Is Inflation Coming Back? If so, Why?

Gilles Saint-Paul

SCOR/PSE macroeconomic risk chair, 03/28/2022

Outline

1. Causes of inflation
2. Why would inflation permanently rise?
3. Lessons from recent historical experience
4. Why was inflation low in the past decade?
5. Understanding the current surge

Causes of inflation

1. The short run
2. The long run
3. From the short run to the long run

The short run

1. Cost-push inflation
2. Demand-pull inflation
3. Expectations

Cost-push

- Firms' cost go up for some reasons: lower productivity, more expensive imported materials, and so forth
- They typically charge a markup over costs
- Therefore the general price level goes up
- An increase in inflation is recorder in the national accounts

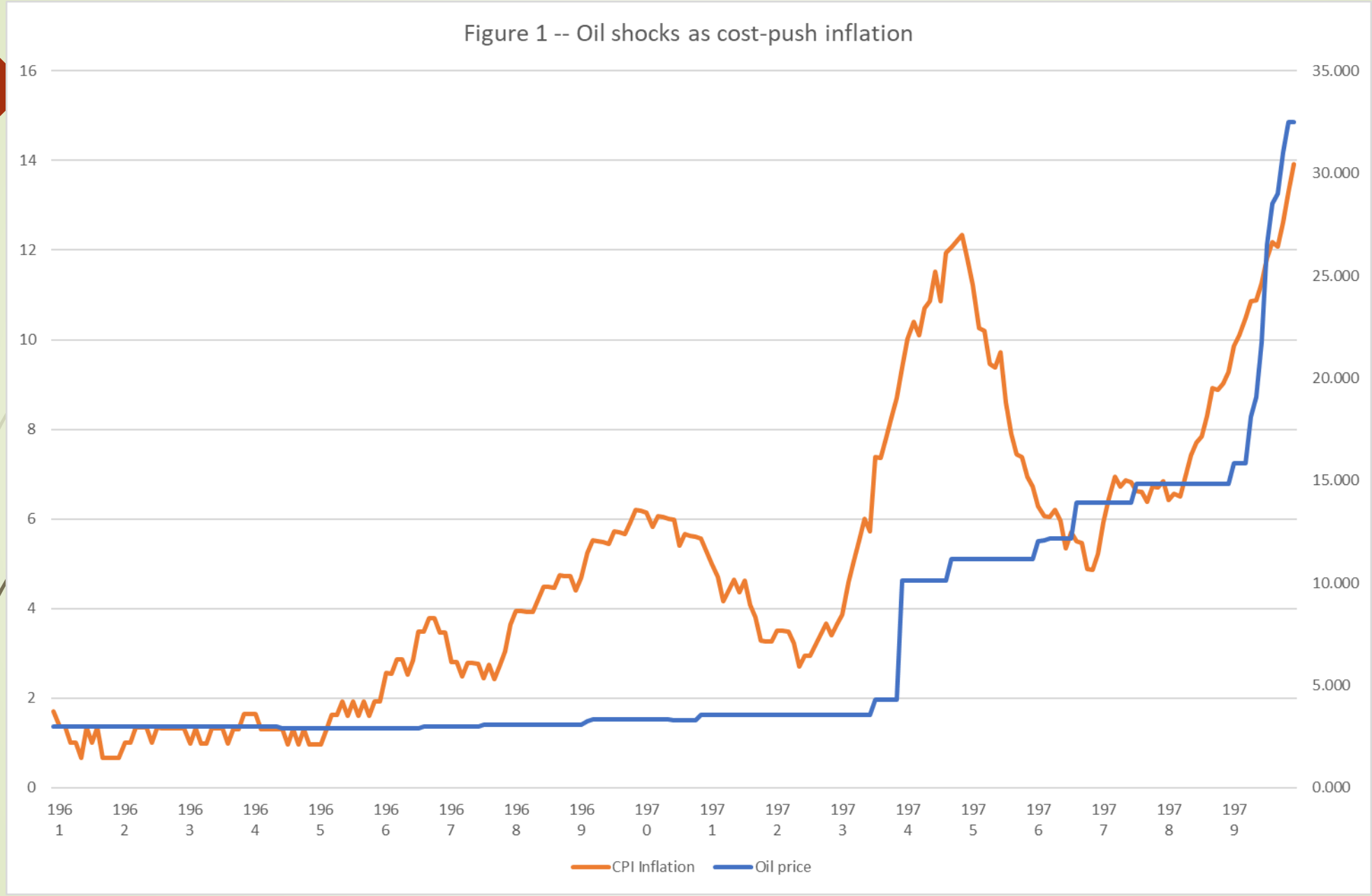


Figure 1 -- Oil shocks as cost-push inflation
16
14
12
10
8
6
4
2
0
35.000
30.000
25.000
20.000
15.000
10.000
5.000
0.000
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
CPI Inflation
Oil price

