

AN ECONOMICAL BUSINESS-CYCLE MODEL

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Paper available at <https://pascalmichailat.org/7/>

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



SERVICE ECONOMY, WITHOUT FIRMS



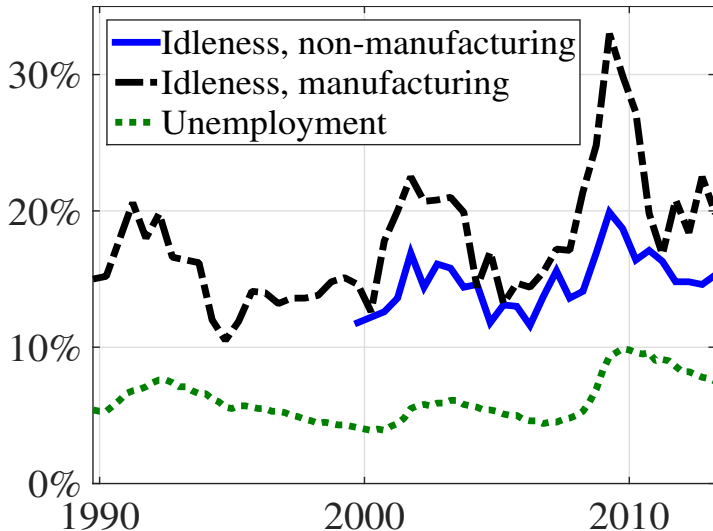
MATCHING FUNCTION (MICHAILLAT, SAEZ 2015)



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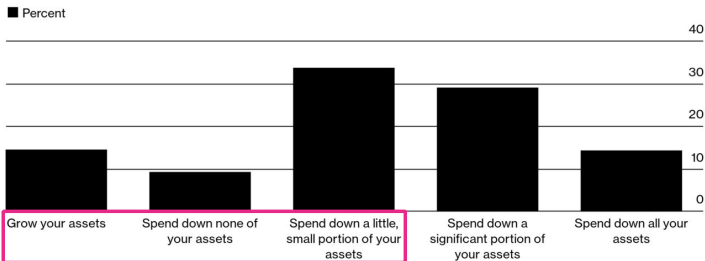
MATCHING FUNCTION (MICHAILLAT, SAEZ 2015)



WEALTH IN UTILITY (MICHAILLAT, SAEZ 2021)

Thinking about all the money you have in financial accounts over the course of your retirement, do you plan to ...?

Survey of 2,000 Americans aged 62 to 75, conducted in September 2020

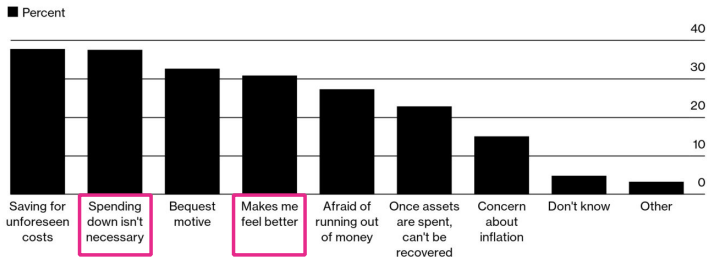


Source: Employee Benefit Research Institute

WEALTH IN UTILITY (MICHAILLAT, SAEZ 2021)

Which of the following are reasons you plan not to spend down your assets in retirement?

Survey of 2,000 Americans aged 62 to 75, conducted September 2020

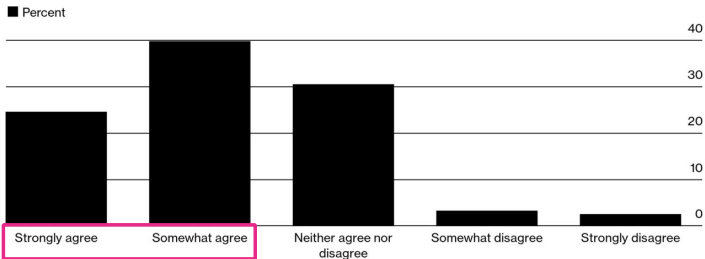


Employee Benefit Research Institute

WEALTH IN UTILITY (MICHAILLAT, SAEZ 2021)

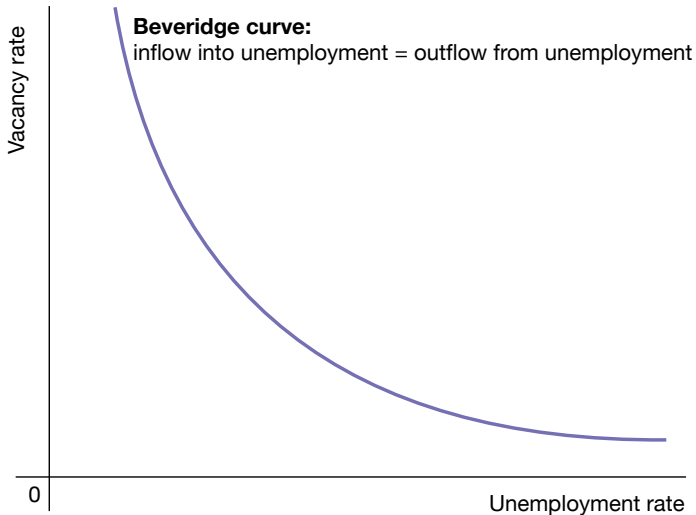
Saving as much as I can makes me feel happy and fulfilled.

Survey of 2,000 Americans aged 62 to 75, conducted September 2000.

