AN ECONOMICAL BUSINESS-CYCLE MODEL

Pascal Michaillat, Emmanuel Saez

Oxford Economic Papers, 2021

LIMITATIONS OF THE NEW KEYNESIAN MODEL

1. lacks conceptual economy
   - not taught to undergraduates
   - not used in related fields, outside of macroeconomics
   - not used by policymakers for day-to-day thinking (Krugman 2000, 2018)
2. does not not describe business cycles well
   - does not feature unemployment
   - makes anomalous predictions about long-lasting ZLB episodes (Michaillat, Saez 2021)

THIS PAPER'S BUSINESS-CYCLE MODEL

1. is more economical
   - solved with an AD-AS diagram
   - effects of shocks derived by comparative statics
   - efficient unemployment & optimal policies described by sufficient-statistic formulas
   - most complicated step: derivation of Euler equation
2. describes business cycles better
   - features unemployment: fluctuating & generally inefficient
   - behaves well during long/permanent ZLB episodes

ASSUMPTIONS

SERVICE ECONOMY, WITHOUT FIRMS

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MATCHING FUNCTION (MICHAILLAT, SAEZ 2015)

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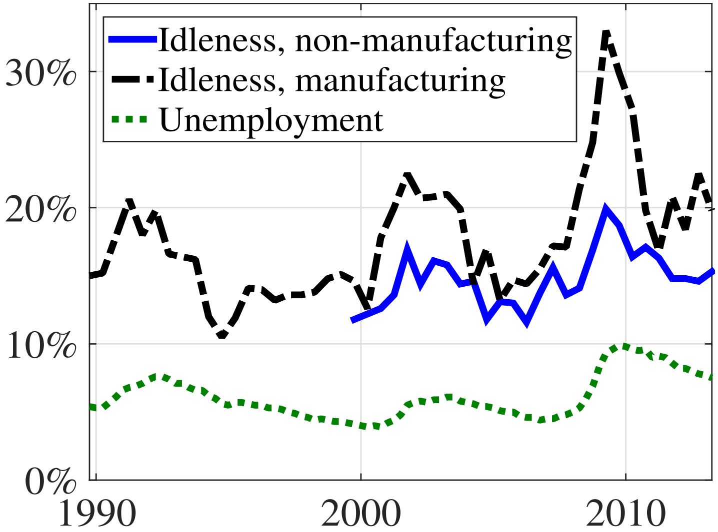
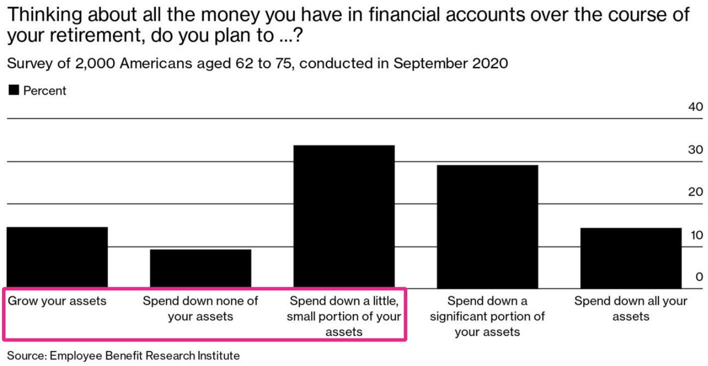


WEALTH IN UTILITY (MICHAILLAT, SAEZ 2021)



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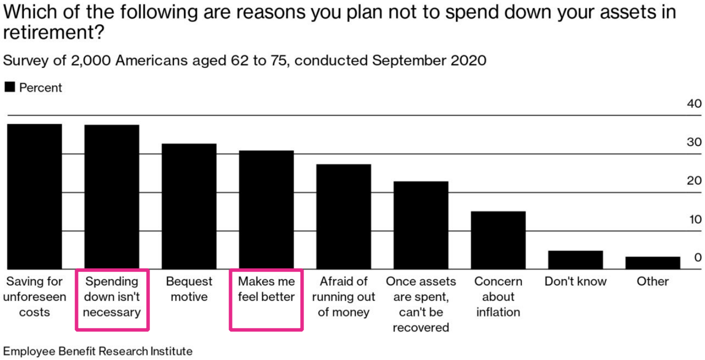

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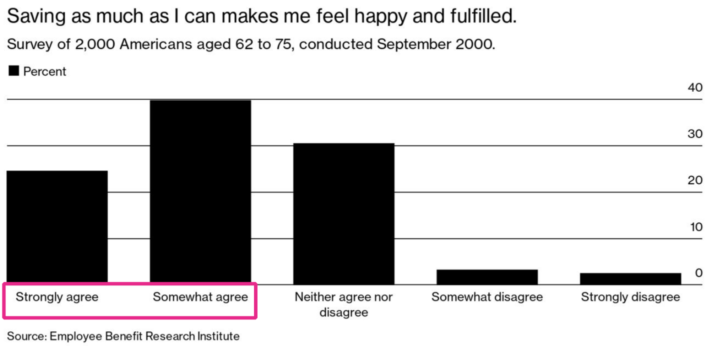
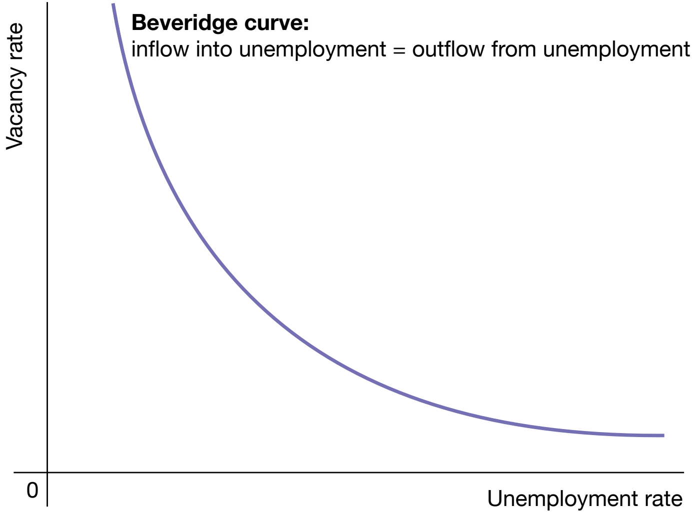
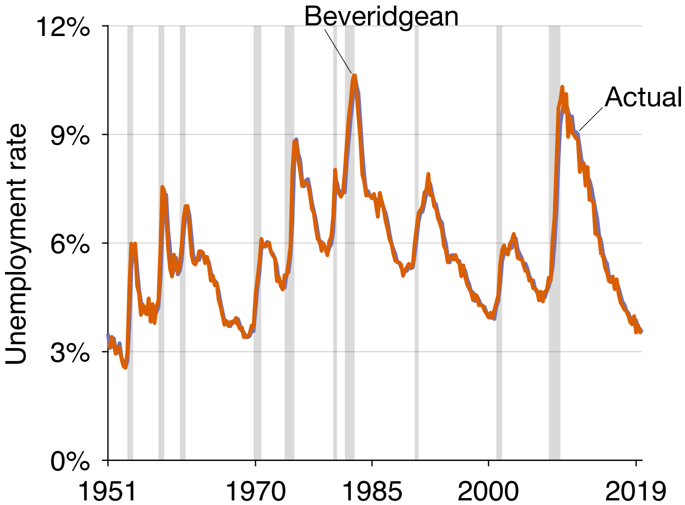


