

Introduction to Empirical Macro-Finance

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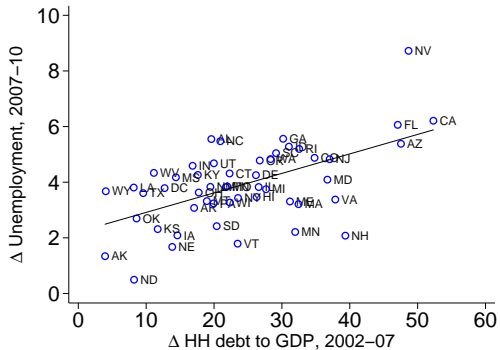
Outline

- Two ways to think about Macro-Finance nexus
 - business cycles
 - long-run
- Macro-Finance and the business cycle
 - The rise of “credit-driven household demand channel”
 - empirics, theory, and public policy
- Macro-Finance and the long-run
 - Understanding the **causes** and **consequences** of the global “credit super-cycle” and falling long-term real rate.

Macro-Finance and the business cycle

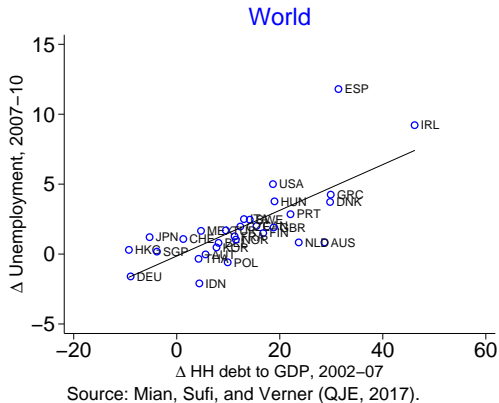
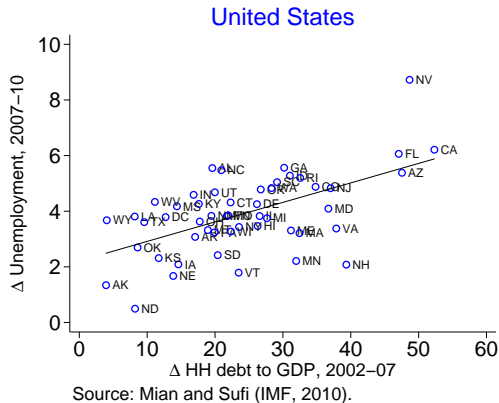
Macro-Finance and the business cycle

United States



Source: Mian and Sufi (IMF, 2010).

Macro-Finance and the business cycle



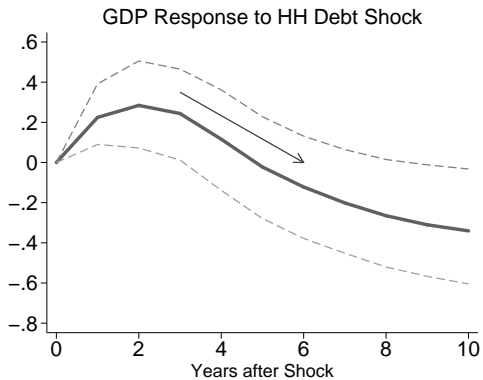
The credit-driven household demand channel

\uparrow credit supply \Rightarrow \uparrow household aggregate demand \Rightarrow \downarrow future GDP growth.

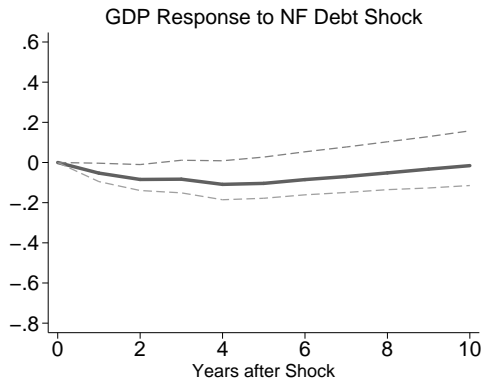
Empirical Challenges

- How to isolate credit supply expansion?
 - \uparrow in quantity and \downarrow in spreads, deregulation/policy experiments, differential pass-through of global shocks (e.g. oil, securitization, savings glut)
- How to identify change in household aggregate demand?
 - Focus on nontradable/tradable sectors, relative size and prices
 - Asymmetry between household and non-financial firm credit
- Use of micro data and regional variation