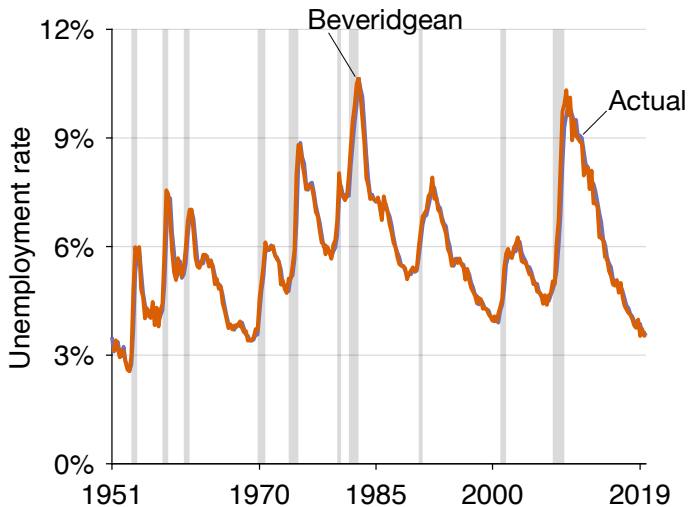


SOLUTION

MATCHING FUNCTION $\rightsquigarrow$ BEVERIDGE CURVE



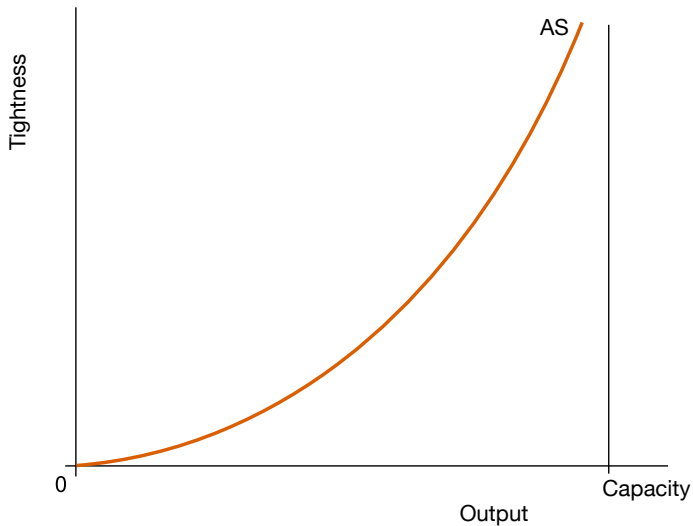
UNEMPLOYMENT: ALWAYS ON BEVERIDGE CURVE



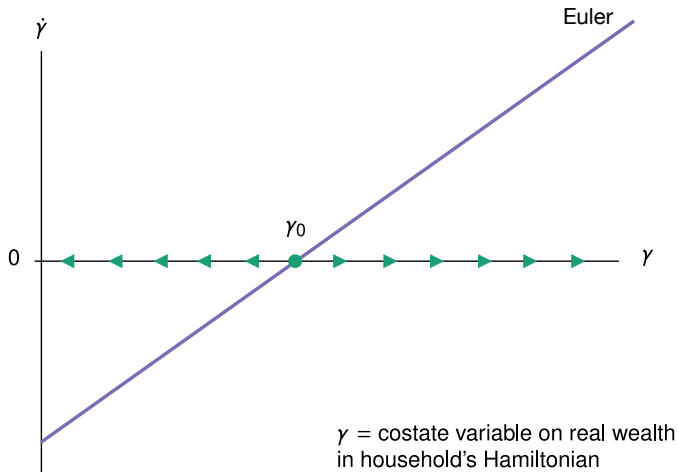
BEVERIDGE CURVE $\rightsquigarrow$ AGGREGATE SUPPLY



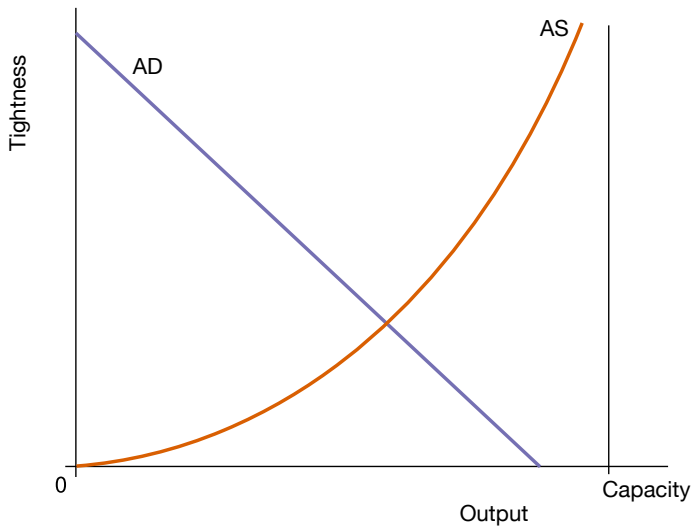
BEVERIDGE CURVE $\rightsquigarrow$ AGGREGATE SUPPLY



WEALTH IN UTILITY $\rightsquigarrow$ EULER EQUATION



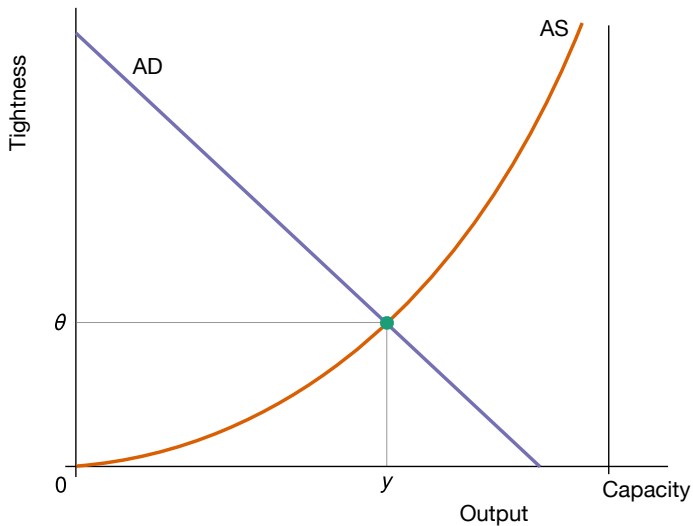
EULER EQUATION $\rightsquigarrow$ AGGREGATE DEMAND