SOLUTION

MATCHING FUNCTION ⇝ BEVERIDGE CURVE



UNEMPLOYMENT: ALWAYS ON BEVERIDGE CURVE



BEVERIDGE CURVE ⇝ AGGREGATE SUPPLY

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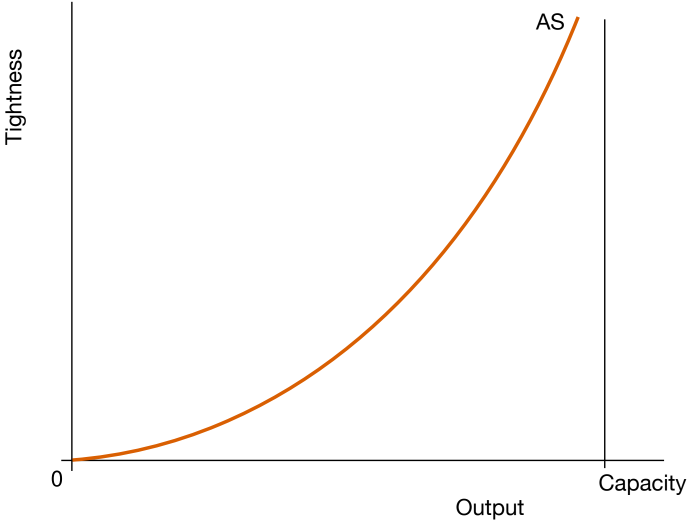
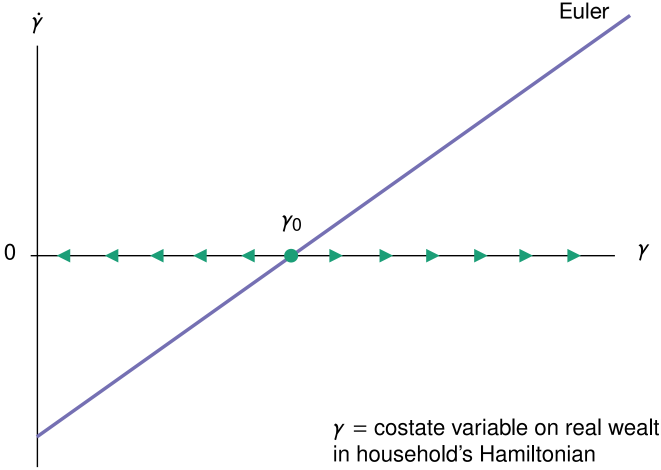
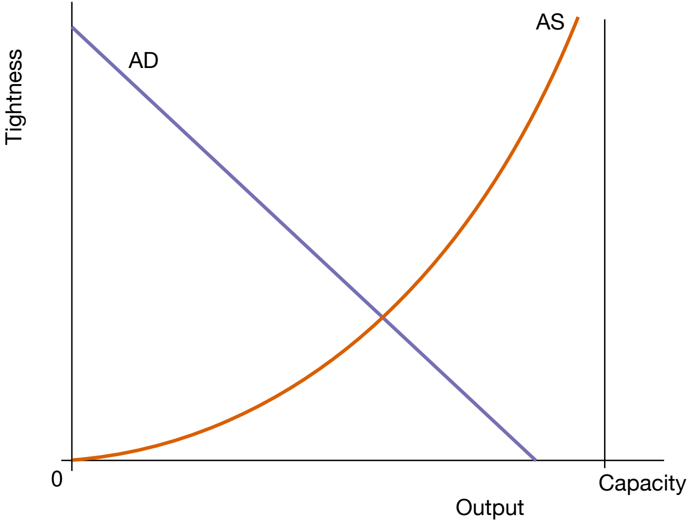


WEALTH IN UTILITY ⇝ EULER EQUATION



γ = costate variable on real wealth
in household's Hamiltonian

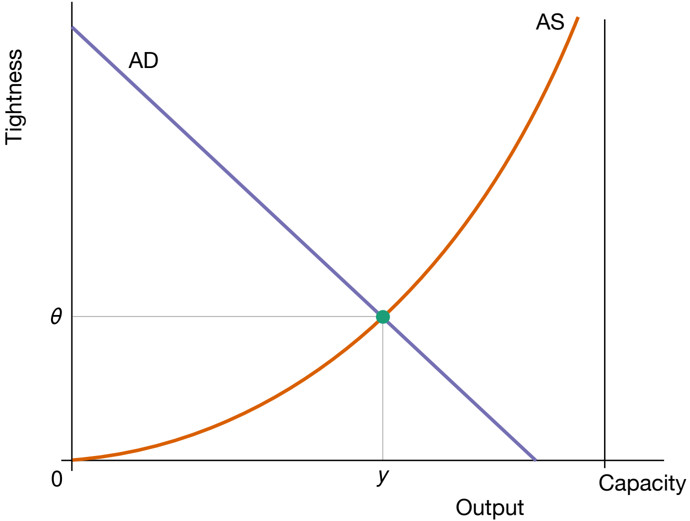
EULER EQUATION ⇝ AGGREGATE DEMAND



PRICE NORM: FIXED INFLATION

- any model with a matching function needs a price mechanism
- we assume that prices grow at a fixed rate of inflation
  - interpretation: fixed inflation is a social norm (Hall 2005)
- fixed inflation is realistic:
  - inflation does not respond to unemployment (Stock, Watson 2010, 2019)
  - inflation does not respond to monetary policy (Christiano, Eichenbaum, Evans 1999)
- fixed inflation does not create bilaterally inefficiencies:
  - buyers & sellers are happy to transact at the given price