International Evidence



Source: Mian, Sufi, and Verner (QJE, 2017)



Source: Mian, Sufi, and Verner (QJE, 2017)

International Evidence

	MSV2017 30 Countries					
	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta_3 \frac{C_{it}}{Y_{it}}$	$\Delta_3 \frac{NX_{it}}{Y_{it}}$	$\Delta_3 s_{it}^{MC}$	$\Delta_3 \ln \left(\frac{L_{it}^{NT}}{L_{it}^T} \right)$	$\Delta_3 \ln \left(\frac{P_{it}^{NT}}{P_{it}^T} \right)$	$\Delta_3 y_{i,t+4}$
$\Delta_3 d_{it}^{HH}$	0.058* (0.024)	-0.15** (0.051)	0.055* (0.025)			
$\Delta_3 d_{it}^F$	0.038** (0.012)	-0.00036 (0.031)	-0.012 (0.021)			
Country fixed effects	✓	✓	✓			
R^2	0.087	0.062	0.012			
Observations	816	832	858			

Standard errors in parentheses

30 countries, 1962-2012. [Source: Mian, Sufi, and Verner \(QJE, 2017\).](#)

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

International Evidence

	MSV2017 30 Countries					
	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta_3 \frac{C_{it}}{Y_{it}}$	$\Delta_3 \frac{NX_{it}}{Y_{it}}$	$\Delta_3 s_{it}^{MC}$	$\Delta_3 \ln \left(\frac{L_{it}^{NT}}{L_{it}^T} \right)$	$\Delta_3 \ln \left(\frac{P_{it}^{NT}}{P_{it}^T} \right)$	$\Delta_3 y_{i,t+4}$
$\Delta_3 d_{it}^{HH}$	0.058* (0.024)	-0.15** (0.051)	0.055* (0.025)	0.36** (0.056)	0.38** (0.097)	
$\Delta_3 d_{it}^F$	0.038** (0.012)	-0.00036 (0.031)	-0.012 (0.021)	0.0085 (0.064)	-0.065 (0.059)	
Country fixed effects	✓	✓	✓	✓	✓	
R^2	0.087	0.062	0.012	0.17	0.067	
Observations	816	832	858	639	670	

Standard errors in parentheses

30 countries, 1962-2012. [Source: Mian, Sufi, and Verner \(QJE, 2017\).](#)

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

International Evidence

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	(1)	(2)	(3)	(4)	(5)	(6)
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$\Delta_3 d_{it}^F$	0.038** (0.012)	-0.00036 (0.031)	-0.012 (0.021)	0.0085 (0.064)	-0.065 (0.059)	-0.032 (0.038)
Country fixed effects	✓	✓	✓	✓	✓	✓
R^2	0.087	0.062	0.012	0.17	0.067	0.11
Observations	816	832	858	639	670	840

Standard errors in parentheses

30 countries, 1962-2012. [Source: Mian, Sufi, and Verner \(QJE, 2017\).](#)

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

International Evidence

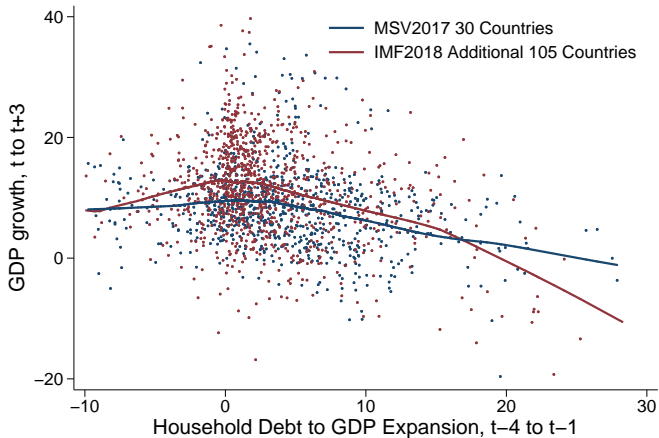
	MSV2017 30 Countries						IMF2018 Additional 105 Countries
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta_3 \frac{C_{it}}{Y_{it}}$	$\Delta_3 \frac{NX_{it}}{Y_{it}}$	$\Delta_3 s_{it}^{MC}$	$\Delta_3 \ln \left(\frac{L_{it}^{NT}}{L_{it}^T} \right)$	$\Delta_3 \ln \left(\frac{P_{it}^{NT}}{P_{it}^T} \right)$	$\Delta_3 y_{i,t+4}$	$\Delta_3 y_{i,t+4}$
$\Delta_3 d_{it}^{HH}$	0.058* (0.024)	-0.15** (0.051)	0.055* (0.025)	0.36** (0.056)	0.38** (0.097)	-0.34** (0.089)	-0.37* (0.17)
$\Delta_3 d_{it}^F$	0.038** (0.012)	-0.00036 (0.031)	-0.012 (0.021)	0.0085 (0.064)	-0.065 (0.059)	-0.032 (0.038)	-0.019** (0.0072)
Country fixed effects	✓	✓	✓	✓	✓	✓	✓
R^2	0.087	0.062	0.012	0.17	0.067	0.11	0.056
Observations	816	832	858	639	670	840	964

