

Interest Rate Changes and Economic Activity

José-Víctor Ríos-Rull



Based on joint work with Zhen Huo (Yale) and Akihisa Kato (Bank of Japan and Osaka)

John Kuszczak Memorial Lecture

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Micro Data to Macro Implications and how Central Bank Policies should Reflect them

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 - Habits or sticky expectations to delay a bit the response ([Auclert et al. \(2020\)](#)) rather than the more grounded rational inattention ([Sims \(2003\)](#), [Mackowiak and Wiederholt \(2009\)](#)).

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- Overall, indirect effects of an unexpected changes in interest rates, operating through a general equilibrium increase in labor demand ([Kaplan et al. \(2018\)](#)) outweigh intertemporal substitution mechanisms.

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 - Having the shop full of customers increases business productivity without paying for it
 - The missing factor of production is household effort or inconvenience ([Bai et al. \(2019\)](#), [Huo and Ríos-Rull \(2020\)](#))
- Can be easily implemented via an expenditure externality ([Krueger, Mitman, and Perri \(2016\)](#))

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 - The economy is too rigid to turn negative wealth effect into an expansion via harder working

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- More financial stability than standard new-Keynesian inflation-output tradeoffs.

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- Standard Heterogeneous Incomplete Markets Model ([Bewley \(1984\)](#), [Imrohoroglu \(1989\)](#), [Huggett \(1993\)](#), [Aiyagari \(1994\)](#))
- Large Amount of Wealth, some in fixed supply (fixed factors, land), some reproducible (physical capital with adjustment costs and buildings), and risk free liquid assets.
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Household Problem: State is $\{\eta, \epsilon, \theta^e, \theta^x, a\} = \{z, a\}$

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Parameterization for St St	
Risk aversion for consumption	2.0
Satiation level for housing	4.5
Loan to value ratio	0.8
Annual world interest rate	4.0%
Relevant Out of St St Elasticities	
Wage elasticity	0.5
TFP elasticity (with externality) (small)	0.3
Elasticity of Substitution bw nontradable and import	0.8
Adjustment cost coefficient (to be fine tuned)	1.57

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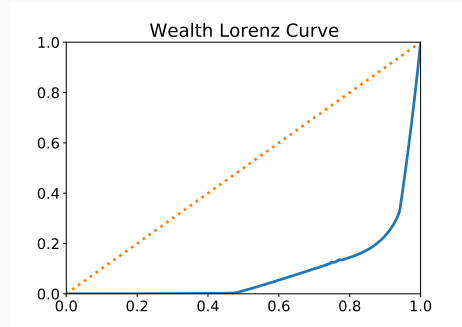
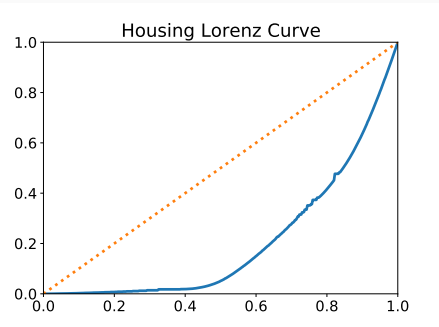
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Share of Export	0.30	0.30
Employment Rate	0.92	0.92

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	Target	Model	Tool	Value
Output	1.00	1.00	TFP in Export	0.73
Capital-to-Output	2.00	2.00	Capital dep. rate	0.025
Housing-Value-to-Output	1.80	1.76	Util shifter in housing	0.50
Debt-to-GDP	0.00	0.02	Discount rate	0.92
Wealth-to-Output	4.50	4.57	Dep. rate in housing	0.008
Wealth Gini	0.82	0.82	Top Share holdings	13.20
Frac. of H held by bottom 70%	0.25	0.27	\hat{h}_1	0.98
Frac. of H held by bottom 80%	0.39	0.41	\hat{h}_2	1.80
Frac. of H held by bottom 90%	0.58	0.64	σ_h	2.98
Relative Price of Nontradable	1.00	1.00	TFP in e	0.73
Share of Export	0.30	0.30	CES weight on e	0.75
Employment Rate	0.92	0.92	wage	0.96



- Gini coeff: housing 0.63, Wealth 0.82 (data 0.82 in 2007 SFC)

Business Cycles

- 1 Increase in Interest Rate (world event or Policy) 1% (Baseline)

Look at Impulse Responses of Various Adverse Events

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$$\log w_t - \log w^{ss} = -\psi^w (\log U_t - \log U^{ss})$$

- A Temporary but persistent increase in the (World) Interest Rate
- With TFP Externality only on Nontradables

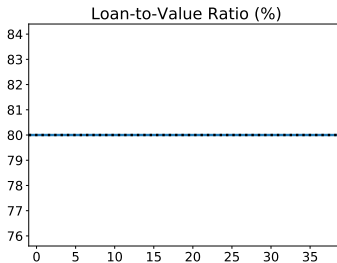
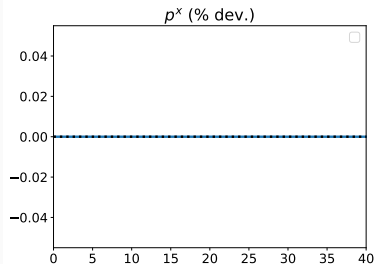
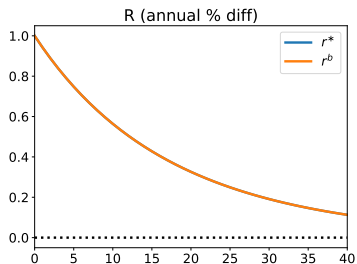
- TFP Elasticity wrt expenditures .5

- Wage Adjustments ($\psi^w = .5$)

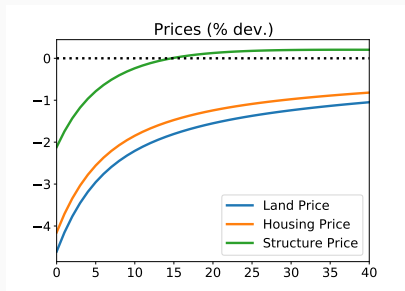
$$\log w_t - \log w^{ss} = -\psi^w (\log U_t - \log U^{ss})$$

- Import Elasticity .8

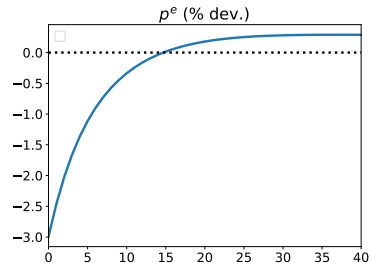
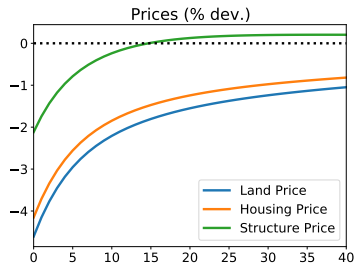
1- Exogenous Shifter: (Only r moves)



