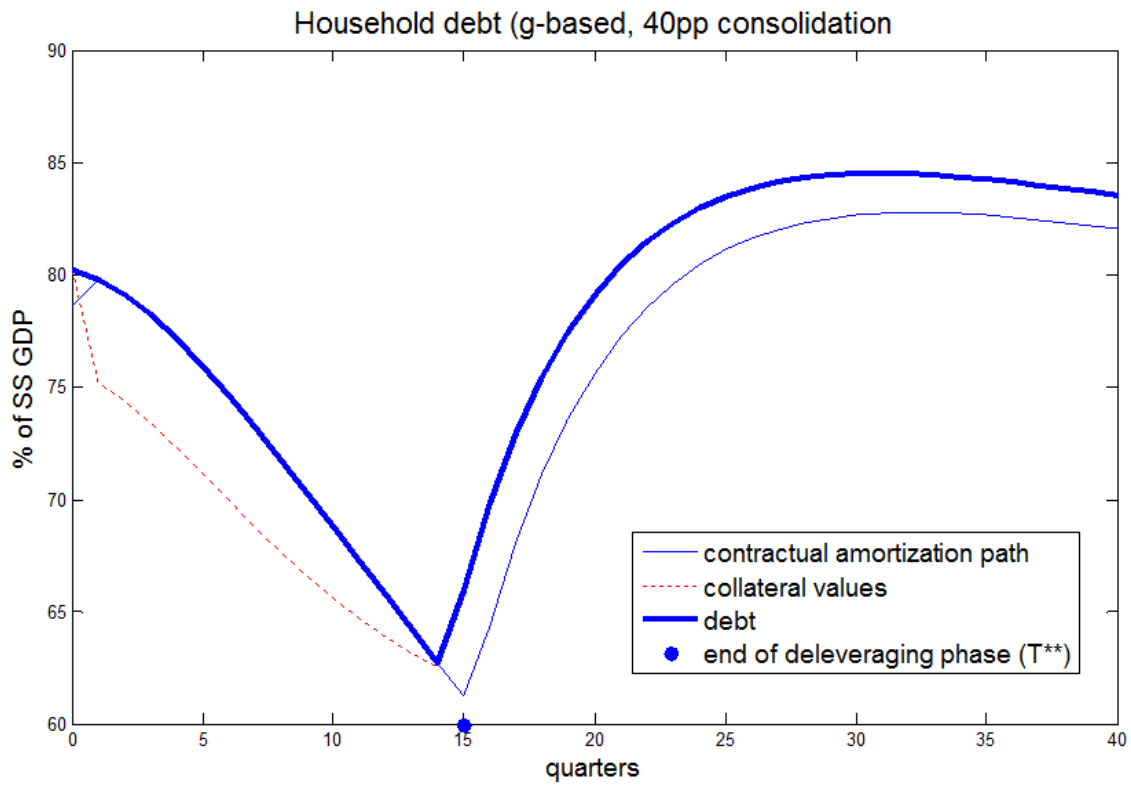
$b^{gy}_t \equiv \frac{P_t b^g_t}{P_{H,t} g dp_t}$ and $fi_t \in \{g_t, T_t, \tau^w_t, \tau^c_t, \tau^k_t\}$. Today, we focus on g.

  - ϕ_b and $\phi_{\Delta b}$ set to make the deficit path comparable across instruments.
  - ϕ_b governs the degree of gradualism.

- **Fiscal sacrifice ratio** ("**fiscal multiplier**"): the change in output relative to the size of the targeted consolidation: $\left| \frac{\Delta y_t}{\Delta \bar{b}^{gy}} \right|_{fi_t}$ (Erceg and Lindé, 2013).