Standard errors in parentheses

30 countries, 1962-2012. Source: Mian, Sufi, and Verner (QJE, 2017).

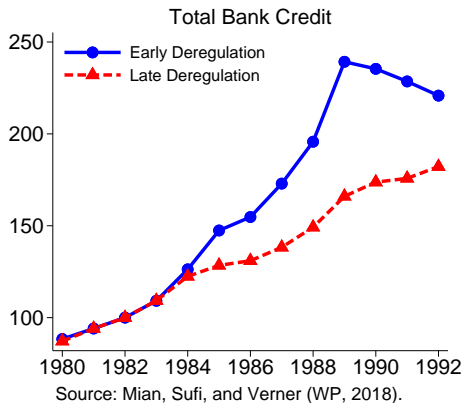
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Rise in household leverage predicts GDP slowdown

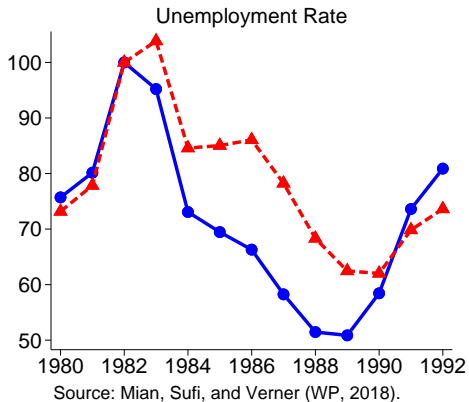
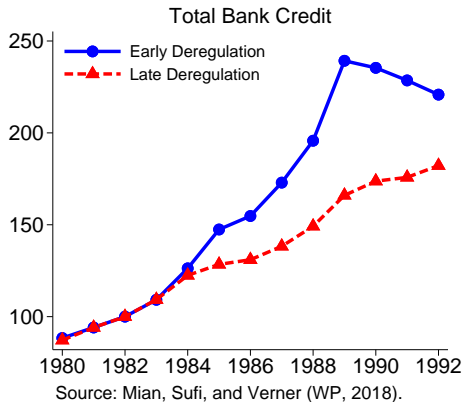


Source: Mian, Sufi, and Verner (QJE, 2017).

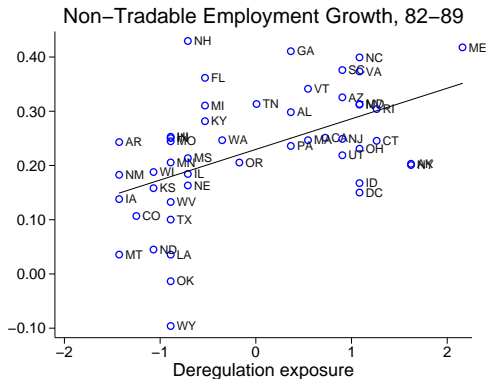
Deregulation experiment in the 1980s in U.S.



Deregulation experiment in the 1980s in U.S.



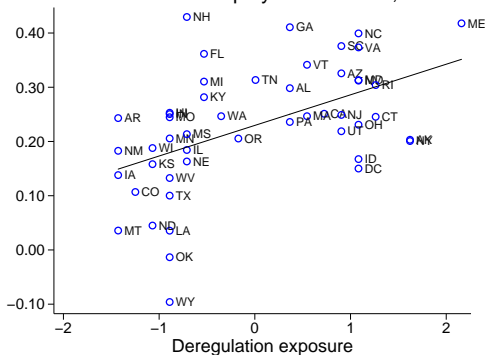
Local demand and NT / T sector expands



Source: Mian, Sufi, and Verner (WP, 2018).