SOLUTION OF THE MODEL



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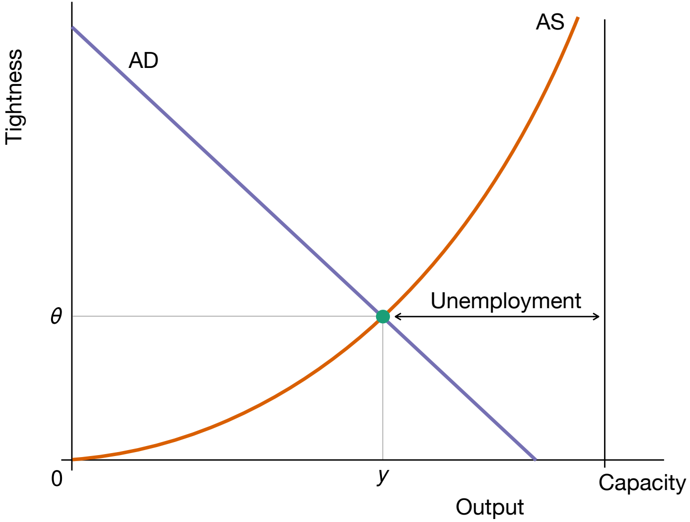
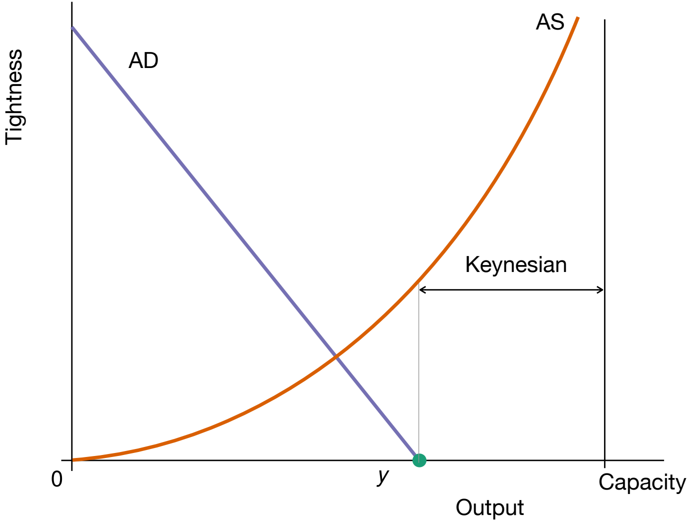


KEYNESIAN VS. FRICTIONAL UNEMPLOYMENT



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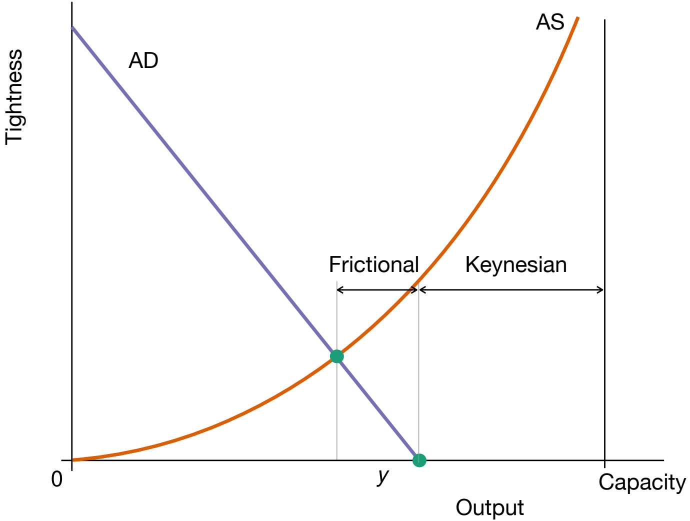
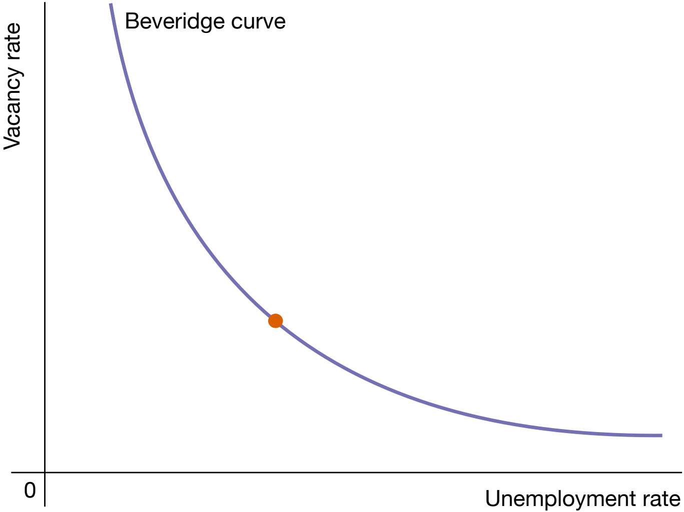


INEFFICIENCY

EFFICIENT ALLOCATION (MICHAILLAT, SAEZ 2020)



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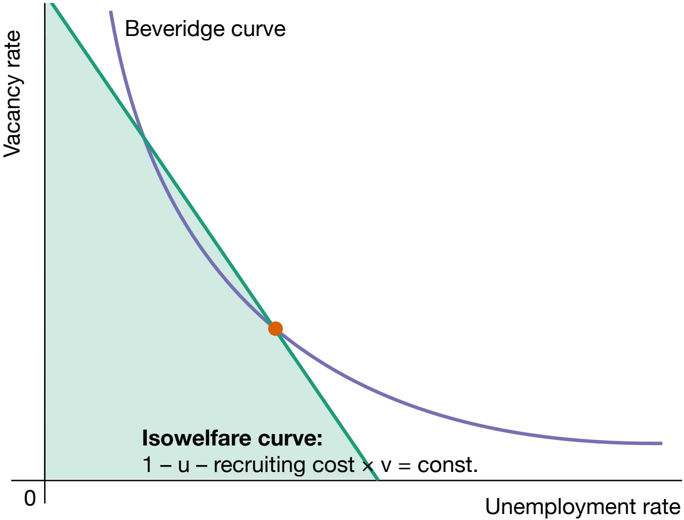

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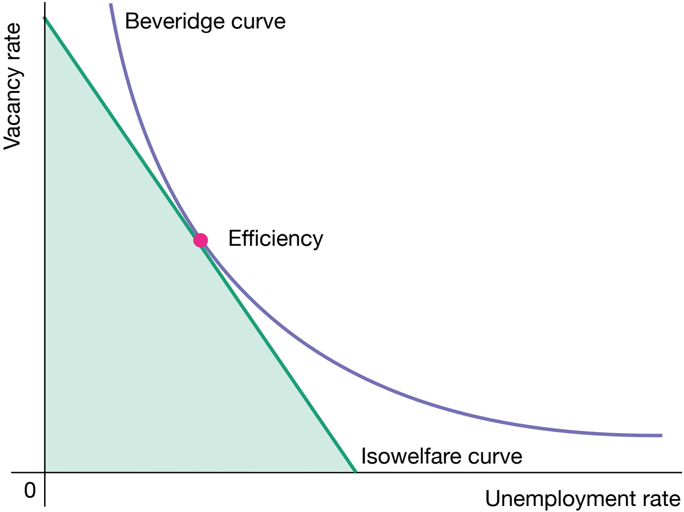