The asymmetric debt constraint at work: An example

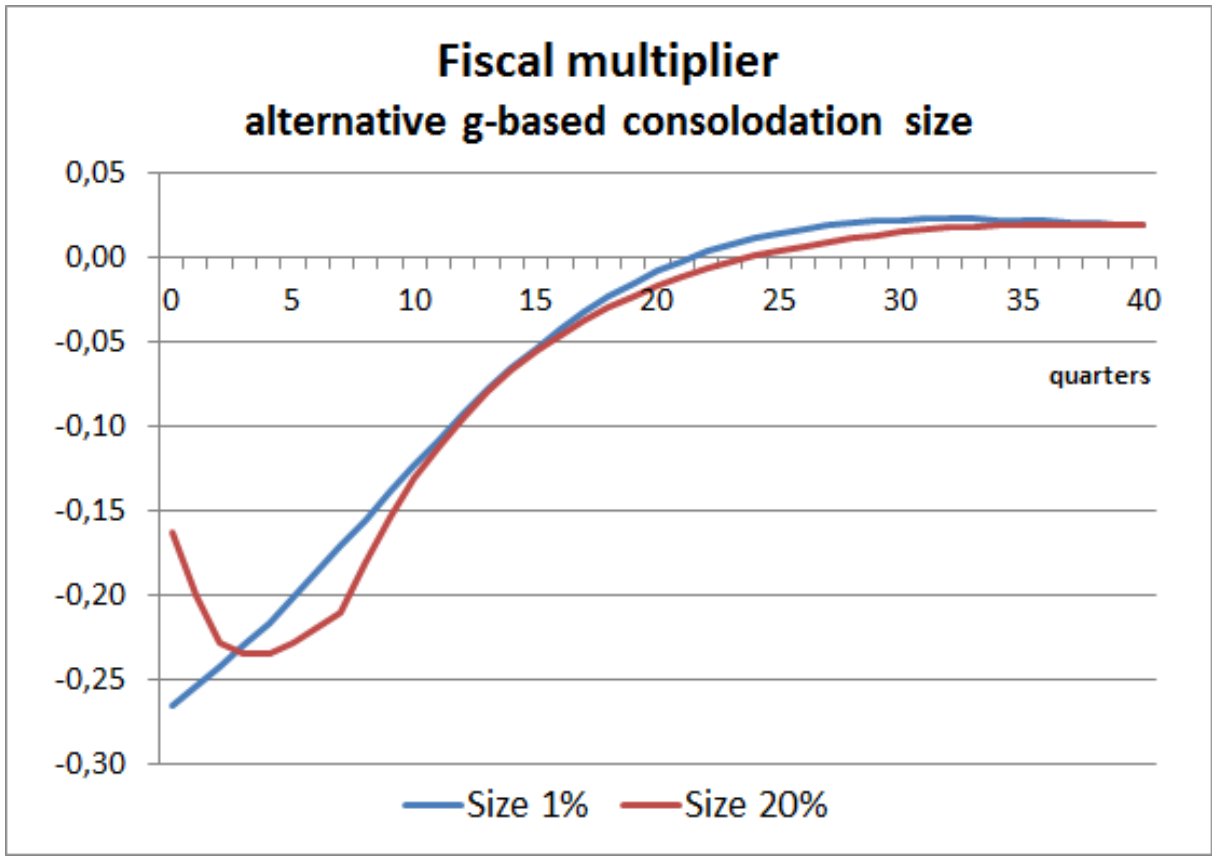
- Households deleveraging after a fiscal shock (initial condition: SS, high-collateral regime).