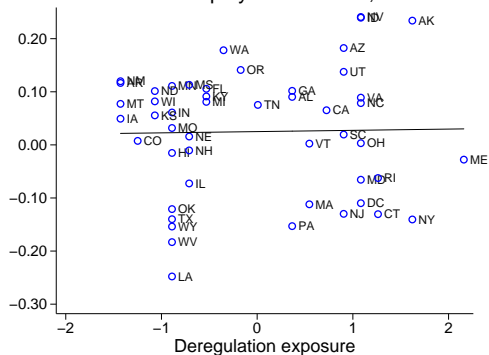
Local demand and NT / T sector expands

Non-Tradable Employment Growth, 82-89



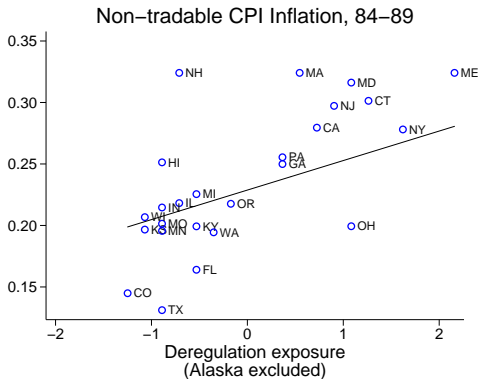
Source: Mian, Sufi, and Verner (WP, 2018).

Tradable Employment Growth, 82-89



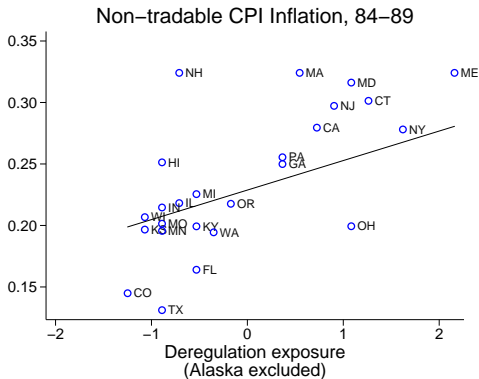
Source: Mian, Sufi, and Verner (WP, 2018).

Local demand and NT / T price rises

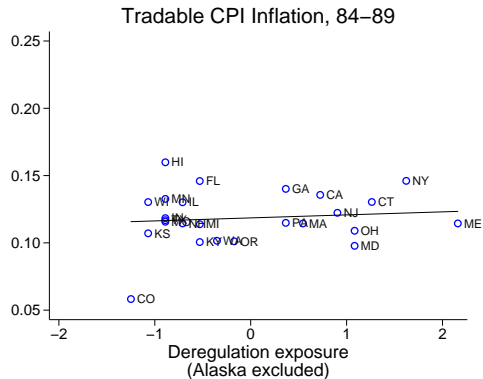


Source: Mian, Sufi, and Verner (WP, 2018).

Local demand and NT / T price rises

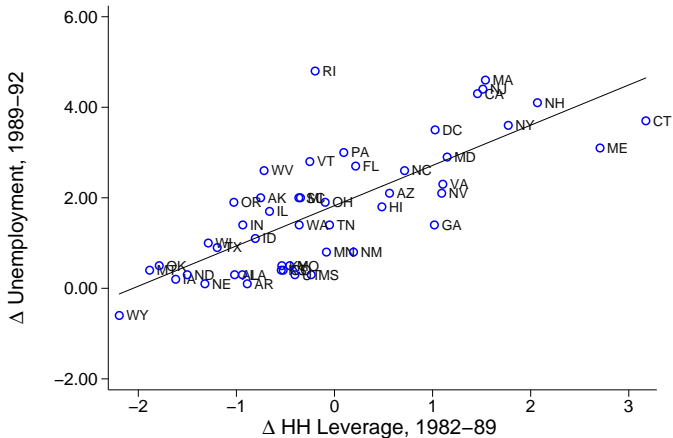


Source: Mian, Sufi, and Verner (WP, 2018).



Source: Mian, Sufi, and Verner (WP, 2018).