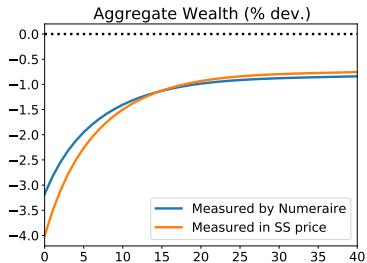
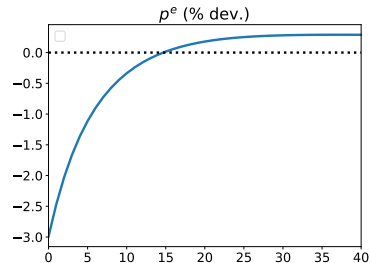
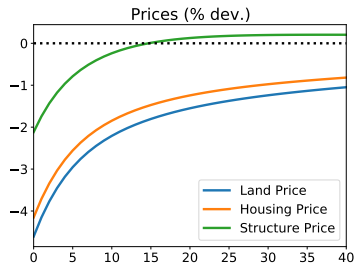
1- Asset Prices & Quantities (Financial and Total Wealth)



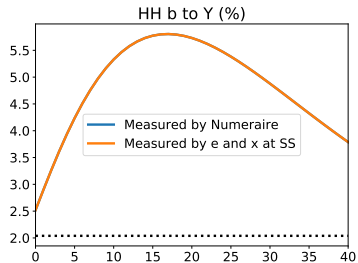
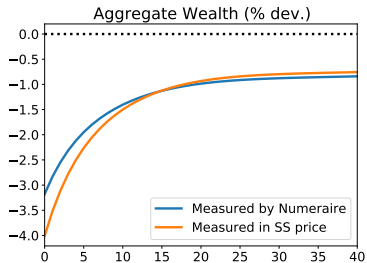
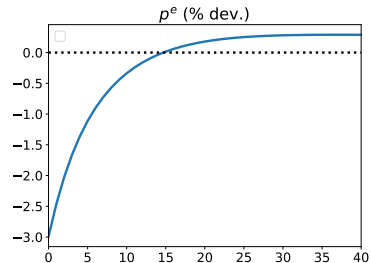
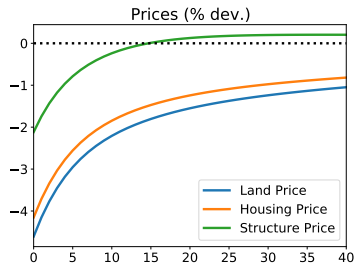
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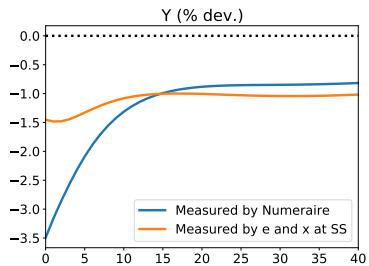
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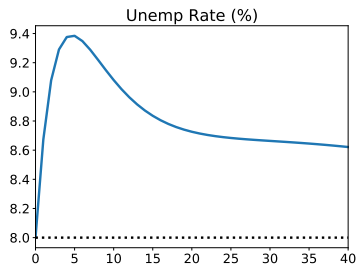
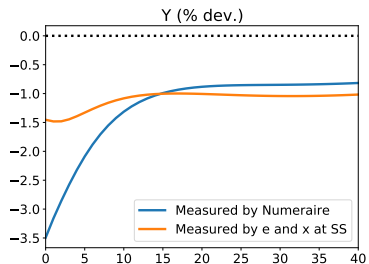
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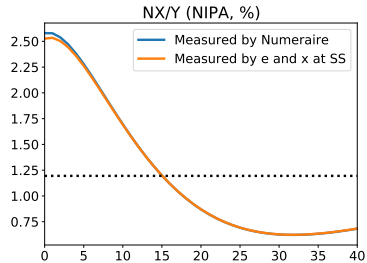
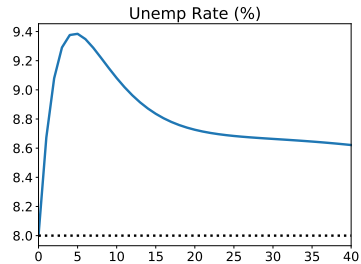
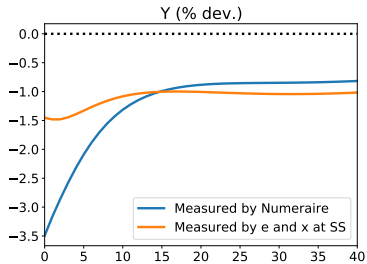
1- Main Business Cycle Objects