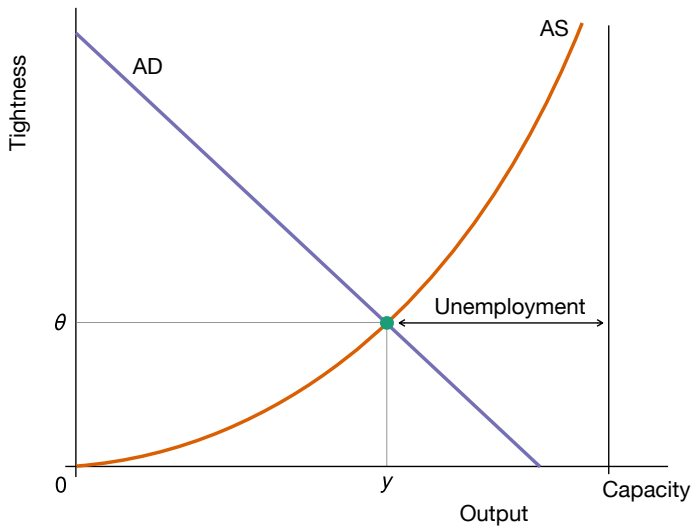
PRICE NORM: FIXED INFLATION

- 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

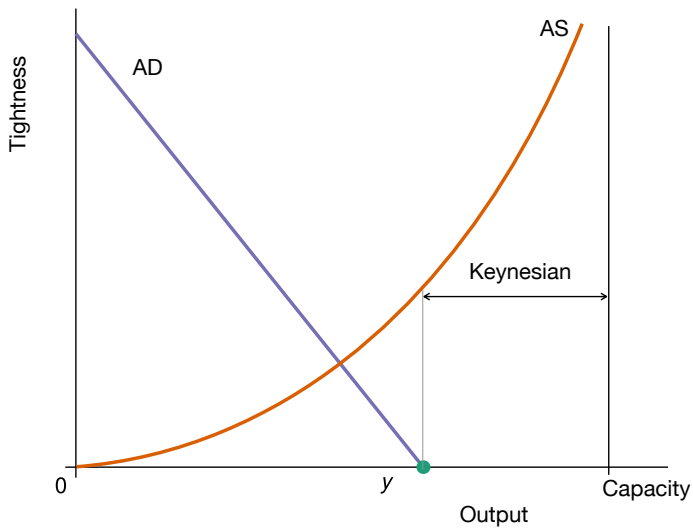
SOLUTION OF THE MODEL



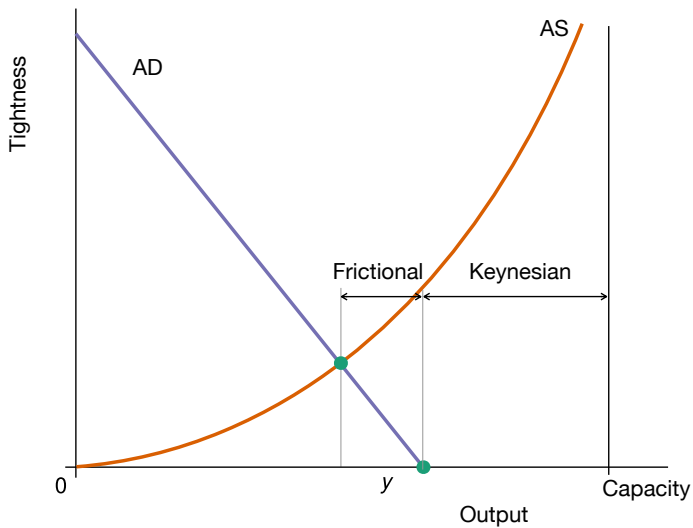
SOLUTION OF THE MODEL



KEYNESIAN VS. FRICTIONAL UNEMPLOYMENT

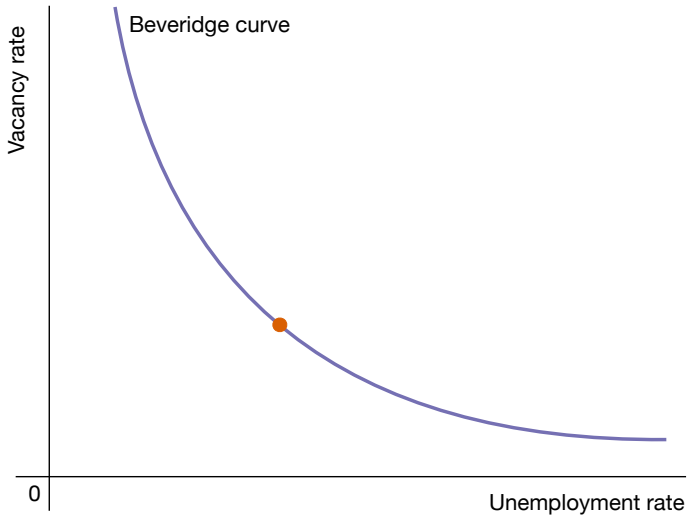


KEYNESIAN VS. FRICTIONAL UNEMPLOYMENT

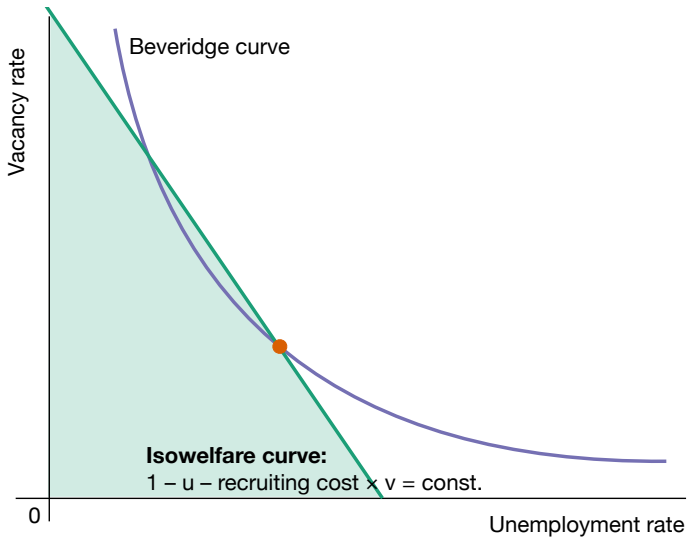


INEFFICIENCY

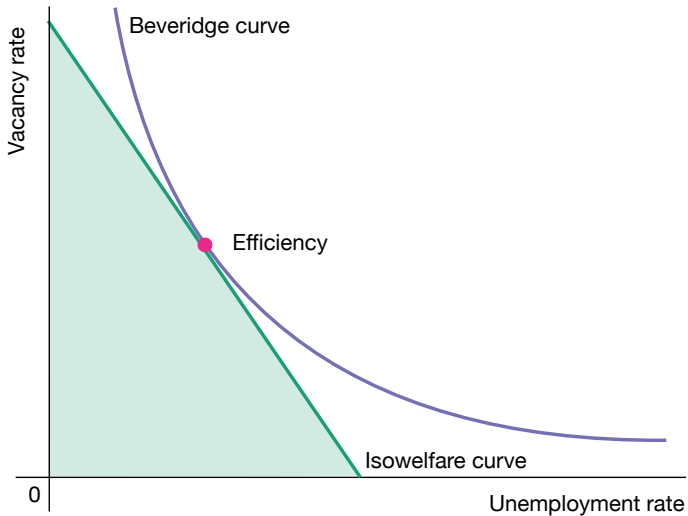
EFFICIENT ALLOCATION (MICHAILLAT, SAEZ 2021)