Rise in household leverage predicts depth of 1990/91 recession

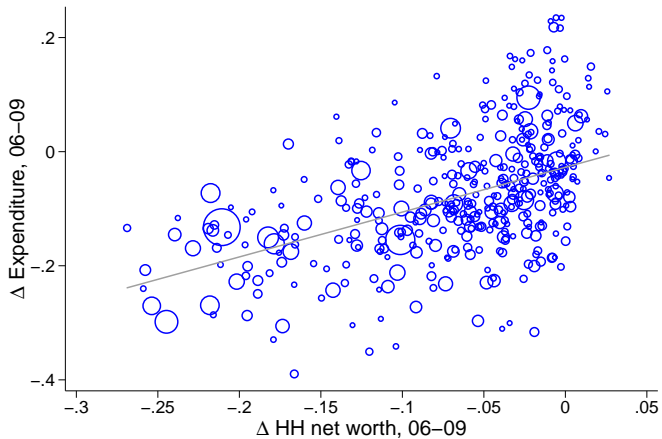


Source: Mian, Sufi, and Verner (WP, 2018).

U.S. experience during the 2000's

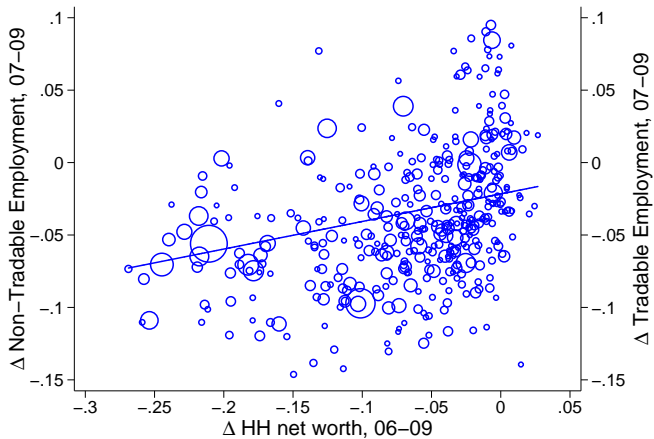
- A large expansion in credit supply, Mian and Sufi (2009), (also see [1])
- Credit expansion led to an increase in local demand and the non-tradable sector expanded, Di Maggio and Kermani (2017)
- When the music stops, Fisher's "debt deflation" dynamics take hold (see [2])
 - large fall in demand, Mian et al. (2013)
 - fall in employment due to demand shortage, Mian and Sufi (2014)
 - foreclosure fire-sale externalities amplify the negative cycle, Mian et al. (2015)

The fall in demand



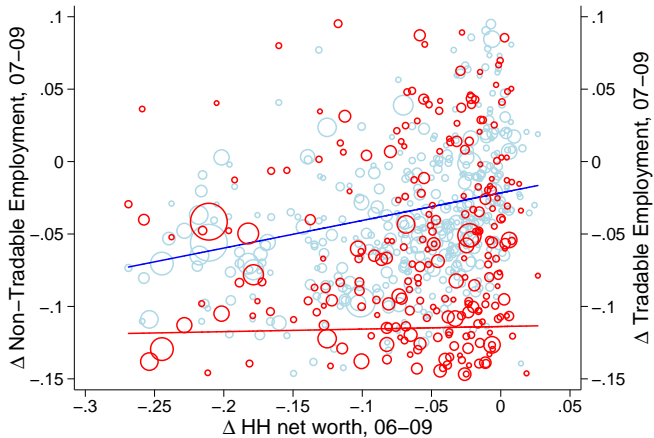
Source: Mian, Rao, and Sufi (QJE, 2013).

Fall in employment in response to demand



Source: Mian and Sufi (ECMA, 2014).