Outline

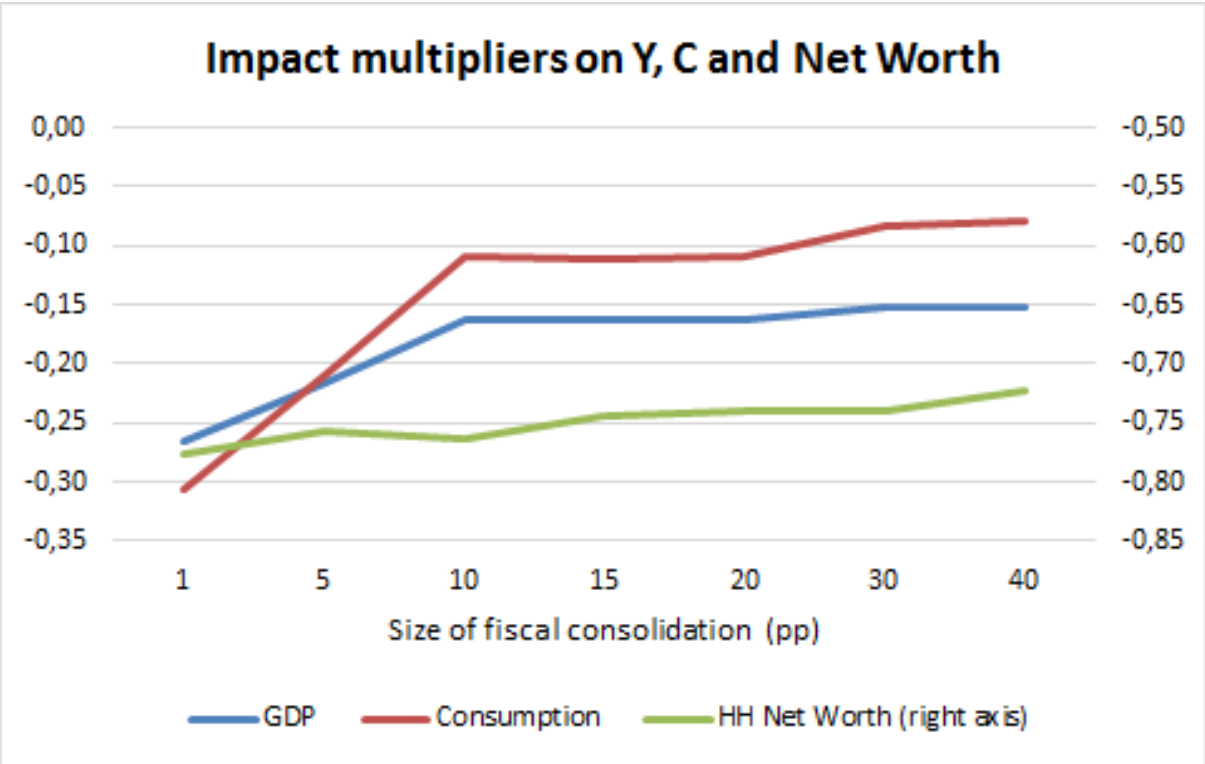
Consolidation size and multipliers (I)

- Larger consolidations are less costly in the short-run but exert a higher cost as time passes



Consolidation size and multipliers (II)

- Following a large consolidation that moves the economy into the low-collateral regime, borrowers' net worth drops accordingly but long-run debt buffers the response of consumption and output.



Consolidation size and multipliers (III)

- In a **small fiscal consolidation**, the fall in borrowers' net worth (collateral) is also small and the high-collateral regime holds:

$$b_t = m_t \frac{1}{R_t} E_t \pi_{t+1} p^h_{t+1} h_t$$

  - Then b_t responds in tandem with net worth (collateral channel) and so do consumption and output.