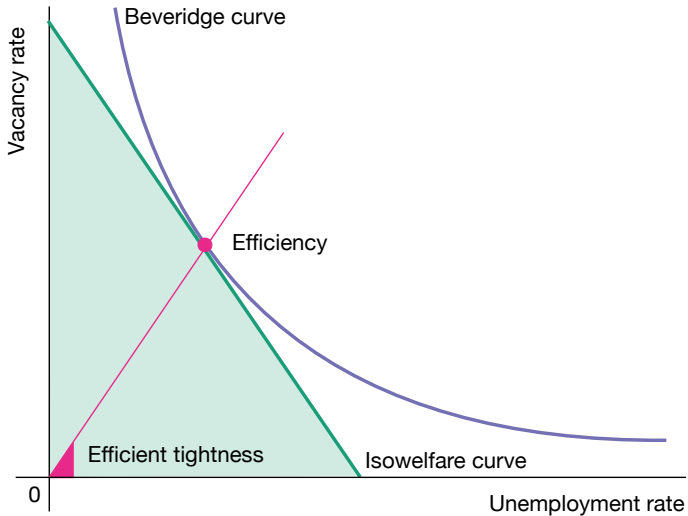
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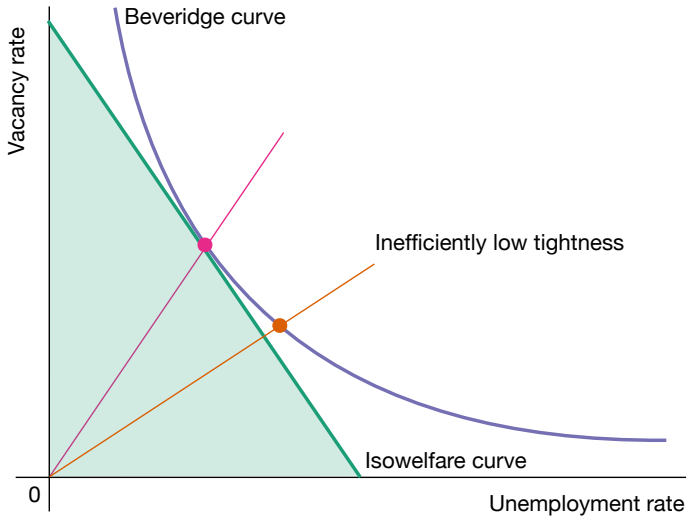
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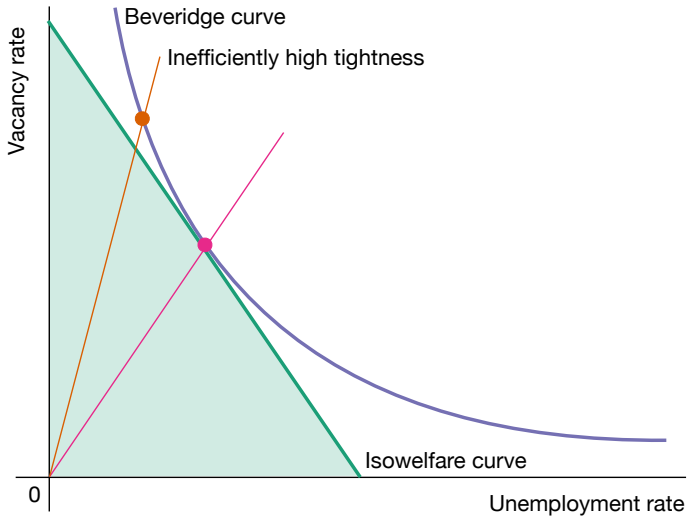
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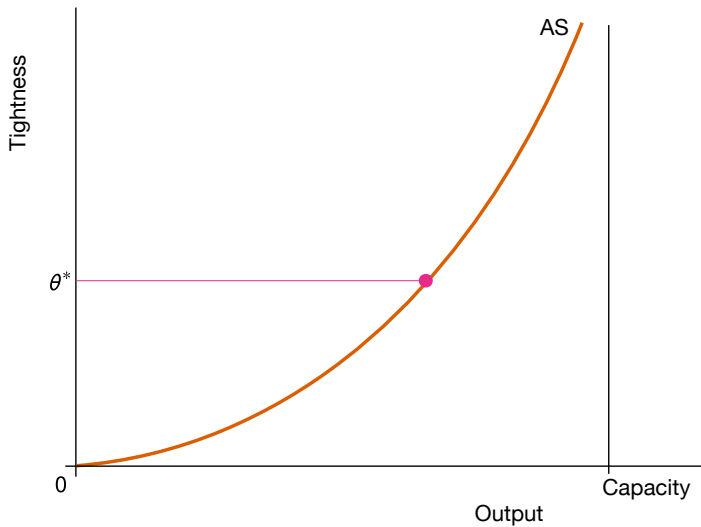
INEFFICIENT ALLOCATIONS



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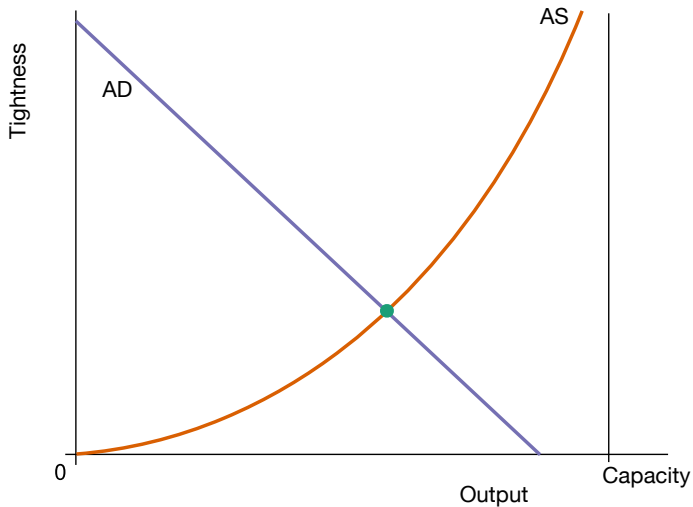