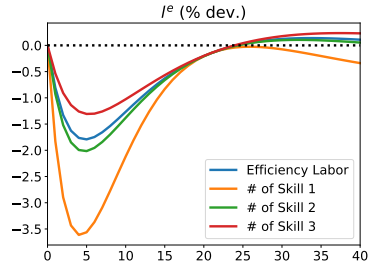
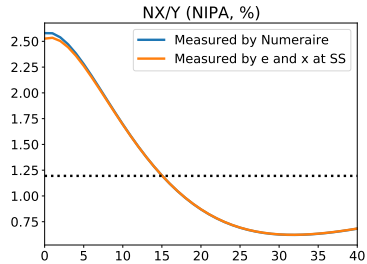
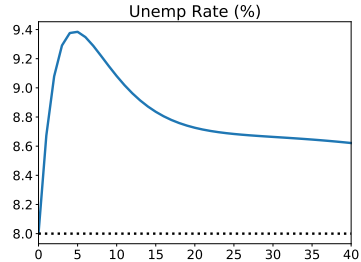
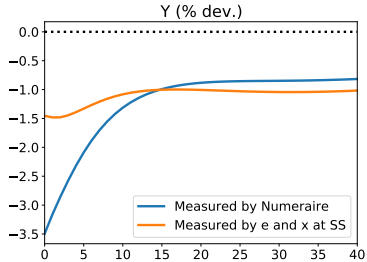
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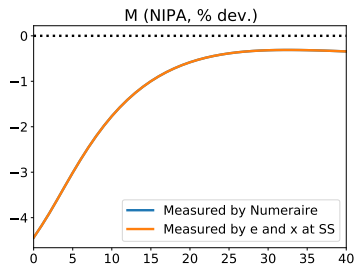
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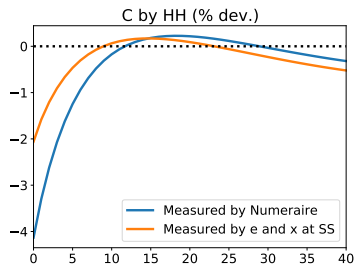
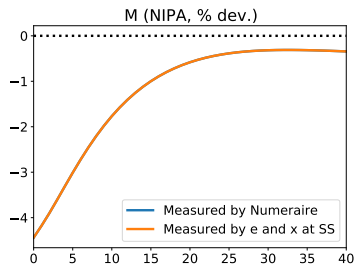
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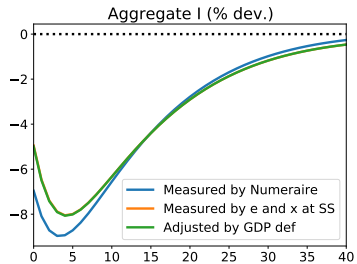
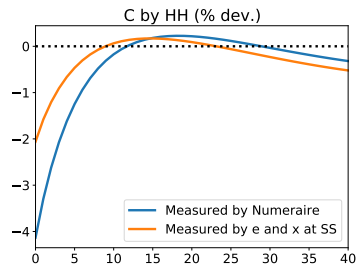
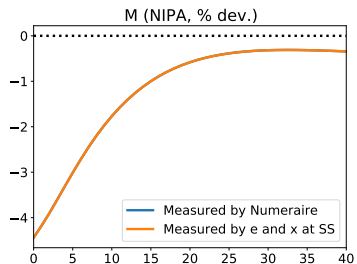
1- GDP Components



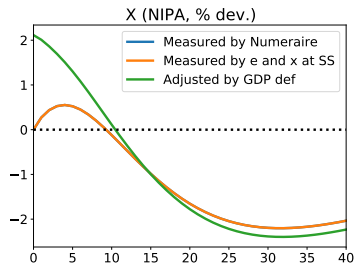
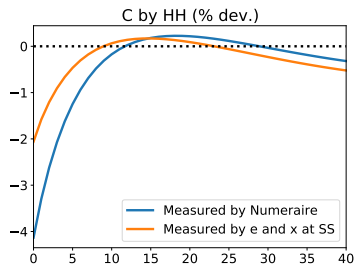
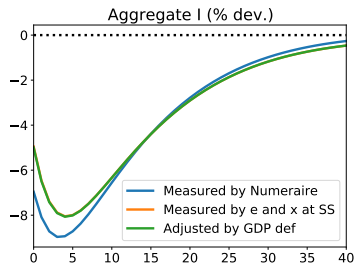
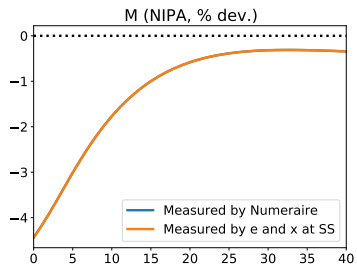
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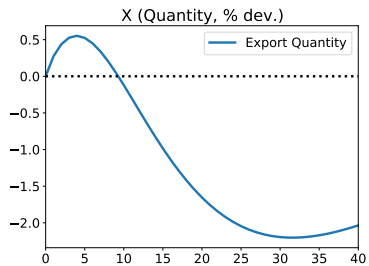
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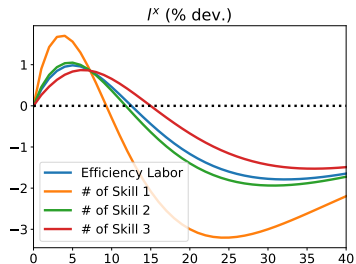
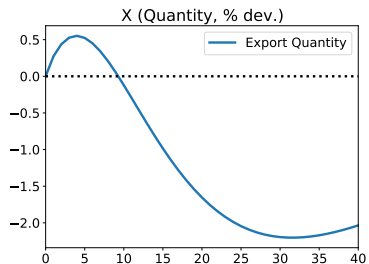
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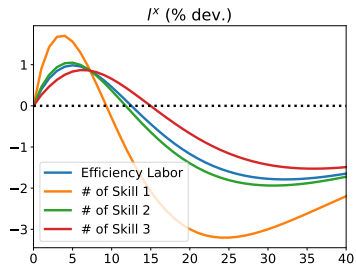
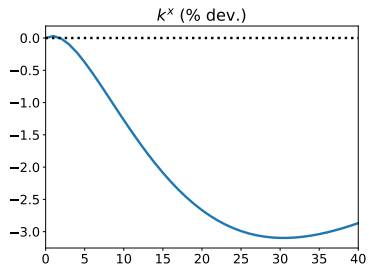
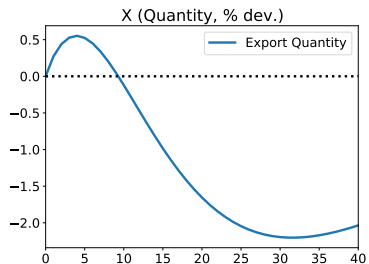
1- Sector