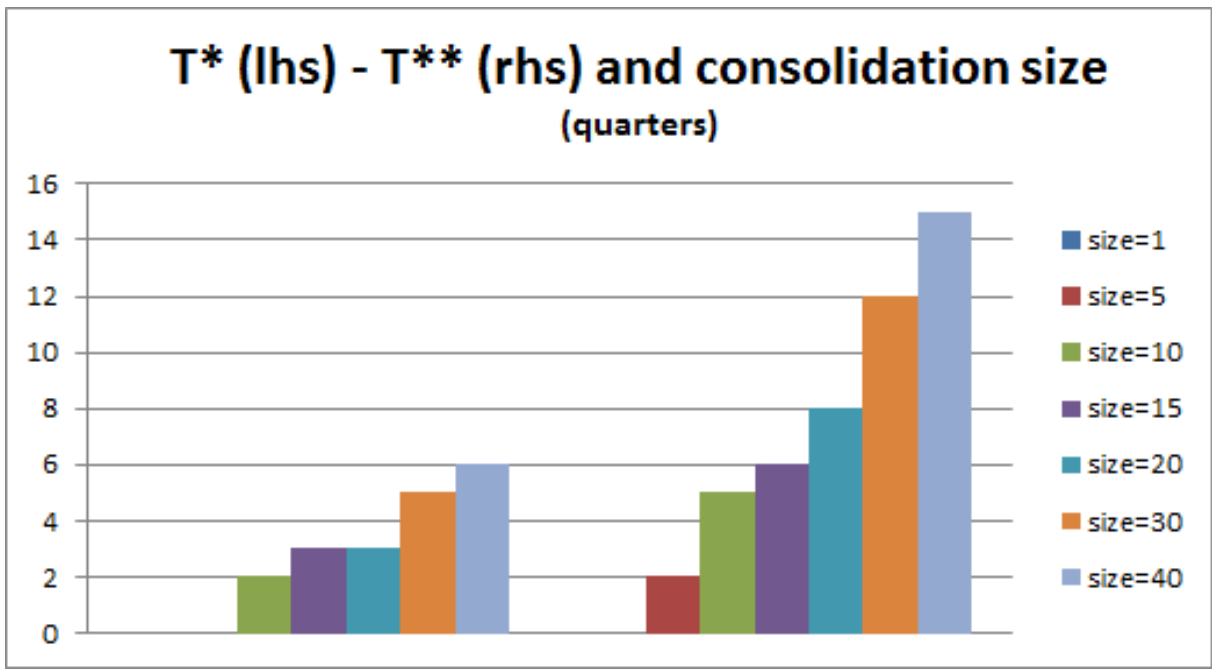
- In a **large fiscal consolidation**, the economy enters the low collateral regime:

$$b_t = \frac{\gamma}{\pi_t} b_{t-1}$$

  - b_t does not respond proportionally to net worth (collateral channel switched off) and hence consumption and output do not fall that much.

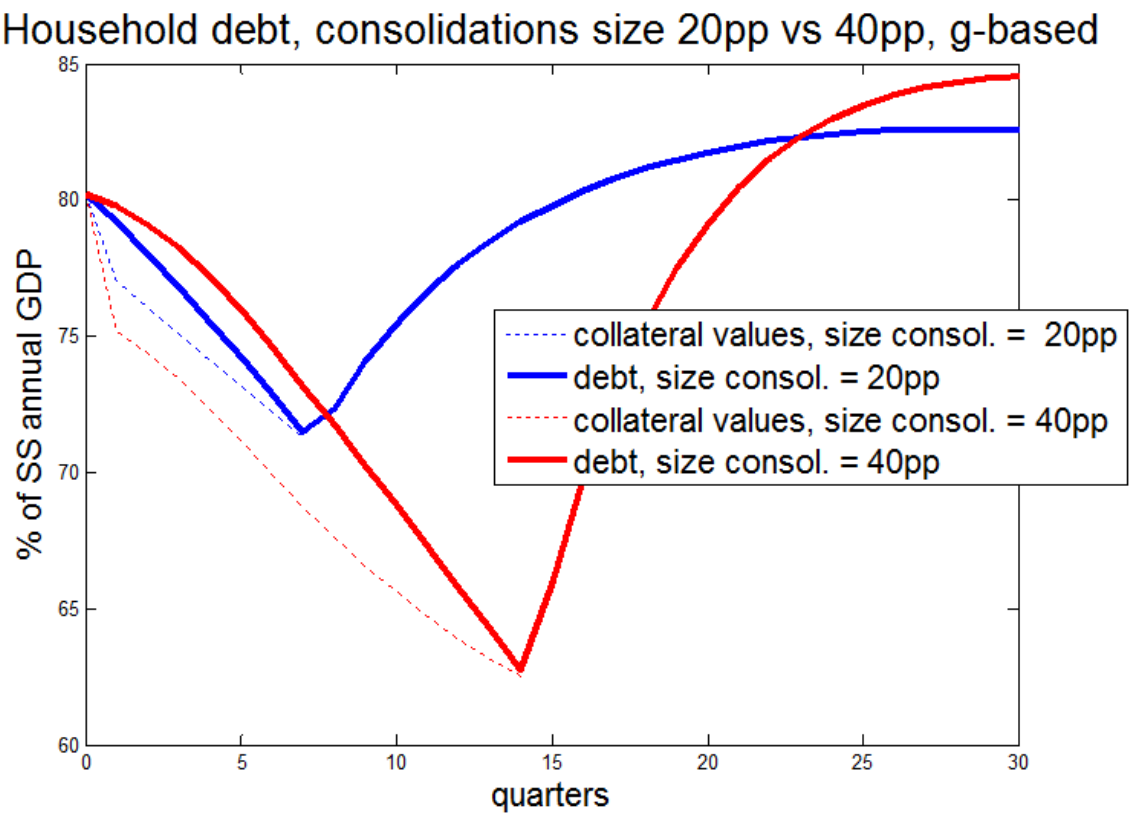
Consolidation size and multipliers (IV)