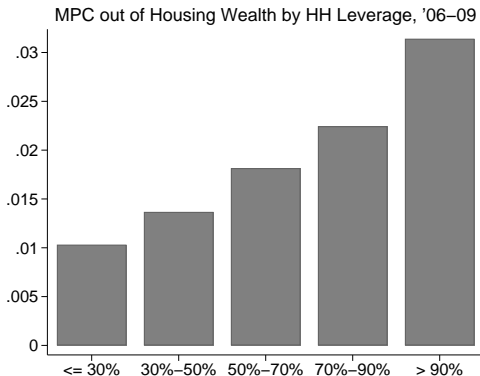
Fall in employment in response to demand



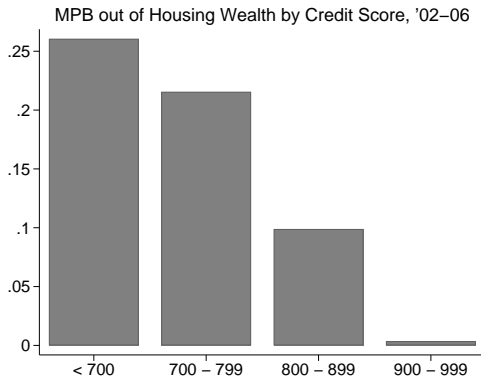
Source: Mian and Sufi (ECMA, 2014).

Theoretical implications of credit-driven household demand channel

- Heterogeneity across borrowers and creditors matters as it interacts with frictions like ZLB & wage rigidity. e.g. Eggertsson and Krugman (2012), Farhi and Werning (2015), Guerrieri and Lorenzoni (2017), Schmitt-Grohé and Uribe (2016) ([3])
- Ex-ante “over-borrowing” due to AD and pecuniary externalities (see [4])

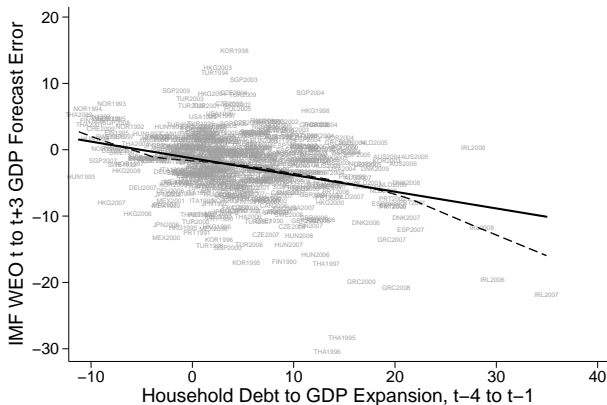


Source: Mian, Rao, and Sufi (QJE, 2013).



Source: Mian and Sufi (AER, 2011).

- Systematic forecasting errors suggests departure from rational expectations with common beliefs (See [5])
- Important to model heterogeneous beliefs and behavioral biases, e.g. Geanakoplos (2010), Gennaioli et al. (2012), López-Salido et al. (2017) ([6])



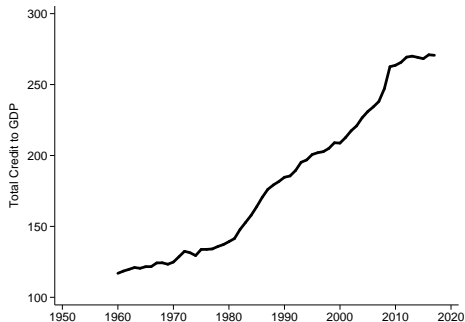
Source: Mian, Sufi, and Verner (QJE, 2017)

Public policy implications of credit-driven household demand channel

- Post-2007 policy should have focused on reducing household debt service payments and preventing foreclosures (see [8]).
- Mortgage design matters, more equity-like contracts that promote risk-sharing have benefits at the macro level
- Monetary policy pass-through depends on the credit-driven household demand channel, e.g. Di Maggio et al. (2017)
- UK and many other countries have since adopted macro-prudential regulations that impose constraints based on loan to value or debt service to income

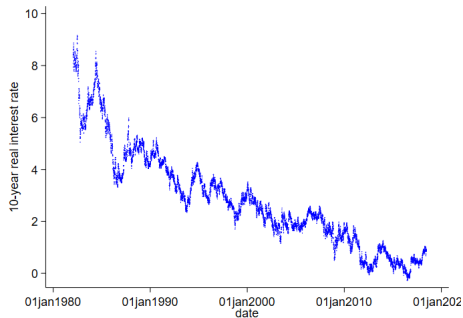
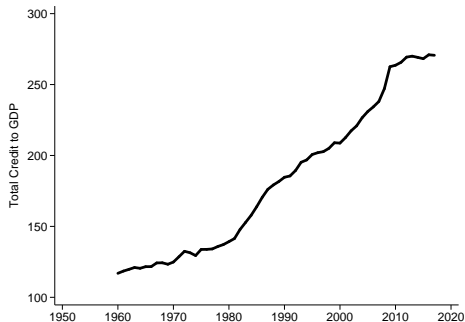
Macro-Finance and the long-run

- Huge rise in quantity and large fall in price of credit since about 1980. Why did this happen? What are its consequences?