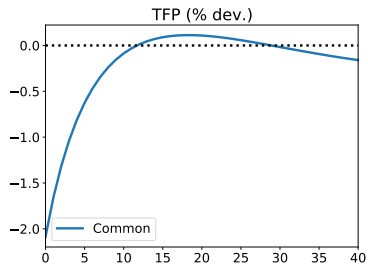
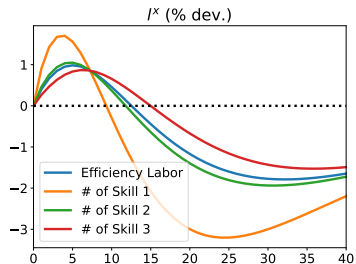
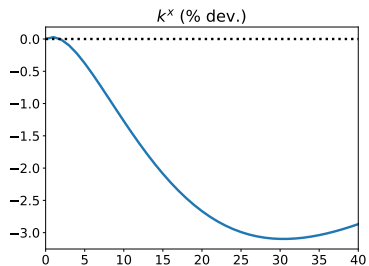
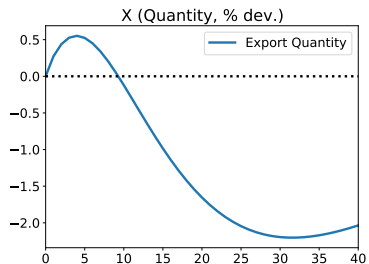
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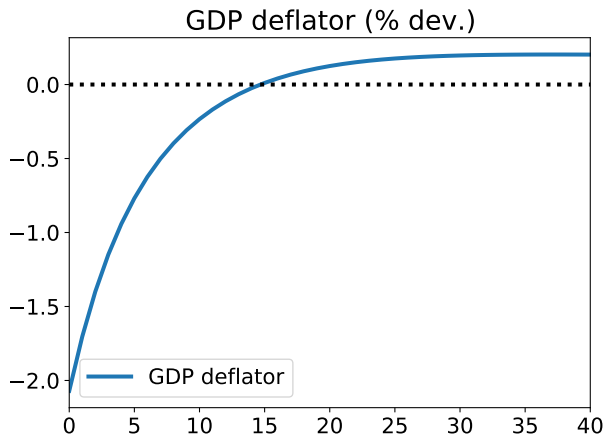
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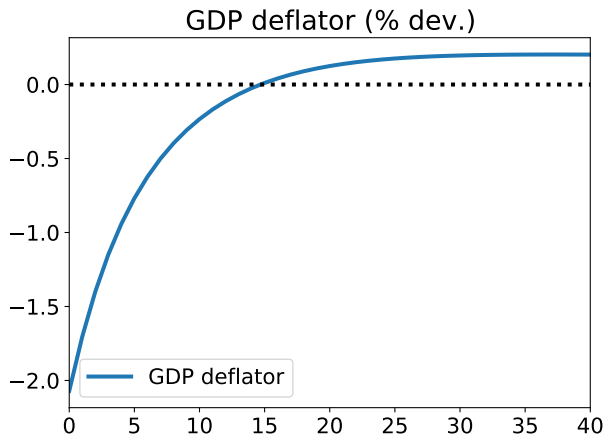
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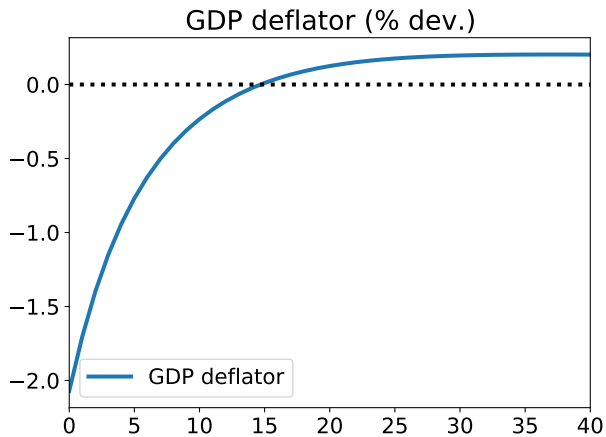
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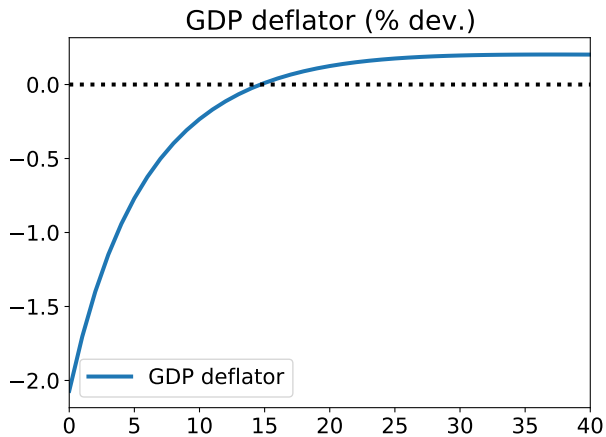
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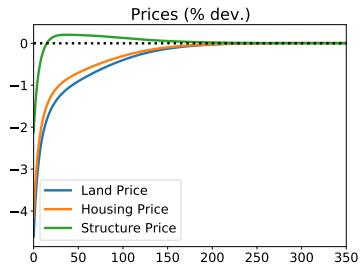
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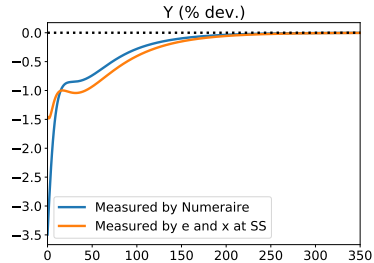
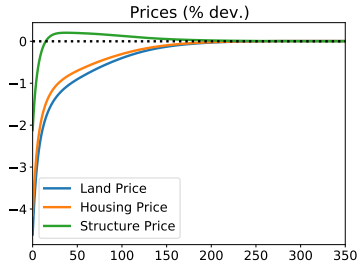
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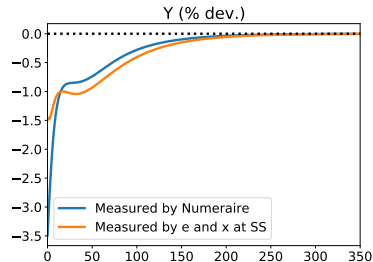
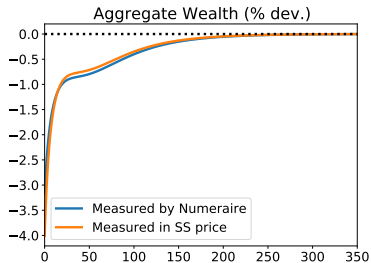
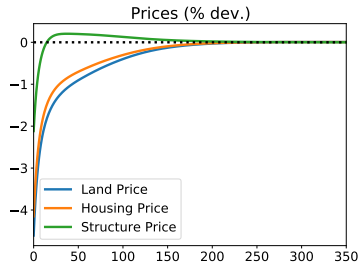
1- The Longer View: 87 years