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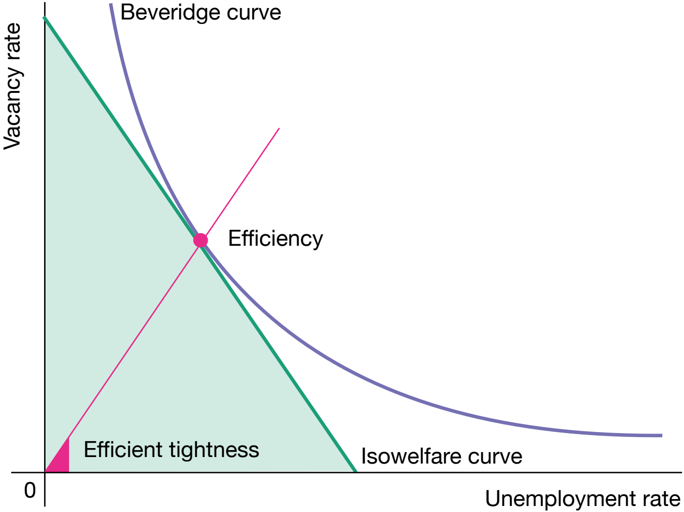
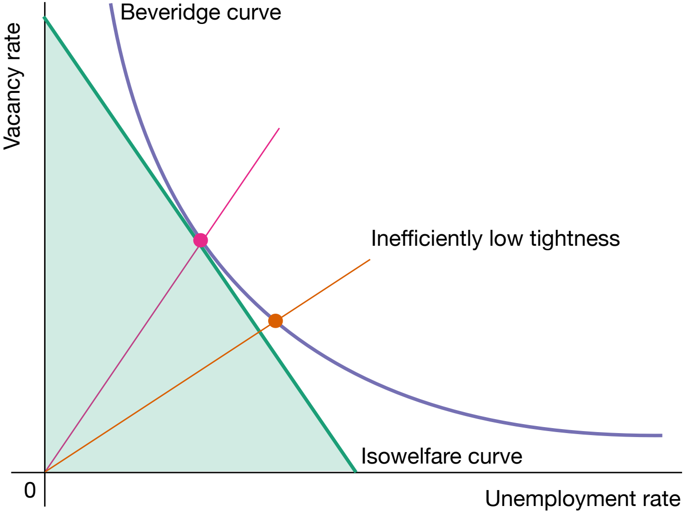


INEFFICIENT ALLOCATIONS



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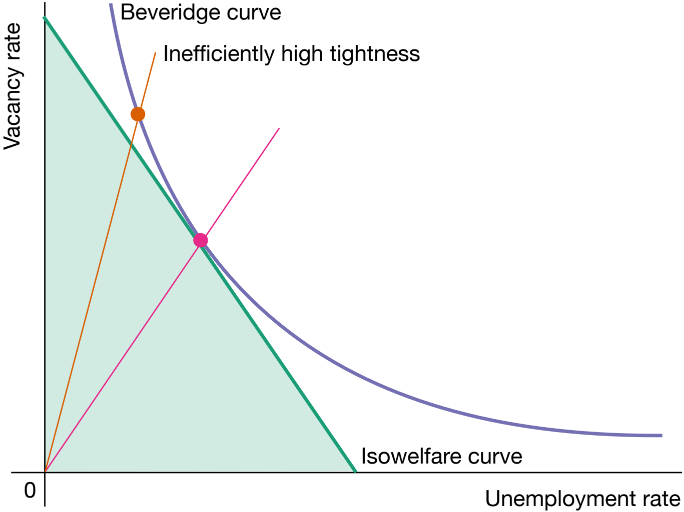
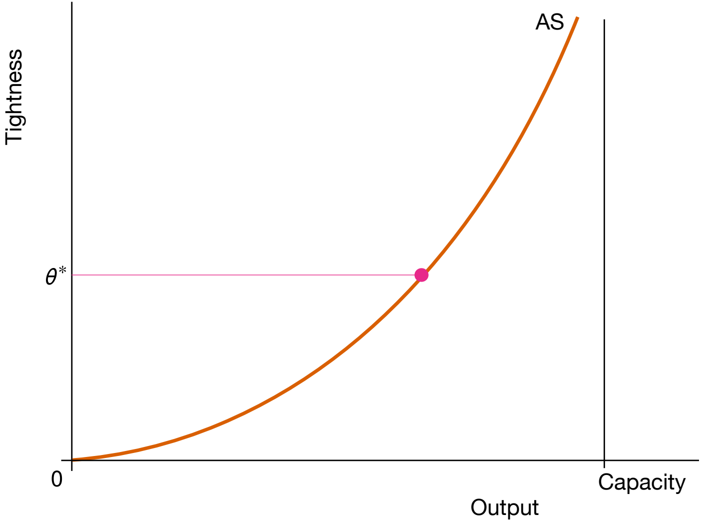
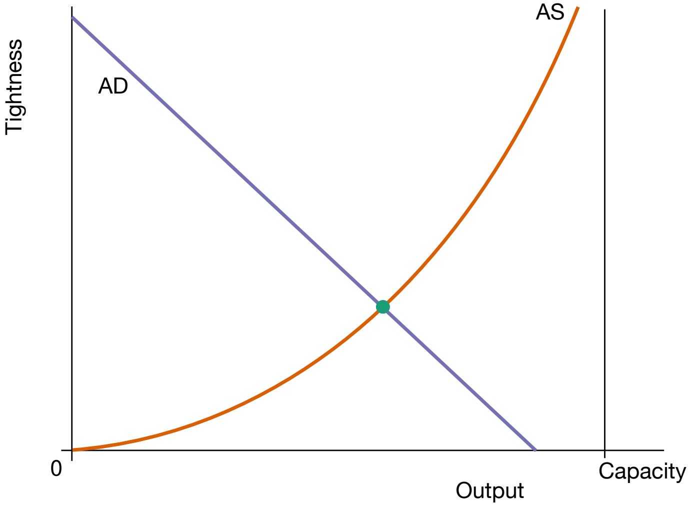