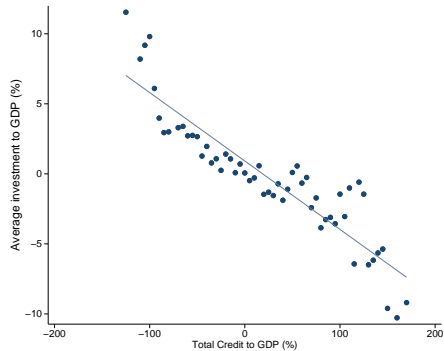


Macro-Finance and the long-run

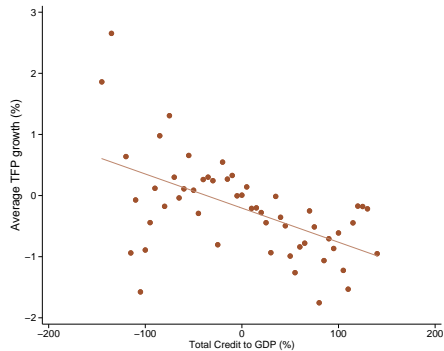
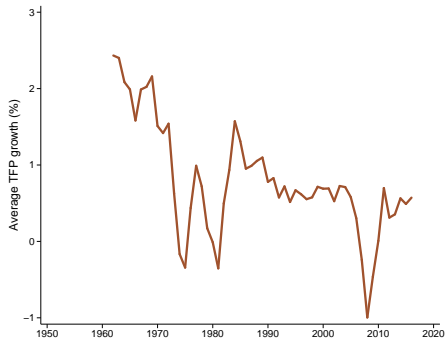
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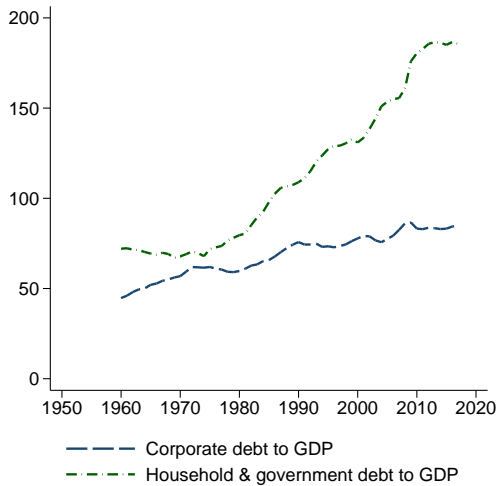
- Is credit financing the supply-side of the economy?



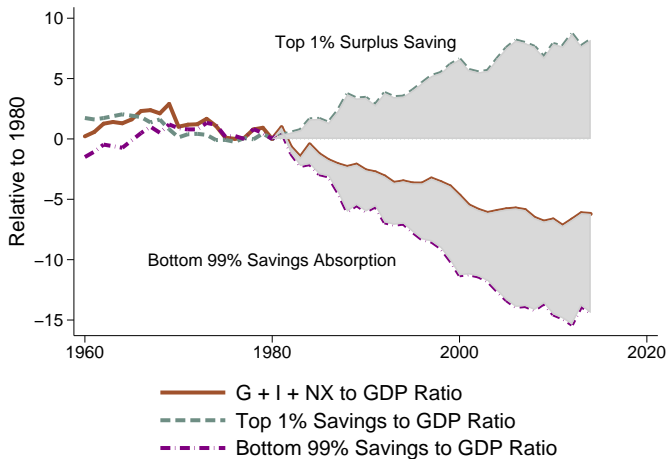
- Is credit financing the supply-side of the economy?