EFFICIENT TIGHTNESS

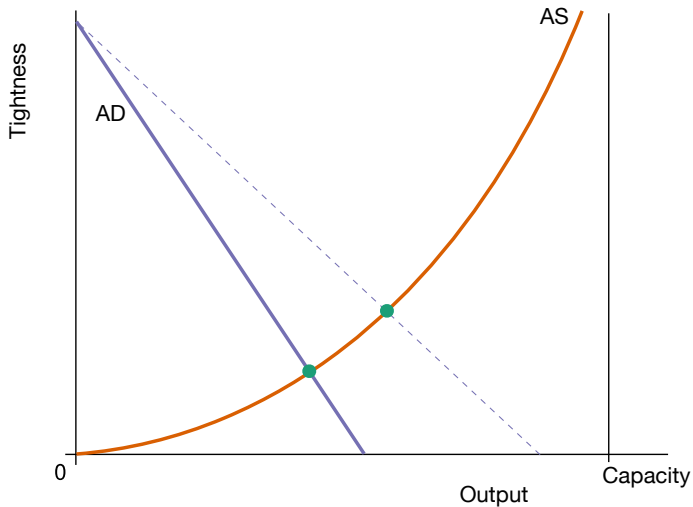


BUSINESS CYCLES

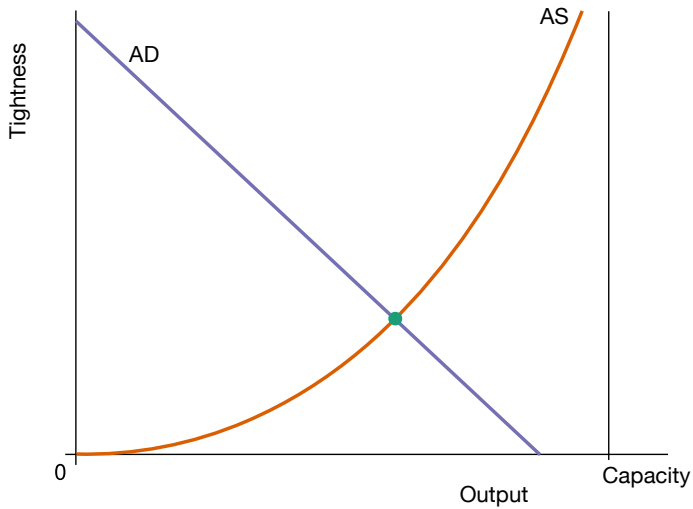
NEGATIVE DEMAND SHOCK



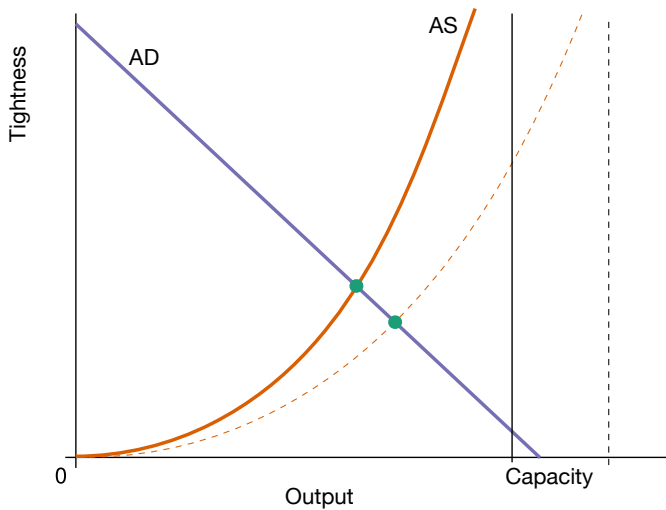
NEGATIVE DEMAND SHOCK



NEGATIVE SUPPLY SHOCK

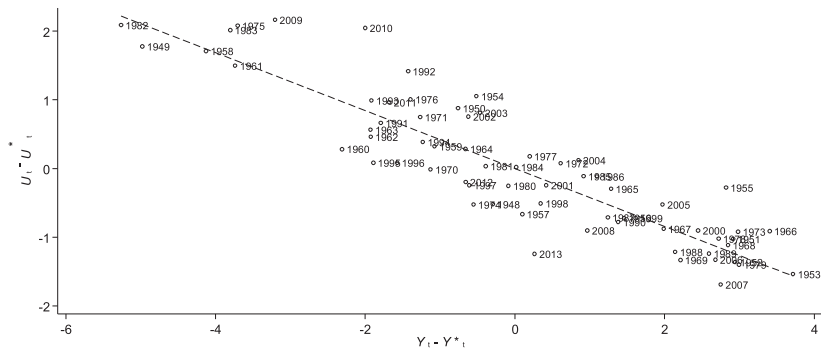


NEGATIVE SUPPLY SHOCK



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

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

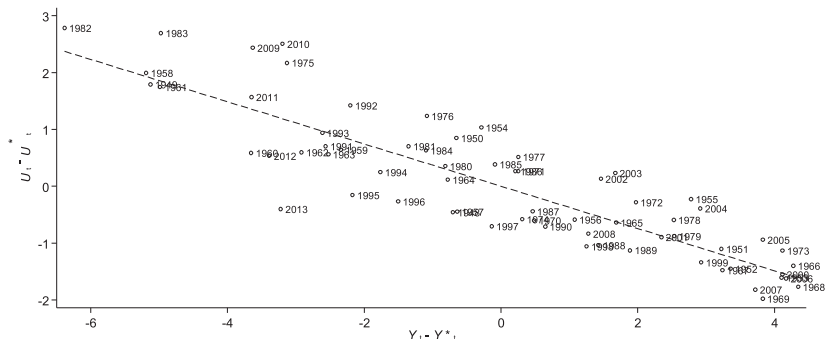


Natural Rates Based on HPF with $\lambda = 100$

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 $\Rightarrow$ DEMAND SHOCKS ARE PREVALENT