EFFICIENT TIGHTNESS



BUSINESS CYCLES

NEGATIVE DEMAND SHOCK



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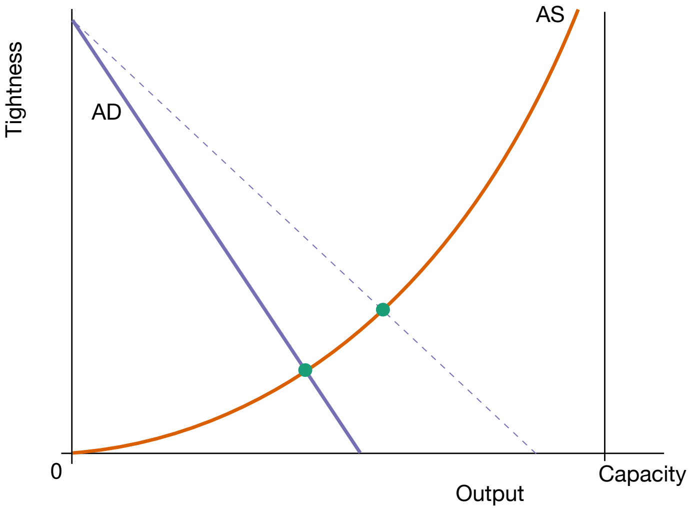
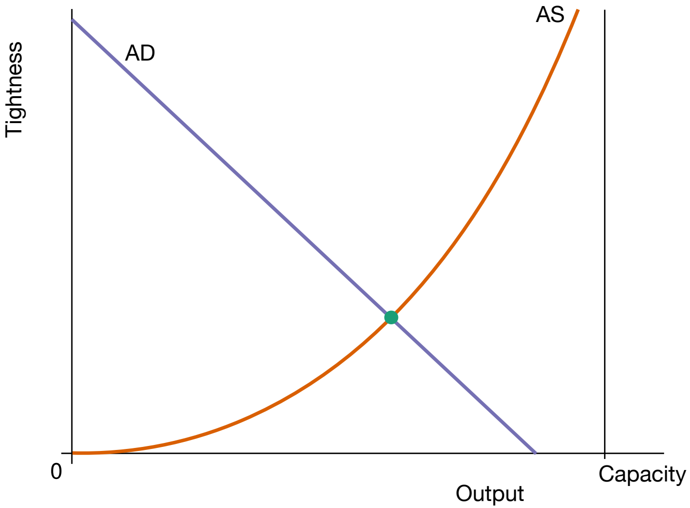


NEGATIVE SUPPLY SHOCK



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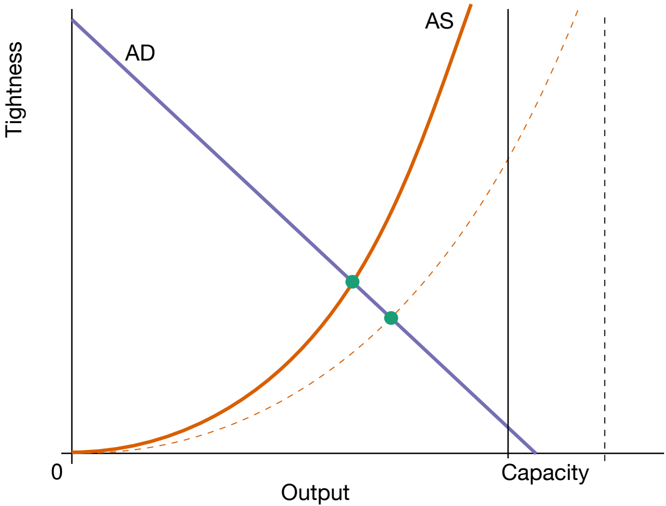
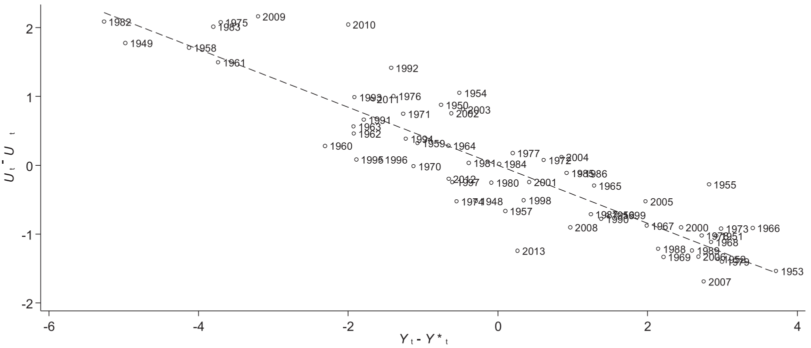


OKUN'S LAW $\Longrightarrow$ DEMAND SHOCKS ARE PREVALENT

Okun's law in the United States, 1948–2013 [Ball, Leigh, Loungani 2017]

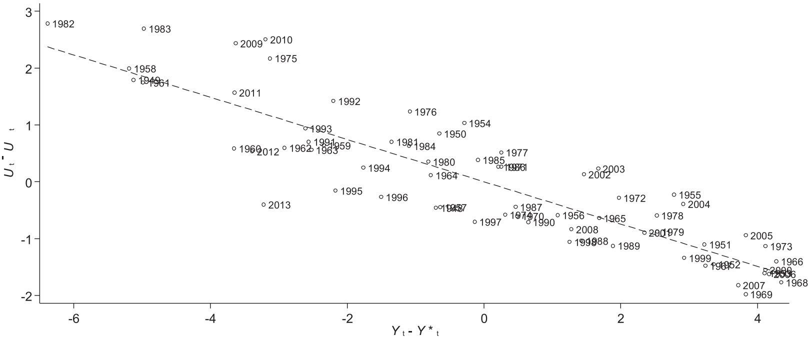


Natural Rates Based on HPF with $\lambda = 100$

NOTE: HPF denotes Hodrick–Prescott filter. This figure reports change in unemployment rate and in log of real GDP in percentage points, and output gap and unemployment gap in percent.

OKUN'S LAW ⟹ DEMAND SHOCKS ARE PREVALENT

Okun's law in the United States, 1948–2013 [Ball, Leigh, Loungani 2017]

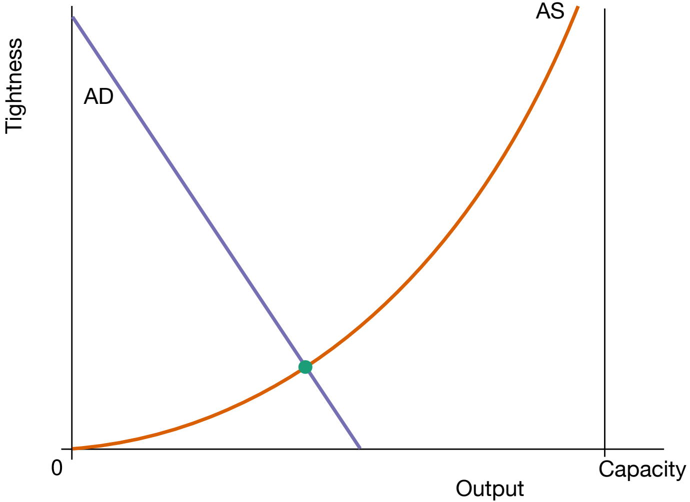


Natural rates based on HPF with λ = 1,000

NOTE: HPF denotes Hodrick–Prescott filter. This figure reports change in unemployment rate and in log of real GDP in percentage points, and output gap and unemployment gap in percent.