- **Large consolidations** induce large initial collateral revaluations, thus **postponing the recovery** of credit (T^* and T^{**}) and output $\Longrightarrow$ higher medium-run multipliers.



Consolidation size and multipliers (V)

- Large consolidation $\Rightarrow$ large drop in borrowers' net worth $\Longrightarrow$ for given a debt, it takes longer to rebuild collateral $\Rightarrow$ T^* and T^{**} $\uparrow$.



A practical implication

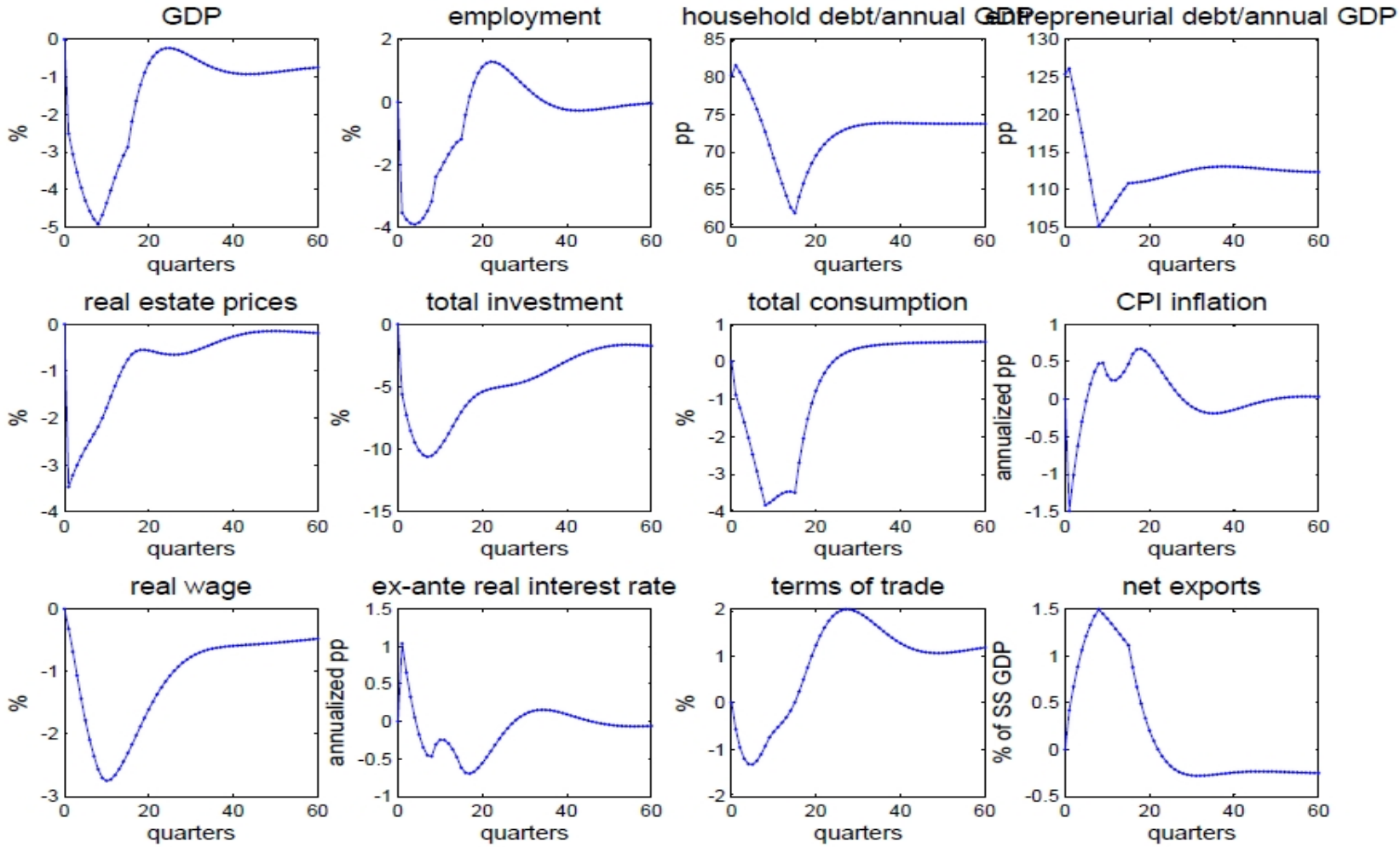
- Analyses on the costs of consolidations based on estimated short-term multipliers (under a "normal times" - unchanged steady state assumption) may provide wrong prescriptions:
  - the size of the multipliers may vary over time in a non-linear, non-monotonic way.
- Large consolidations are medium-term phenomena that typically involve a steady state change:
  - Need to look at the transition to assess key aspects of consolidations