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

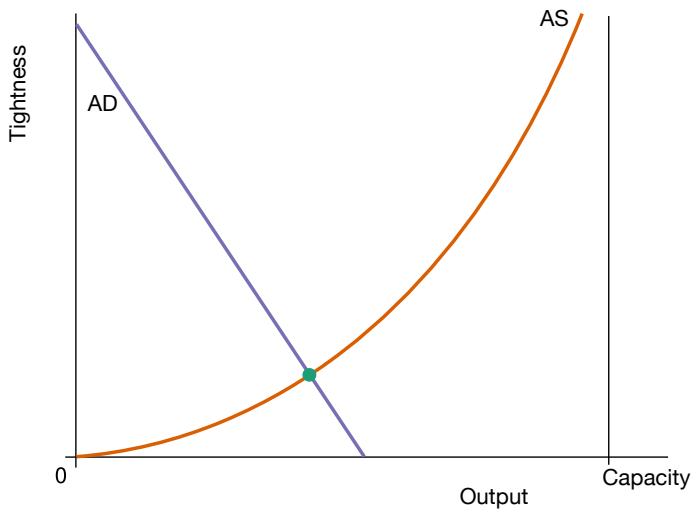


Natural rates based on HPF with $\lambda = 1,000$

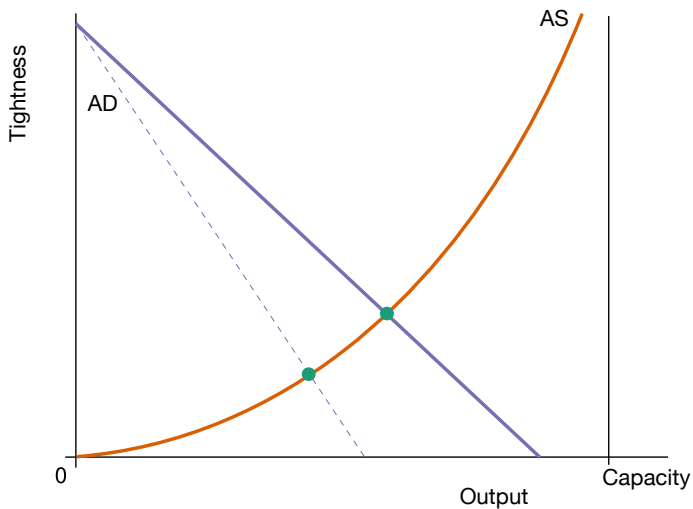
NOTE: HPF denotes Hodrick–Prescott filter. This figure reports change in unemployment rate and in log of real GDP in percentage points, and output gap and unemployment gap in percent.