MONETARY POLICY

REDUCTION IN INTEREST RATE



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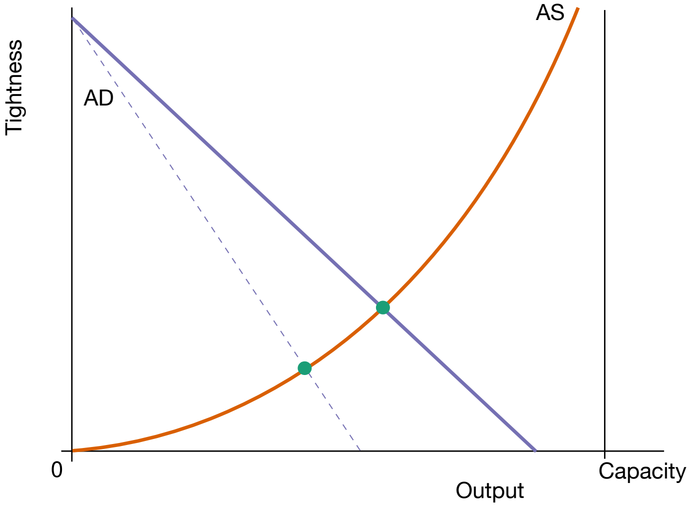
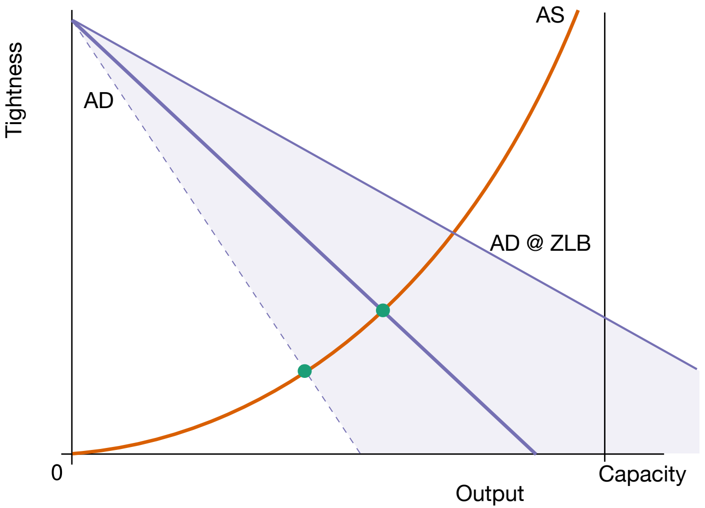


ZERO LOWER BOUND



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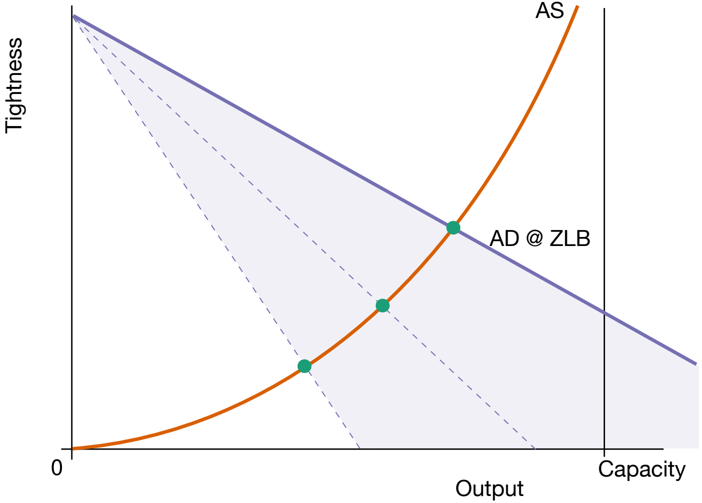
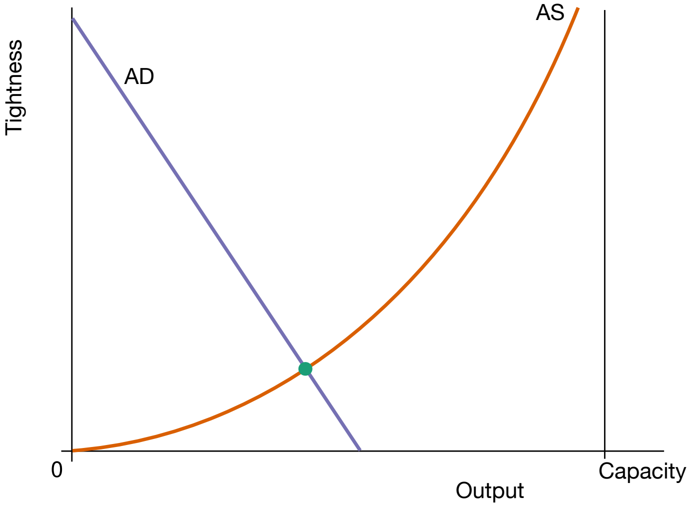


INCREASE IN WEALTH TAX



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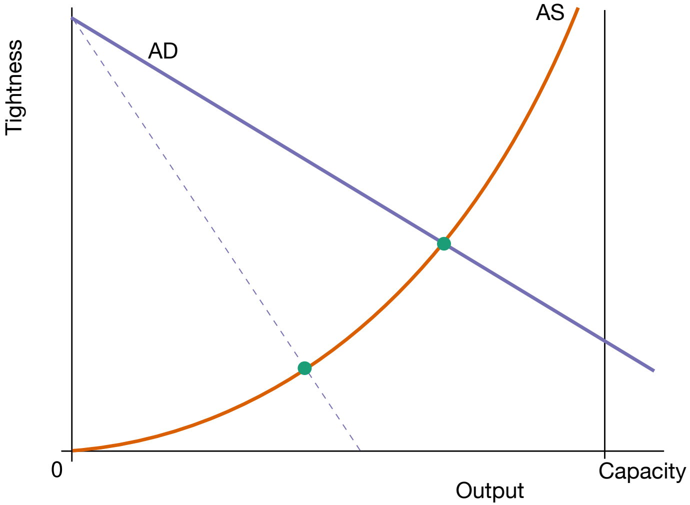
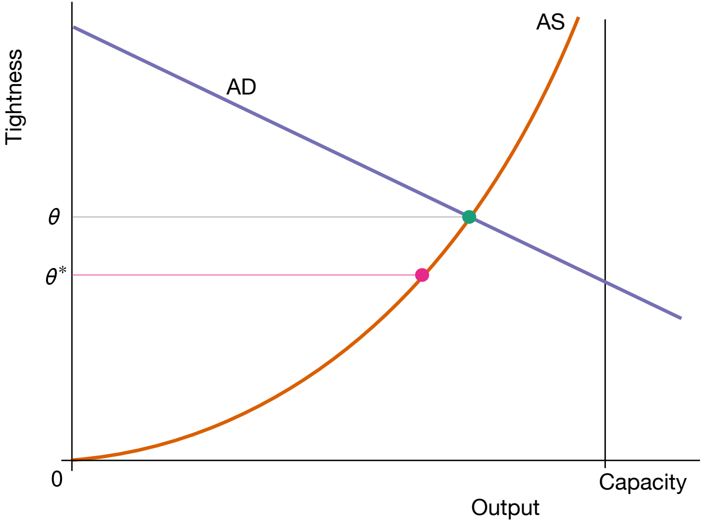