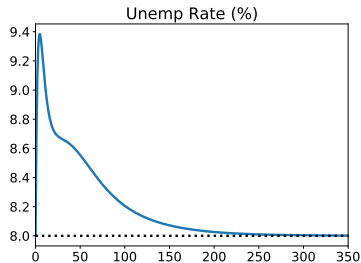
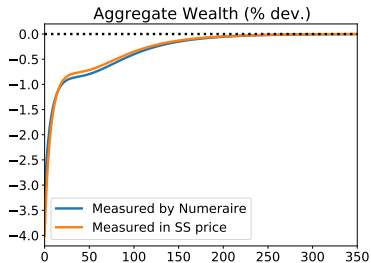
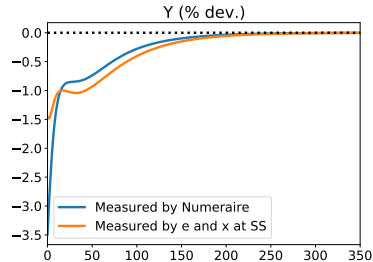
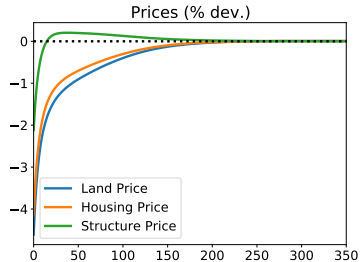
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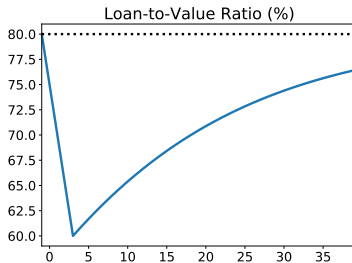
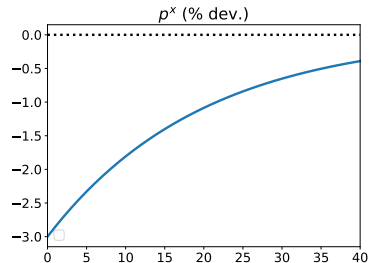
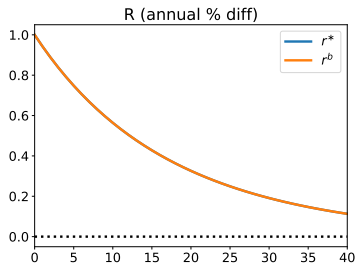
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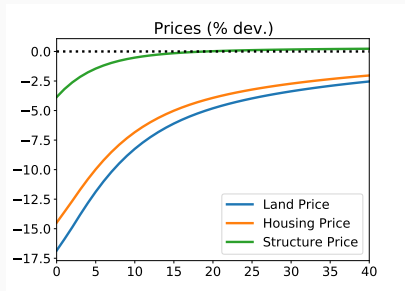
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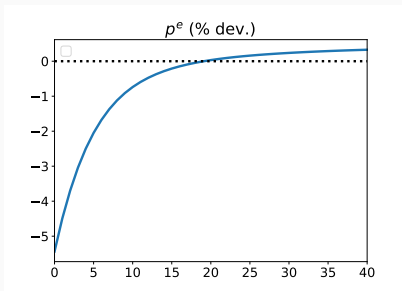
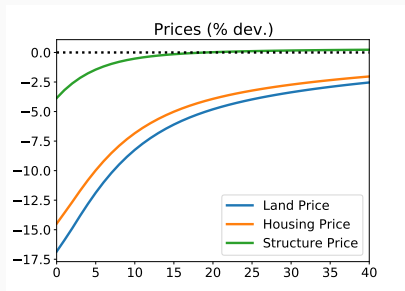
2. Exogenous Shifters: r moves 1% and p^x 5%