MONETARY POLICY

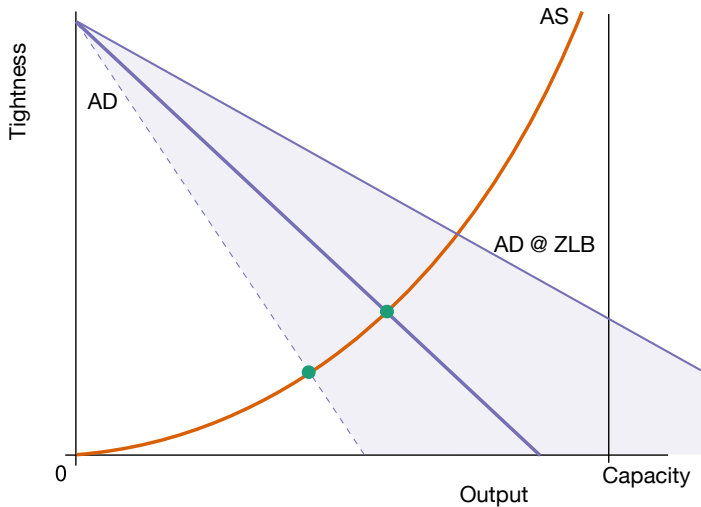
REDUCTION IN INTEREST RATE



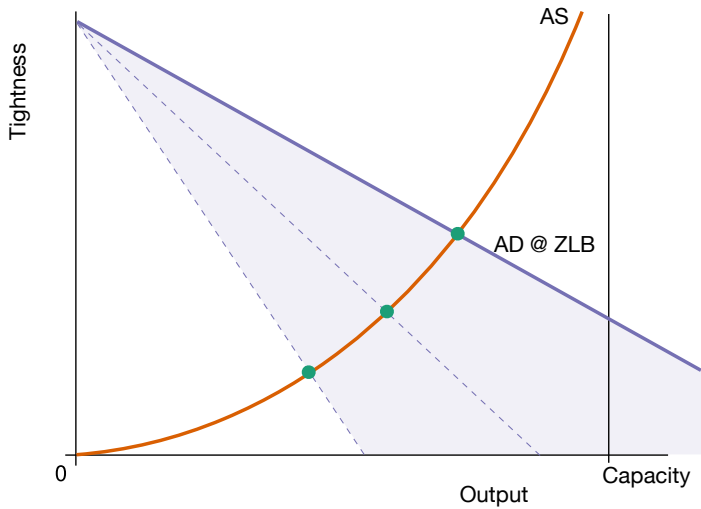
REDUCTION IN INTEREST RATE



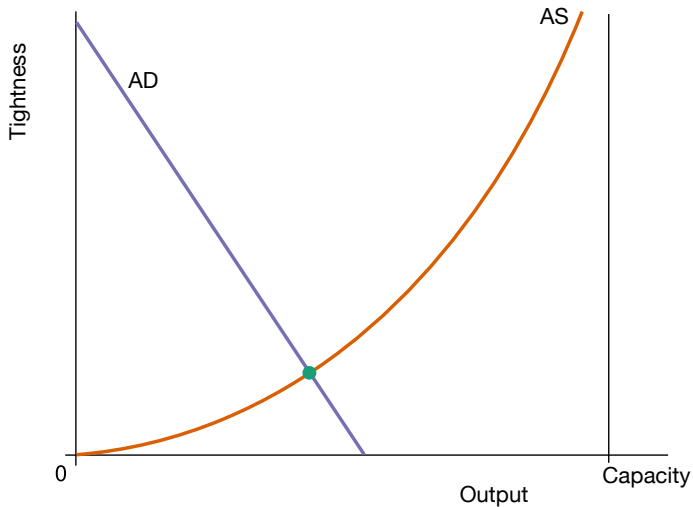
ZERO LOWER BOUND



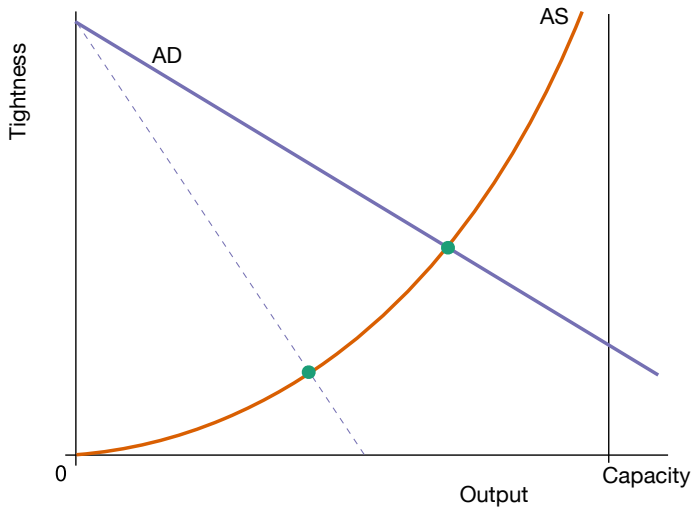
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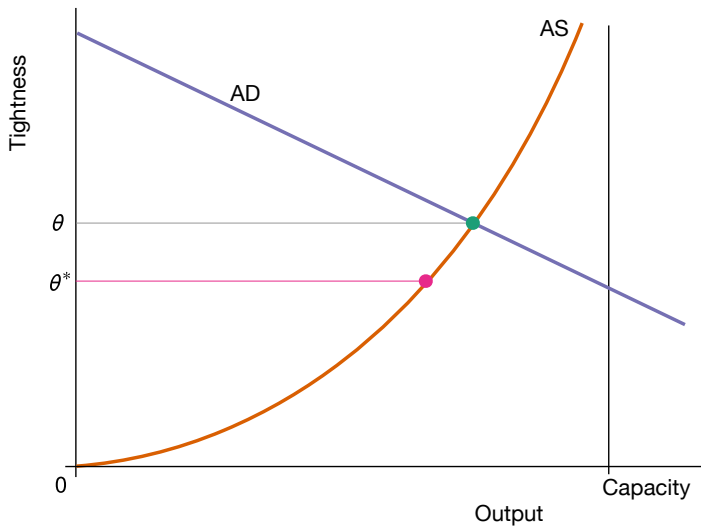
INCREASE IN WEALTH TAX