OPTIMAL MONETARY POLICY: BOOM



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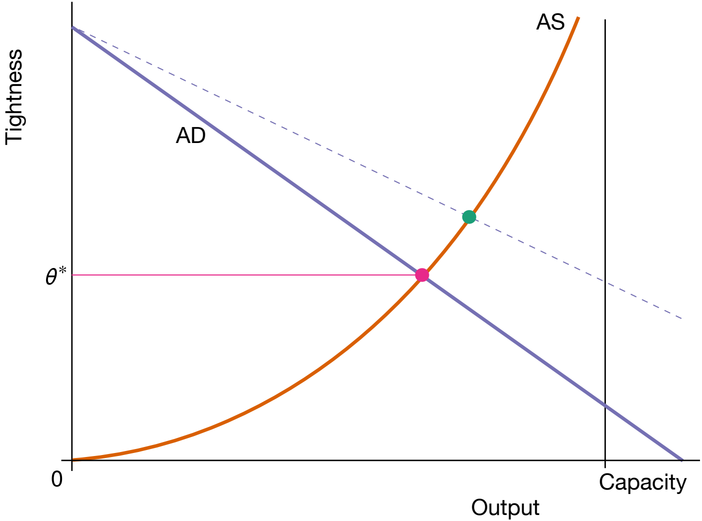
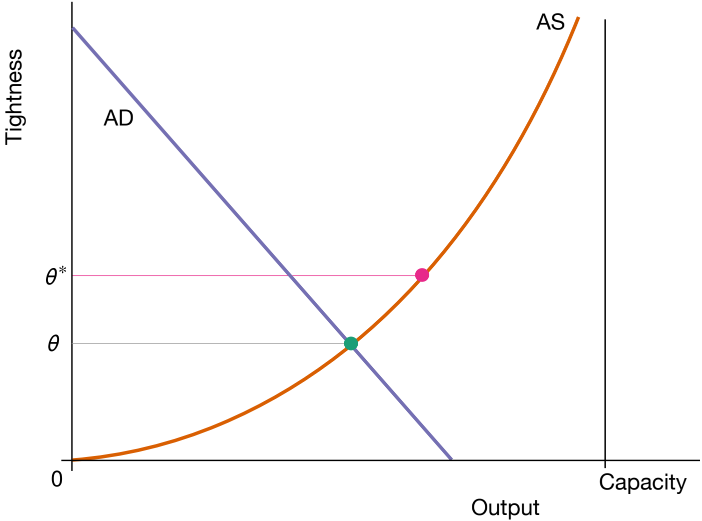


OPTIMAL MONETARY POLICY: SMALL SLUMP



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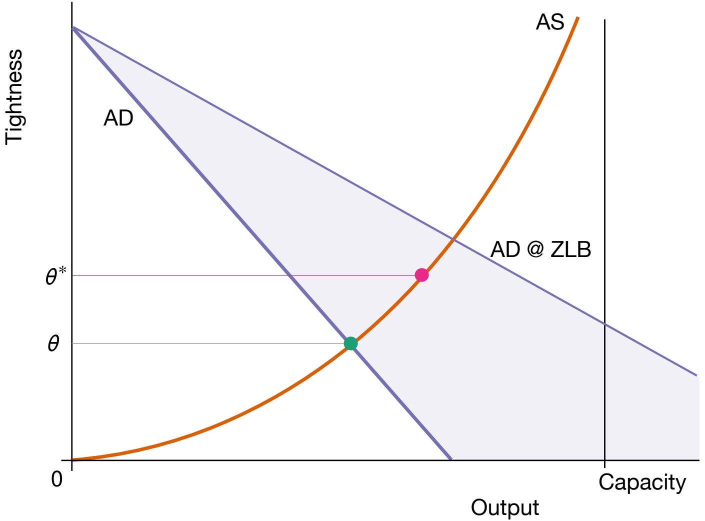

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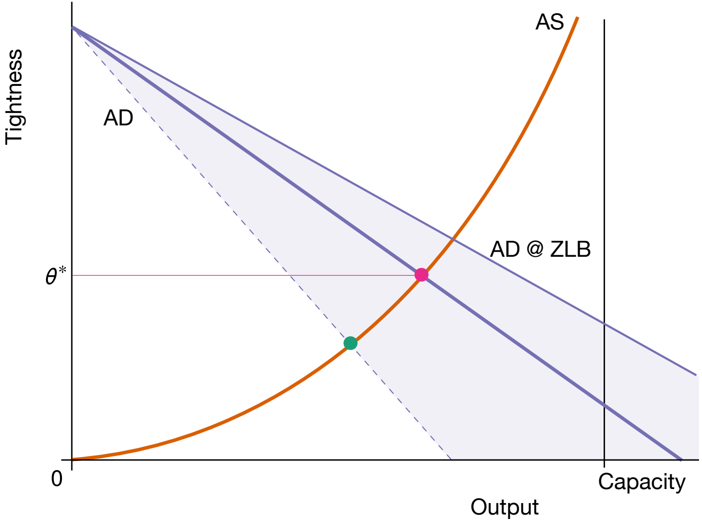
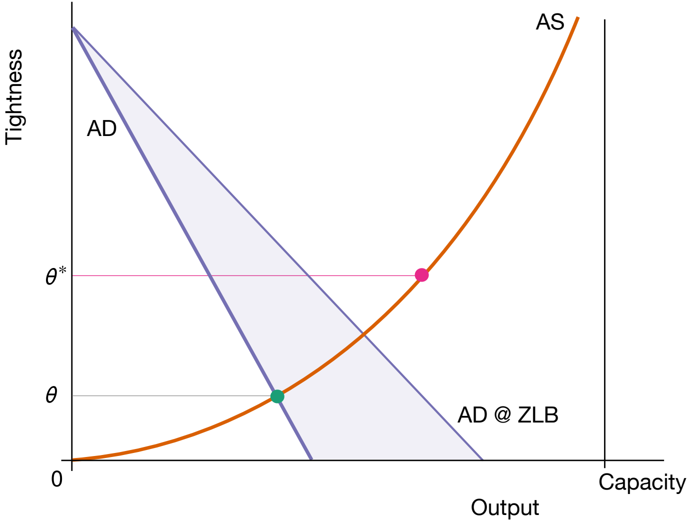