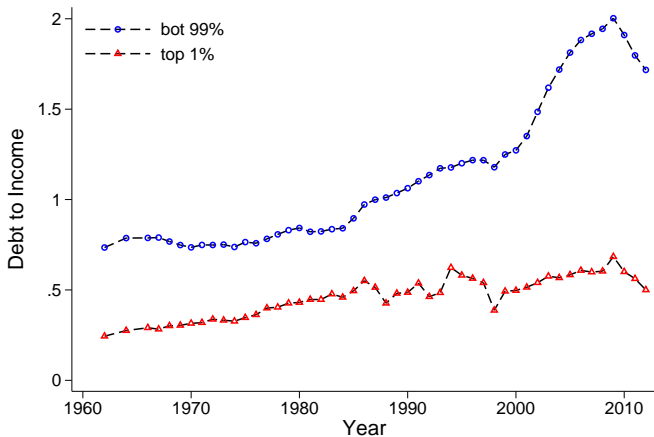
- Is credit financing the demand-side of the economy?



- Where is long-run credit expansion coming from?

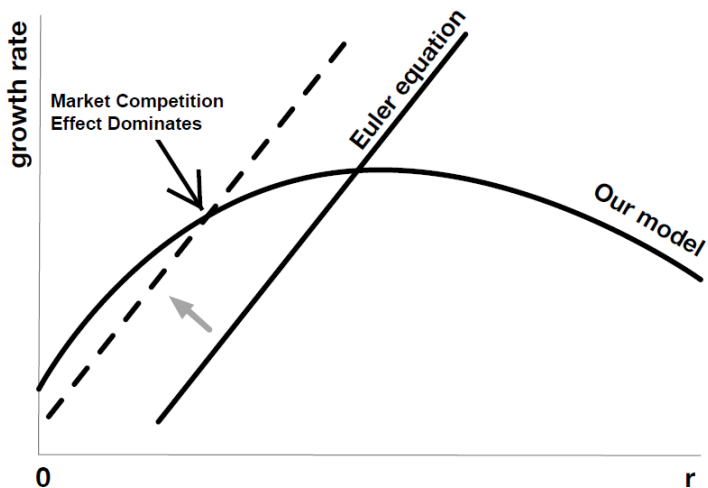


- Where is long-run credit expansion coming from?



Source: Mian and Sufi (WP, 2018).

- What are the consequences of long-run credit expansion?



- What are the consequences of long-run credit expansion?

- Equitable and balanced growth is extremely important - finance can no longer be the “shock absorber” due to liquidity traps and other maleffects of very low interest rates and high debt.
- Financial design matters as distribution matters. So need more risk-sharing across households.
- Wealth tax

Notes

1. Adelino et al. (2014), Demyanyk and Van Hemert (2011), Favara and Imbs (2015), Justiniano et al. (2015, 2017), Keys et al. (2010), Levitin and Wachter (2012), Mian and Sufi (2009, 2017)
2. Andersen et al. (2014), Bahadir and Gumus (2016), Bunn and Rostom (2015), Drehmann et al. (2017), Giroud and Mueller (2017), Glick and Lansing (2010), IMF (2012, 2017), Di Maggio and Kermani (2017), Martin and Philippon (2014), Mian and Sufi (2010, 2011, 2014), Mian et al. (2013, 2017a,b), Verner and Gyongyosi (2017)
3. Eggertsson and Krugman (2012), Farhi and Werning (2015), Guerrieri and Lorenzoni (2017), Huo and Ríos-Rull (2016), Korinek and Simsek (2016), Lorenzoni (2008), Schmitt-Grohé and Uribe (2016)

Notes

4. Agarwal et al. (2017, 2018), Aladangady (2014), Baker (2018), Cloyne et al. (2017), Di Maggio et al. (2017), Ganong and Noel (2017a,b), Jordà et al. (2014), Liu et al. (2019), Mian and Sufi (2018b, Forthcoming)
5. Mian et al. (2017b), Baron and Xiong (2016)
6. Baron and Xiong (2016), Bordalo et al. (2017), Burnside et al. (2017), Geanakoplos (2010), Gennaioli et al. (2012), Kindleberger (1978), Kindelberger and Aliber (2005), Krishnamurthy and Muir (2016), López-Salido et al. (2017), Mian and Sufi (2018a), Minsky (2008), Nathanson and Zwick (2017)
7. Favilukis et al. (2012), Jordà et al. (2016), Kumhof et al. (2015)
8. Agarwal et al. (2018), Aladangady (2014), Cloyne et al. (2017), Di Maggio et al. (2017), Jordà et al. (2014, 2013), Ganong and Noel (2017b), Mian and Sufi (2015)

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