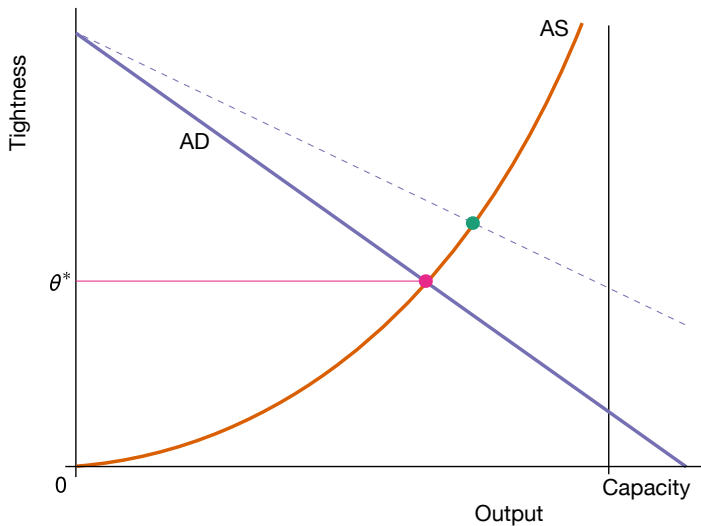
INCREASE IN WEALTH TAX



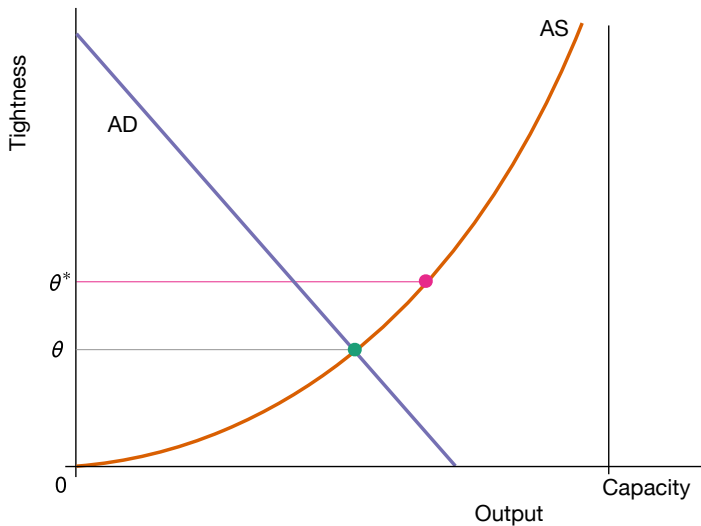
OPTIMAL MONETARY POLICY: BOOM



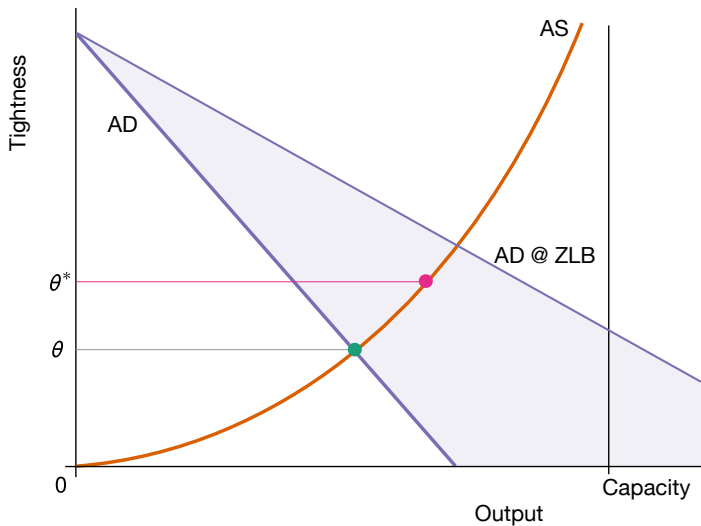
OPTIMAL MONETARY POLICY: BOOM



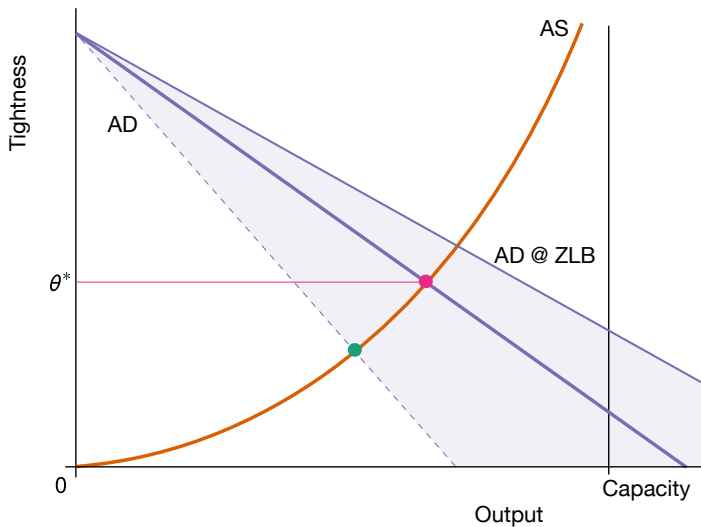
OPTIMAL MONETARY POLICY: SMALL SLUMP



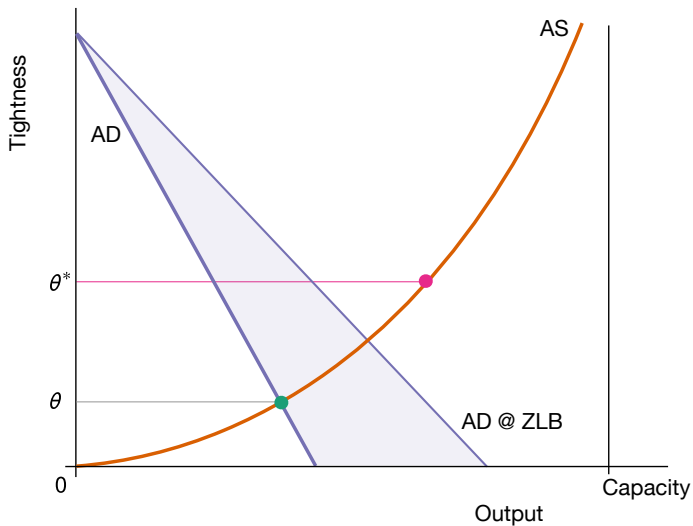
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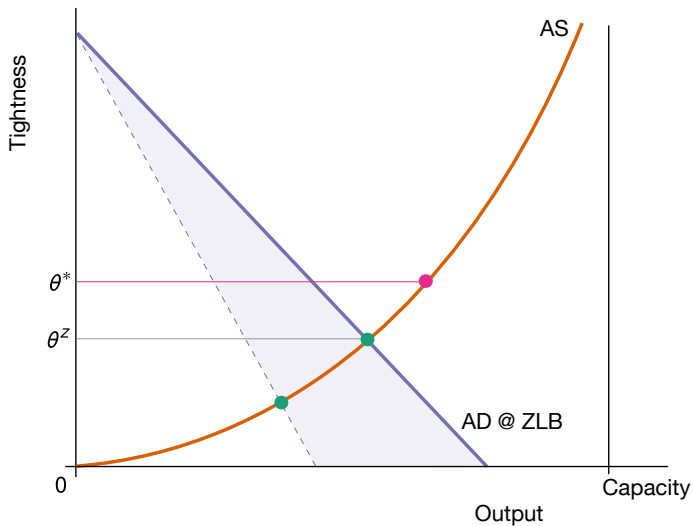
OPTIMAL MONETARY POLICY: SMALL SLUMP



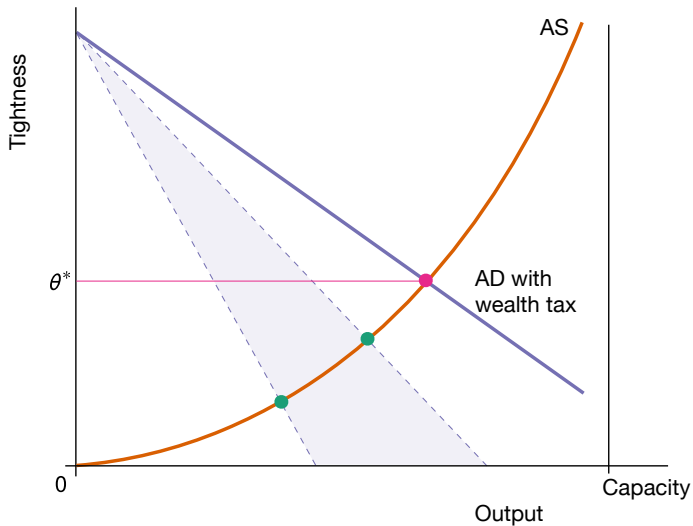
OPTIMAL MONETARY POLICY: LARGE SLUMP



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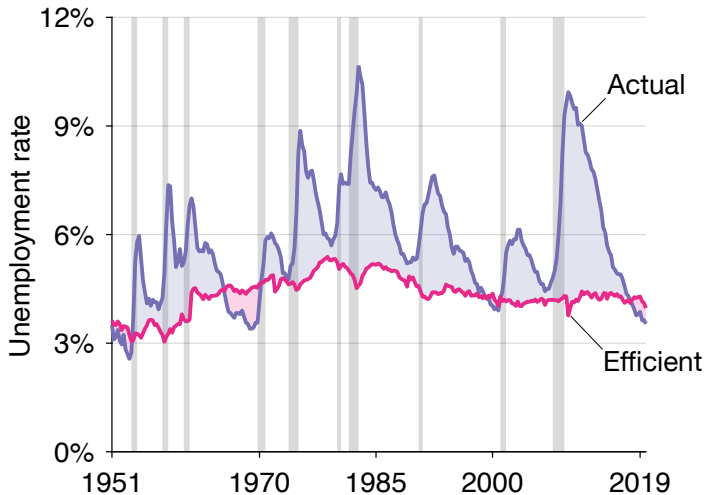
LARGE SLUMP: ROLE FOR WEALTH TAX



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, Elias (2005)	0.2	FAVAR
Coibion (2012)	0.5	narrative & VAR

UNEMPLOYMENT GAP: MICHAILLAT, SAEZ (2021)



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 (Taylor principle)	not required (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 at ZLB	less & less potent 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