Outline

Private deleveraging and fiscal consolidation

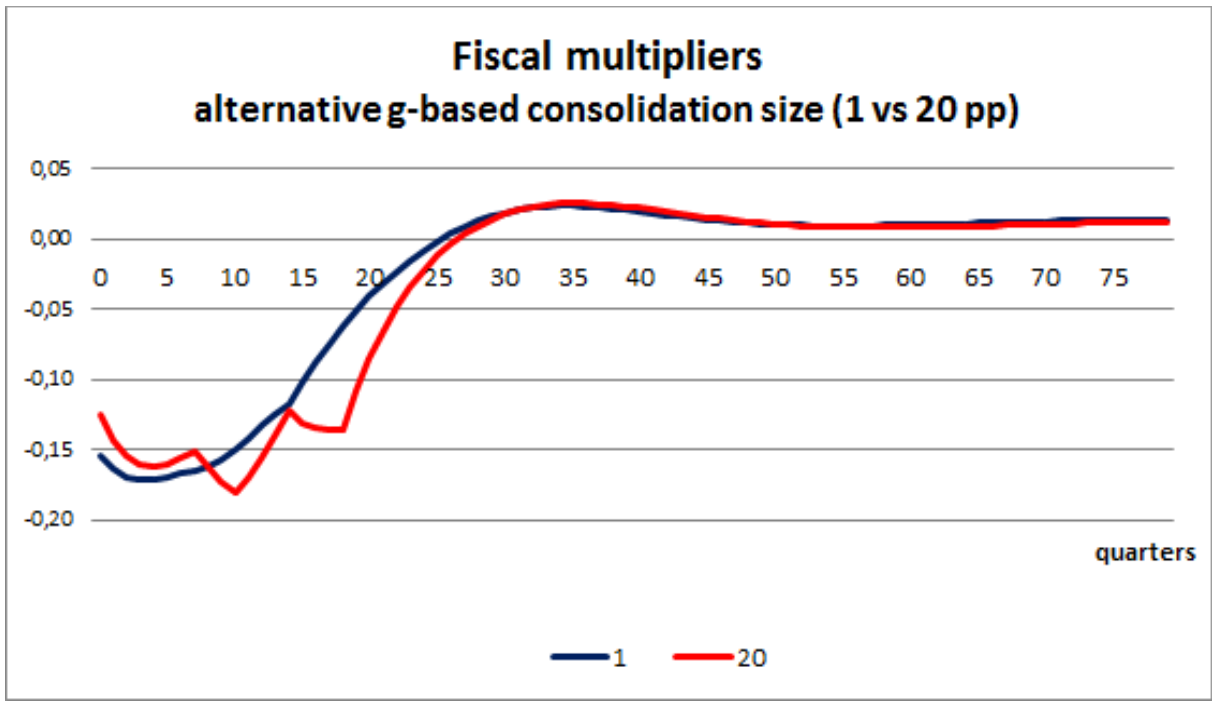
- Consider a **fiscal consolidation** against the **backdrop of an ongoing deleveraging process**, triggered by the financial shock:
  - We simulate a *credit-crunch* shock: Gradual, permanent fall (5pp) in loan-to-value (LTV) ratios: m_t, m_t^e that gets the economy into the "low collateral" regime on impact.
- The no policy-change scenario is:
  - before: the steady state (previous exercise)
  - now: the solo financial shock scenario