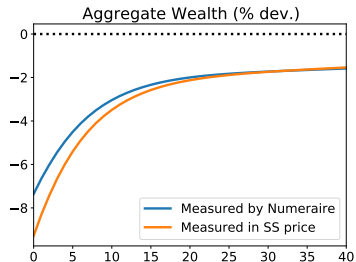
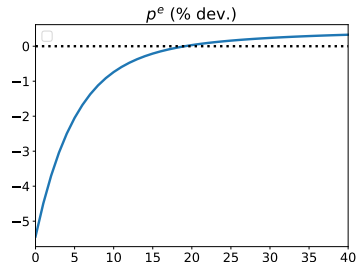
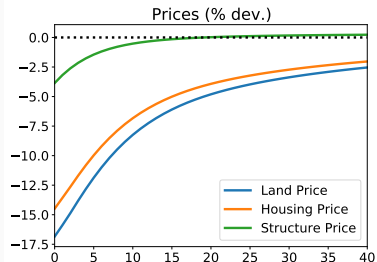
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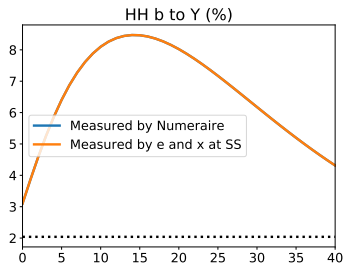
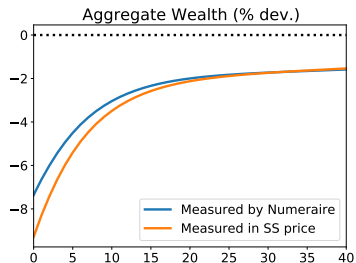
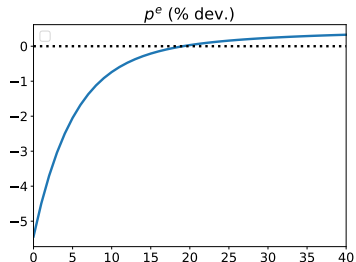
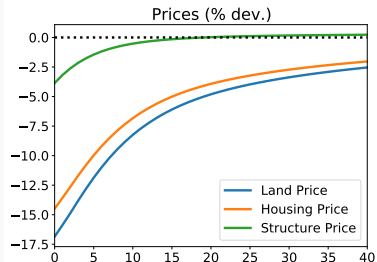
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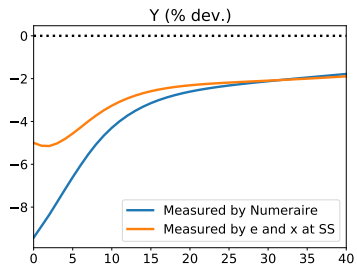
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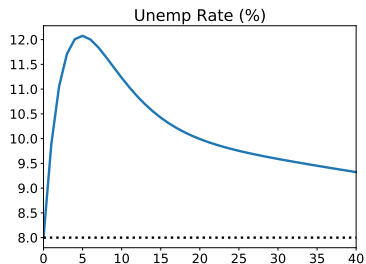
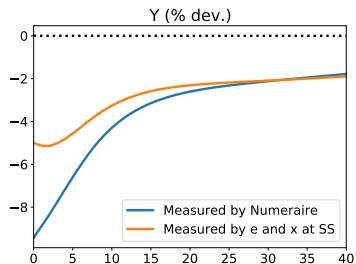
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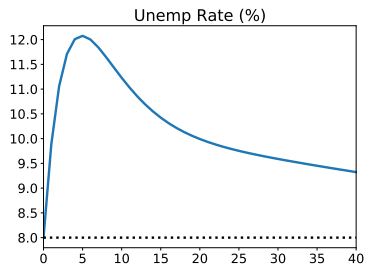
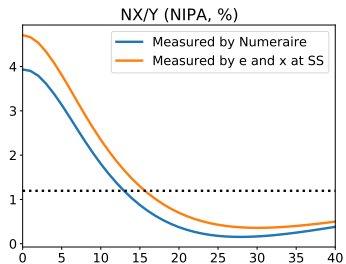
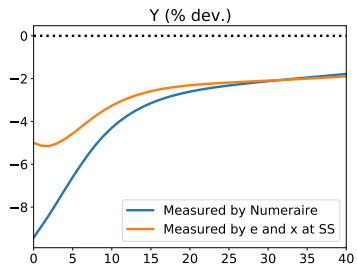
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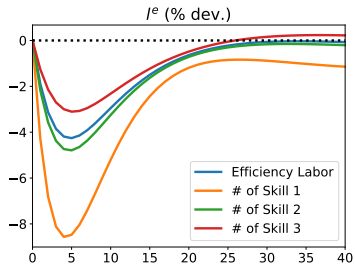
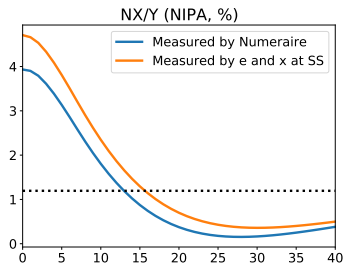
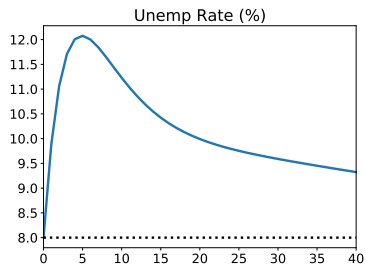
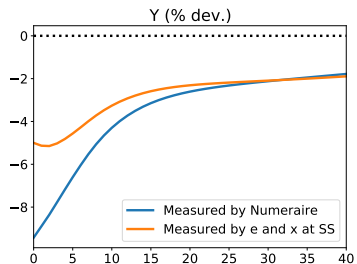
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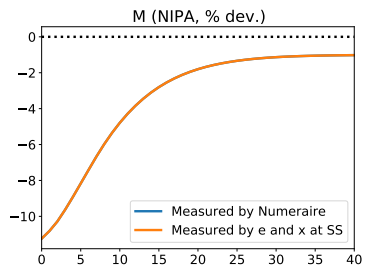
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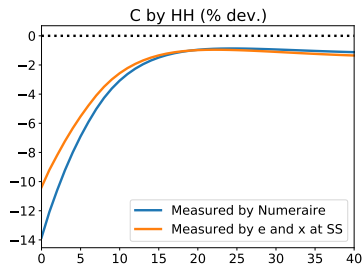
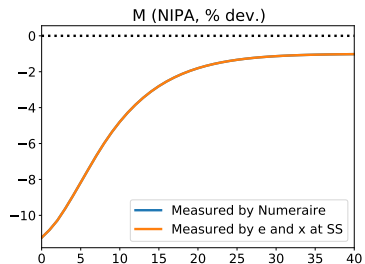
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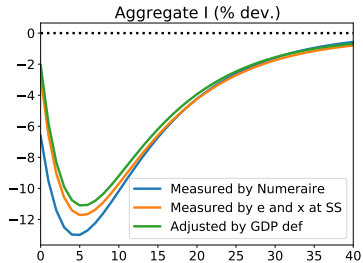
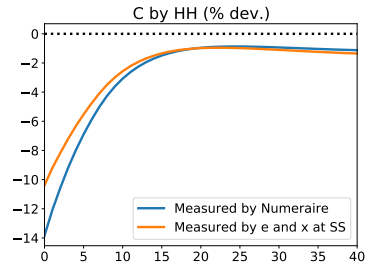
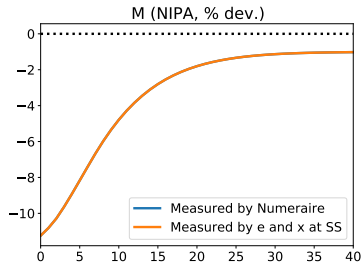
2. GDP Components



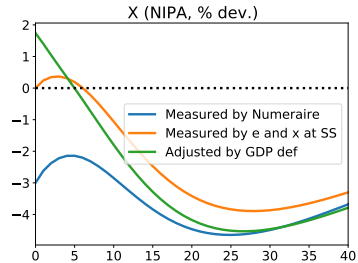
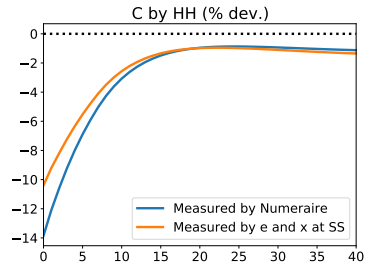
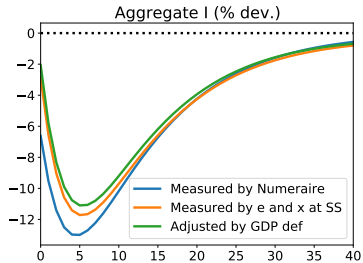
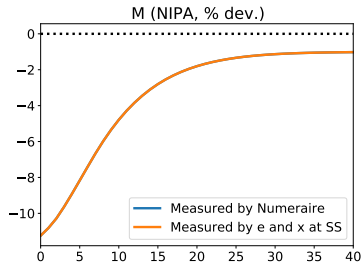
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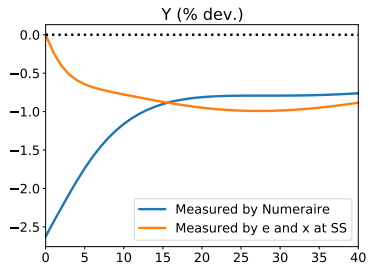
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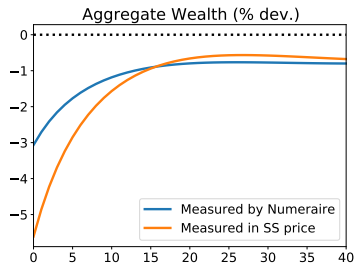
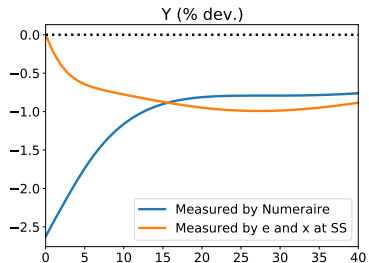
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- Humongous reduction of imports: Sizeable Improvement in Balance of Payments.
- Not consistent world wide. Need much larger drop in foreign demand.