OPTIMAL MONETARY POLICY: LARGE SLUMP



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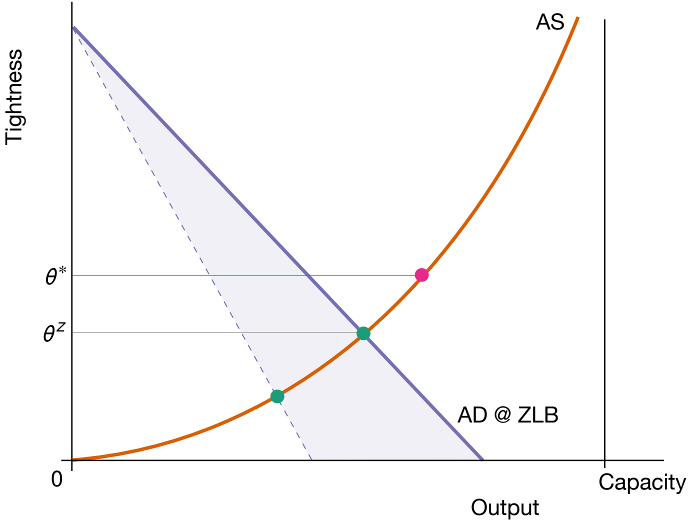
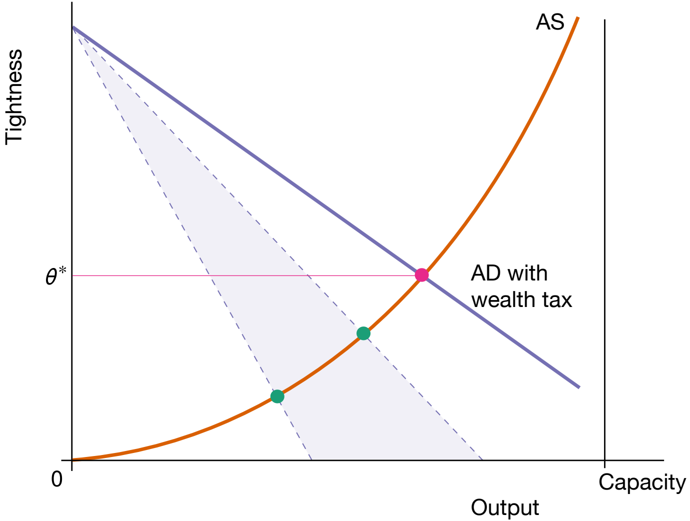


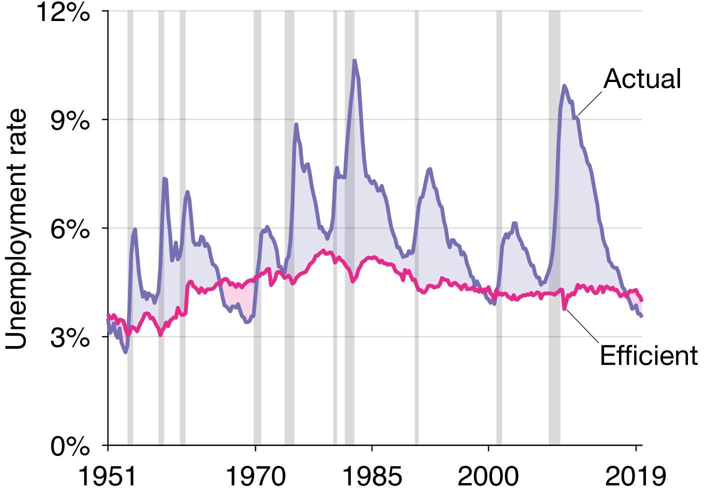
LARGE SLUMP: ROLE FOR WEALTH TAX



MONETARY MULTIPLIER: $du/di = 0.5$

study	du/di	method
Bernanke, Blinder (1992)	0.6	VAR
Leeper, Sims, Zha (1996)	0.1	VAR
Christiano, Eichenbaum, Evans (1996)	0.1	VAR
Romer, Romer (2003)	0.9	narrative
Bernanke, Boivin, Eliasz (2005)	0.2	FAVAR
Coibion (2012)	0.5	narrative & VAR

UNEMPLOYMENT GAP: MICHAILLAT, SAEZ (2020)



OPTIMAL MONETARY POLICY FORMULA

- linear expansion around suboptimal $[i, u]$ assessed at optimal $[i^*, u^*]$: $u^* \approx u + (du/di) \cdot (i^* - i)$
- sufficient-statistic formula:

$$i - i^* \approx \frac{u - u^*}{du/di}$$

⇝ Fed should reduce interest rate by 2 percentage points for each percentage point of unemployment gap

⇝ in line with observed Fed behavior (Bernanke, Blinder 1992)

CONCLUSION

SUMMARY OF MODEL PROPERTIES

property	NK model	this model
AD relation	Euler equation	discounted Euler equation
AS relation	Phillips curve	Beveridge curve
inflation	fluctuating	fixed
unemployment	zero	fluctuating
ZLB world	topsy-turvy	normal
ZLB duration	must be short	can be permanent

SUMMARY OF MONETARY POLICY PROPERTIES

property	NK model	this model
response to inflation	must be strong	not required
	(Taylor principle)	(interest-rate peg works)
policy target	inflation rate	unemployment rate
optimal rule	not implementable	implementable
		w/ sufficient statistics
multiplier du/di	useless	key statistic
forward guidance	very powerful	less & less potent
	at ZLB	as ZLB lasts longer
isomorphic policy	–	wealth tax

OTHER POLICIES

- public hiring or spending (Michaillat 2014; Michaillat, Saez 2019)
  - multiplier is higher when unemployment is higher
  - optimal policy deviates from the Samuelson rule to reduce the unemployment gap
- unemployment insurance (Landais, Michaillat, Saez 2018)
  - optimal policy deviates from the Baily-Chetty rule to reduce the tightness gap