Macroeconomic effects of a solo financial shock



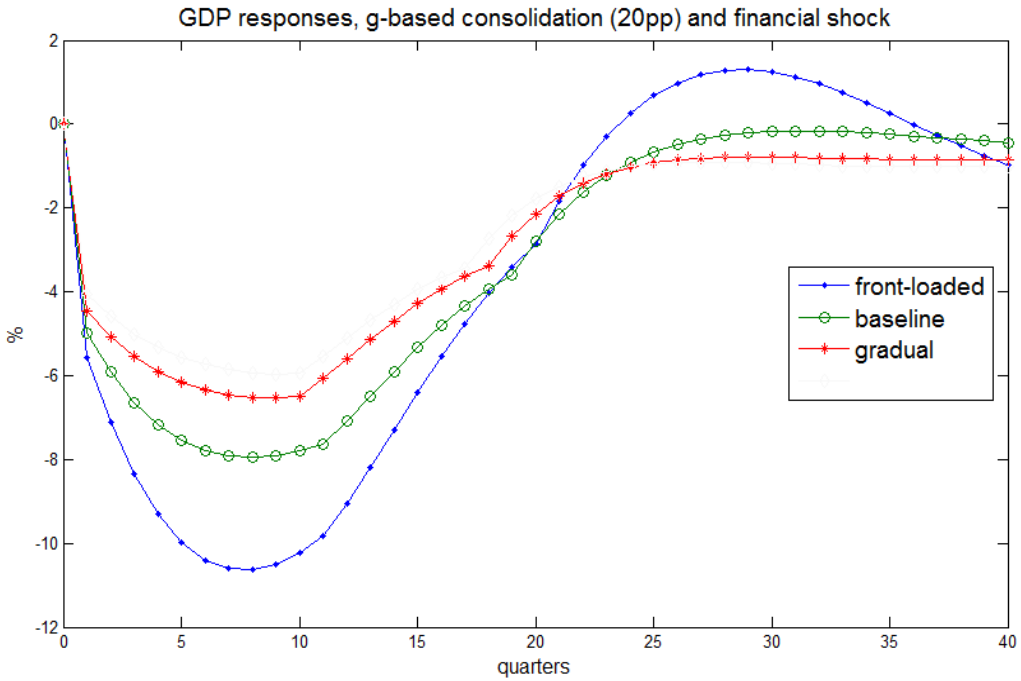
Consolidation size and multipliers

- **Same central insights from** the fiscal shock solo model go through
  - Larger consolidations produce lower multipliers in the short run but postpone the end of private deleveraging, and are more costly over the medium run.



Gradualism vs front-loading (I)

- Consider different values of the response coefficient (ϕ_b) to debt deviations from target $(b^{gy}_{t-1} - \bar{b}^{gy})$.
- More **gradualism reduces short/medium-run** costs from fiscal consolidation **raises longer-run** costs



Gradualism vs front-loading (II)

- Two effects in the short-term
  - On the one hand, the short run multiplier (per unit of change in deficit) is lower for front-loaded consolidations (previous argument).
  - On the other hand, for a given consolidation size, front-loading entails
    - ★ larger fiscal shocks in the early years of the fiscal program;
    - ★ larger contraction of collateral initially $\Longrightarrow$ extend and deepen private deleveraging (increasing T^*, T^{**}) $\Longrightarrow$ private spending of forward looking agents falls deeper in the short-run
- In net terms, front-loading is costly in the short run.
- Contrariwise, in the long run, more aggressive consolidations are less costly, as the bulk of the adjustment is done sooner.