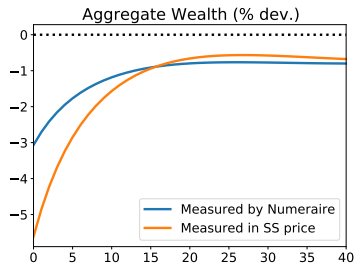
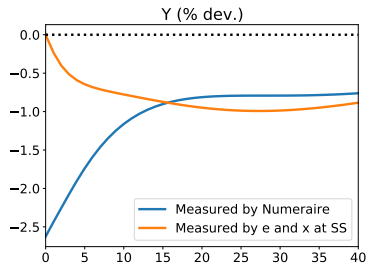
3- No Amplification via Expenditure Externality



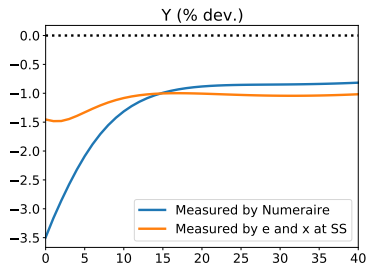
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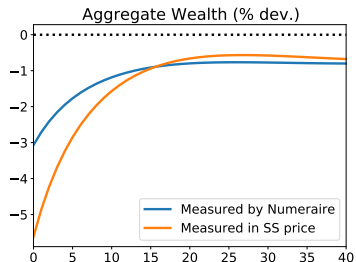
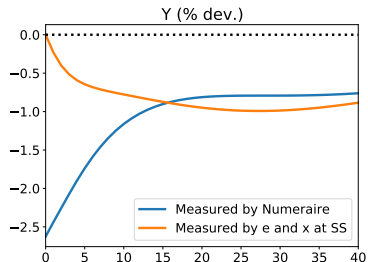
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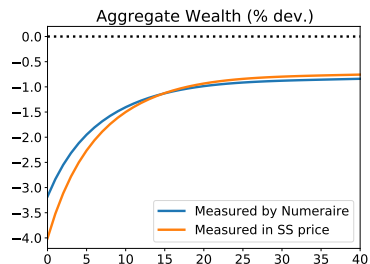
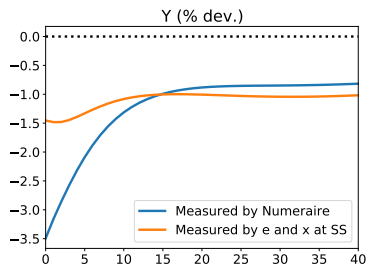
Comparing with Baseline



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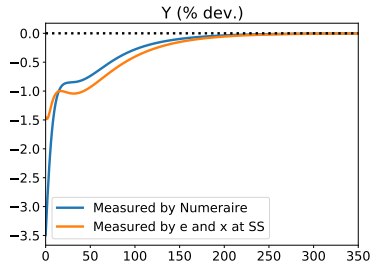


- Elastic Non-tradable price no market clearing on non-tradables, demand determined quantities

- A Temporary but persistent Increase in Interest Rates
- Elastic Non-tradable price no market clearing on non-tradables, demand determined quantities
- Reduction in Max LTV from 80% to 60%
- With TFP Externality
 - TFP Elasticity wrt expenditures .5
 - Wage Adjustments ($\psi^w = .5$)
$$\log w_t - \log w^{ss} = \psi^w (\log Y_t - \log Y^{ss})$$
 - Import Elasticity .8

Comparing with output across horizons between base and partial devaluation

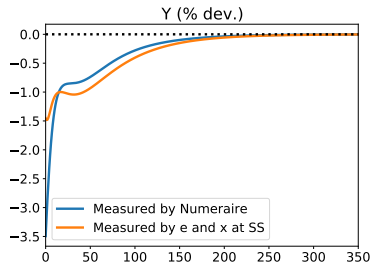
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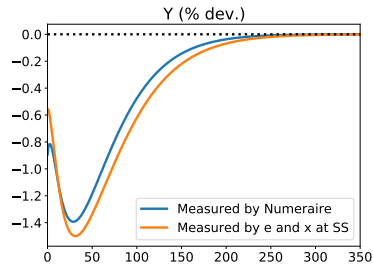
Partial Devaluation

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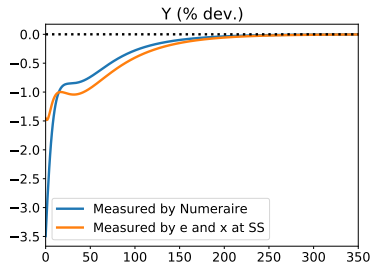


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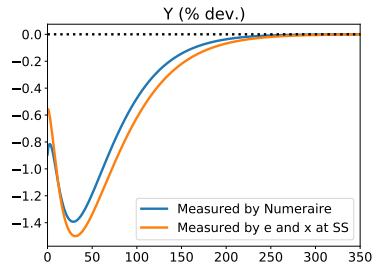


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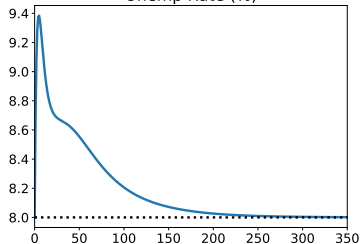
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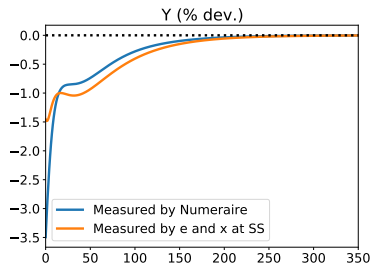


Unemp Rate (%)

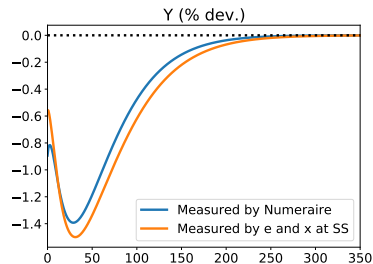


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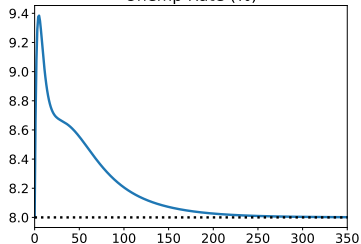
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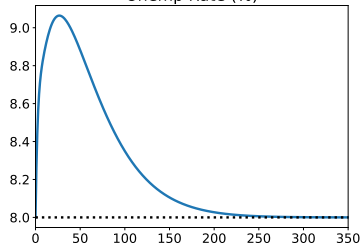
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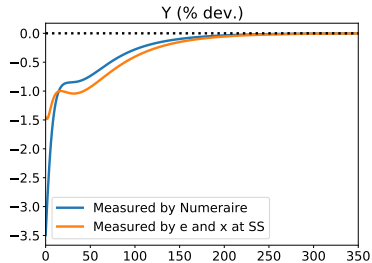