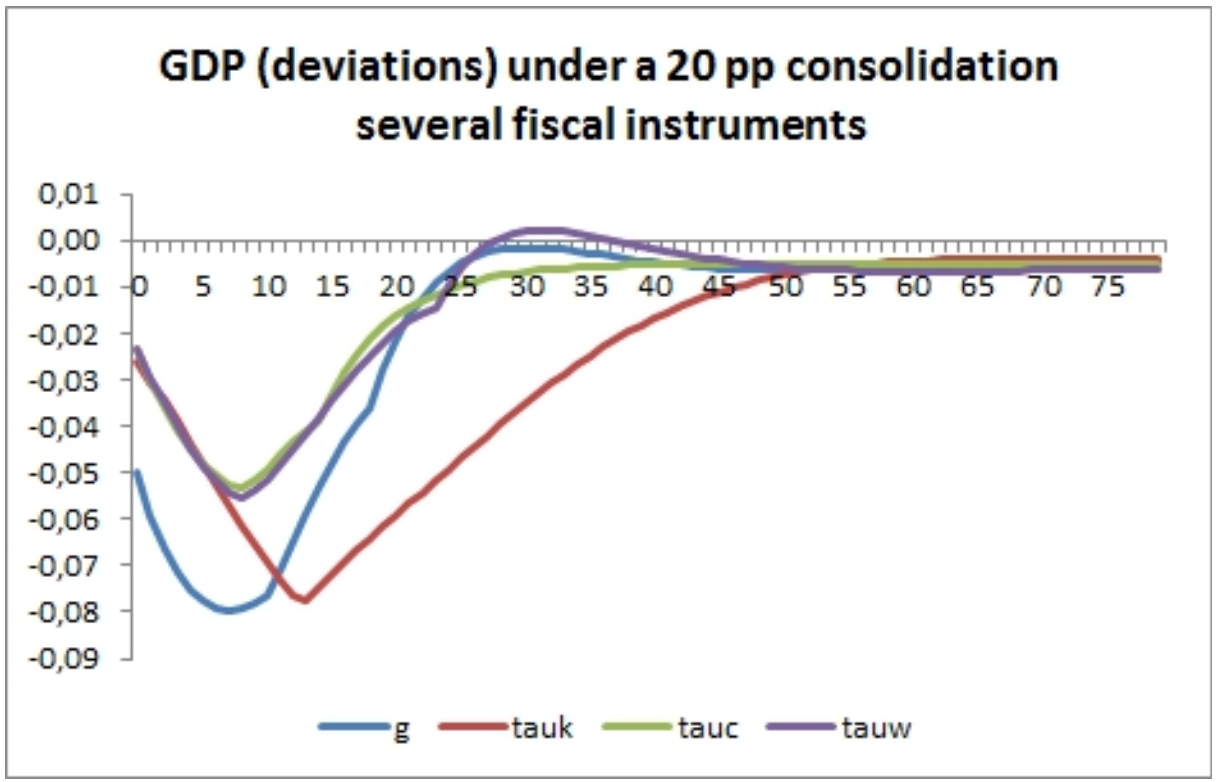
Gradualism vs front-loading (III)

- **Gradualism reduces significantly the welfare costs of the fiscal consolidation** partly by **shortening the duration of the deleveraging phase** (reducing T^* and T^{**}).

Scenario	welf. loss	T^*, T^{**} (qrts)
Front-loaded	0.84	12 , 22
Baseline	0.55	11 , 19
Gradual	0.42	10 , 18

Tax-based fiscal consolidations

- Different fiscal instruments have a potentially very different macro impact, through the private-deleveraging channel



Outline

Concluding remarks

- Long-term debt -a key ingredient in deleveraging episodes- buffers the short term impact of fiscal consolidations
- An important channel to assess the costs of a consolidation is through its effects on private deleveraging dynamics:
  - large consolidations make deleveraging deeper, longer and more costly.
- Frontloading produces sharper and more persistent contractions in available collateral, leading to longer and deeper private deleveraging and rasing the welfare costs of consolidating
- The deleveraging channel highlighted here speaks in favour of "deleveraging-friendly" fiscal instruments that avoid a sharp and persistent fall in collateral values.

Disclaimer

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