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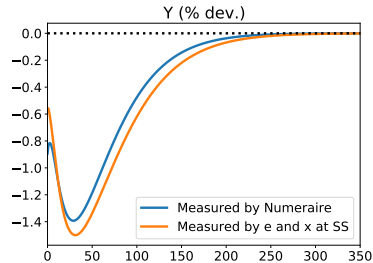


Comparing with output across horizons between base and partial devaluation

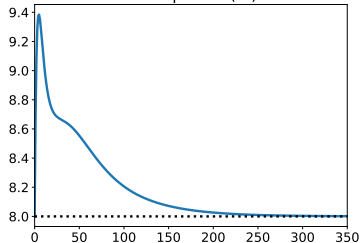
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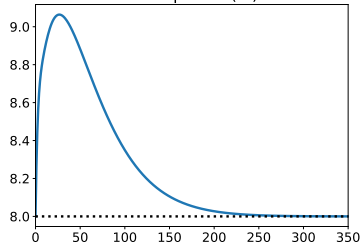
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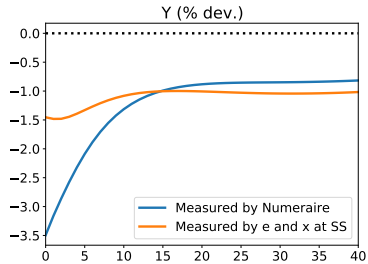


Unemp Rate (%)



Comparison between all Economies: Output

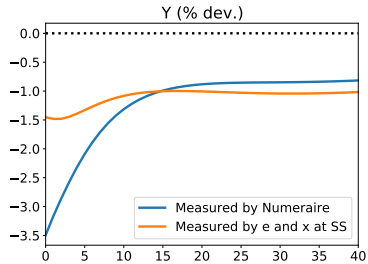
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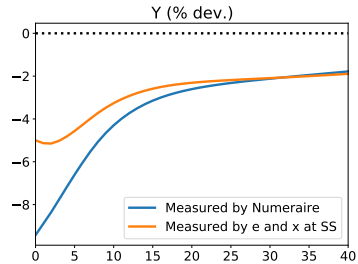
Perfect Storm

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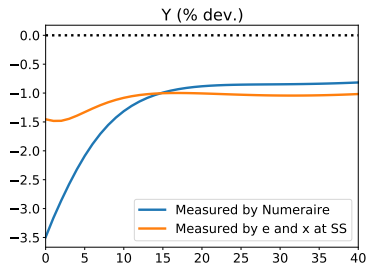


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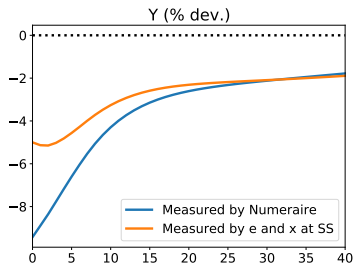


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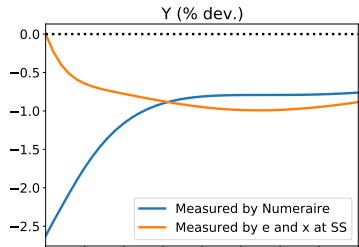
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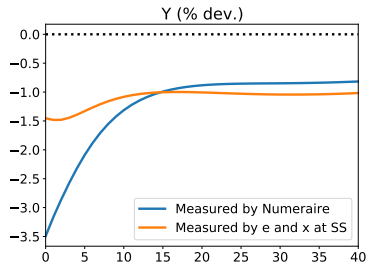
No TFP Externality



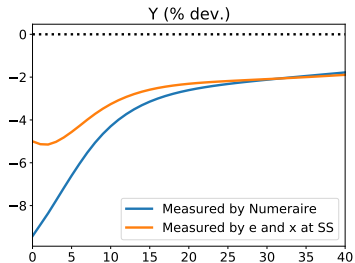
Insufficient Devaluation

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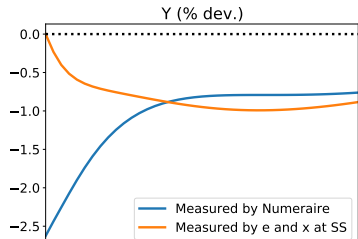
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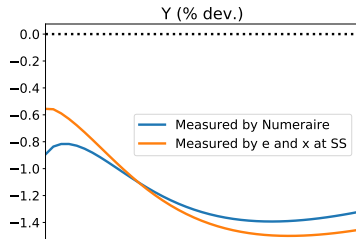
Perfect Storm



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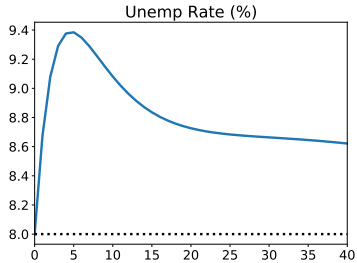


Insufficient Devaluation

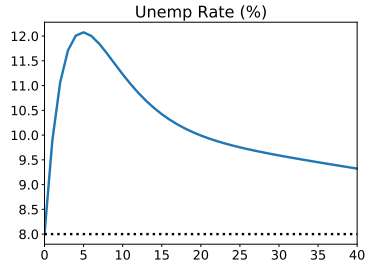


Comparison between all Economies: Unemployment

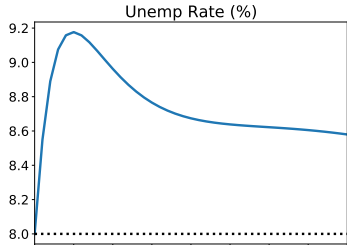
Baseline



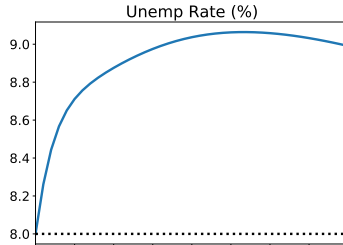
Perfect Storm



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Insufficient Devaluation



What we want to have but do not have YET

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- Have a modern New Keynesian structure to model the link between nominal and real interest rates

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- Build more Asset prices and productivity propagation into those models.

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- In other work we show how expansionary policy (with house price increases) put households more at risk for later interest rate hikes.

Thank you very much

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