Demand-Pull Inflation

- Aggregate activity goes up
- May be due to:
  - Increase in consumer confidence → More consumption
  - Increase in firm's optimism → More investment
  - Increase in government spending
- This creates tensions in the economy:
  - Recruiting is harder
  - Depletion of inventory
  - Raise in capacity utilization

Demand-Pull Inflation (2)

- Tensions raise marginal costs of production
- As a result firms raise their prices
- General price level goes up → More inflation
- Thus demand-pull inflation is just a form of cost-push inflation

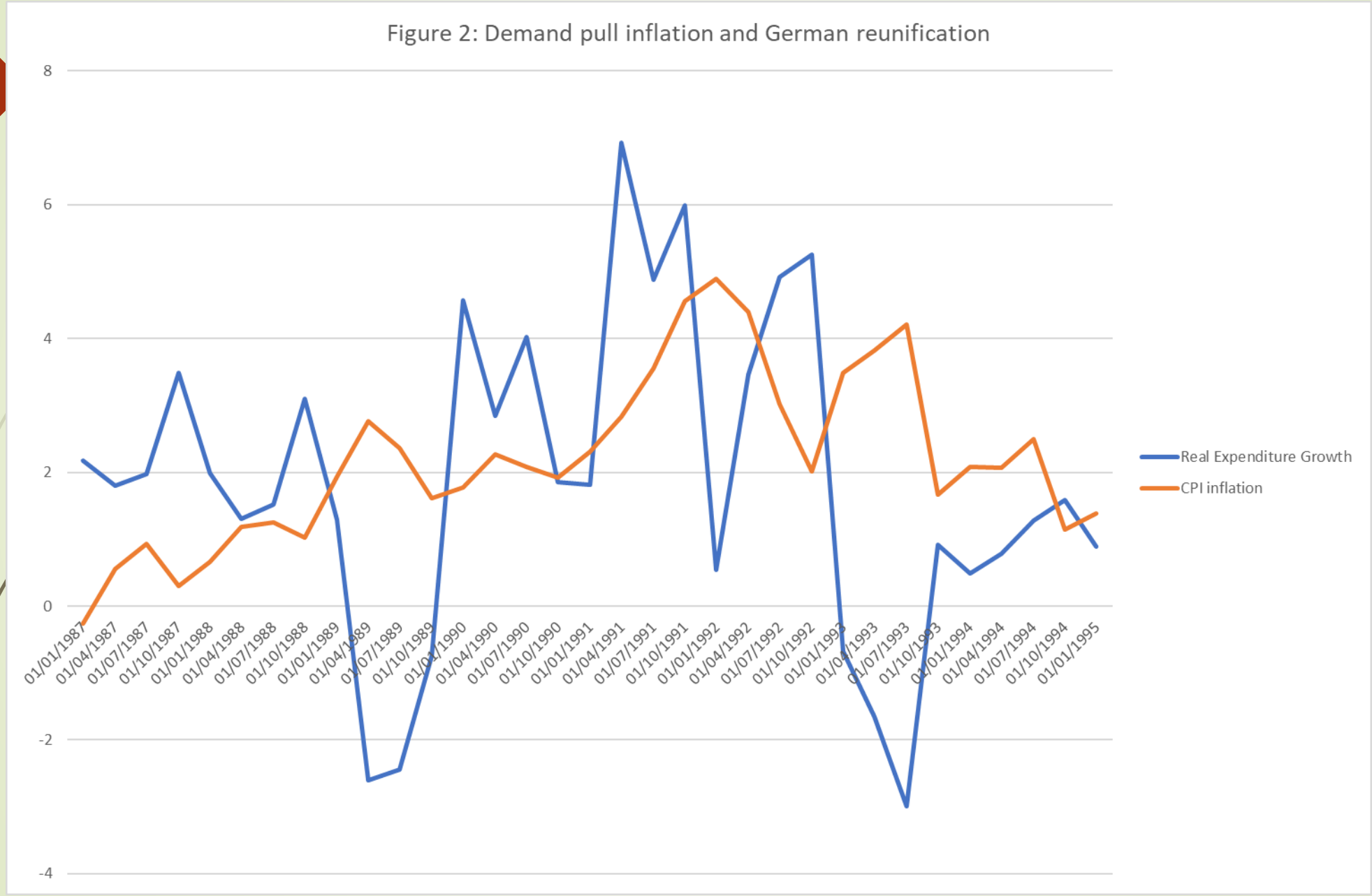
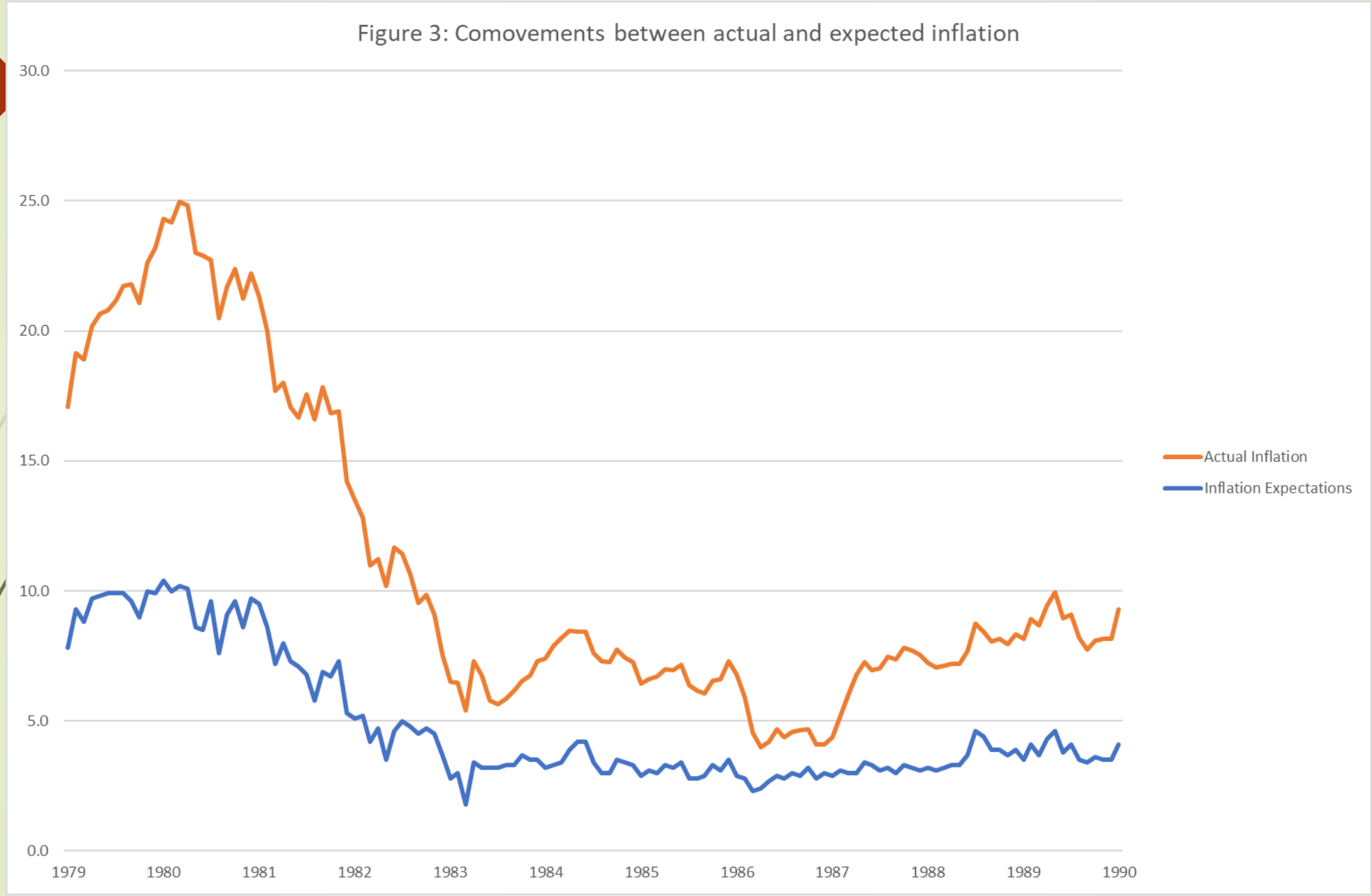


Figure 2: Demand pull inflation and German reunification
8
6
4
2
0
-2
-4
01/01/1987
01/04/1987
01/07/1987
01/10/1987
01/01/1988
01/04/1988
01/07/1988
01/10/1988
01/01/1989
01/04/1989
01/07/1989
01/10/1989
01/01/1990
01/04/1990
01/07/1990
01/10/1990
01/01/1991
01/04/1991
01/07/1991
01/10/1991
01/01/1992
01/04/1992
01/07/1992
01/10/1992
01/01/1993
01/04/1993
01/07/1993
01/10/1993
01/01/1994
01/04/1994
01/07/1994
01/10/1994
01/01/1995
Real Expenditure Growth
CPI inflation

Expectations

- Shifts in inflationary expectations have an important impact on actual inflation
- Absent a central bank reaction, real interest rates fall → Investment boom → Demand pull
- Producers when fixing their price anticipate higher future costs → they raise their price right away → Cost push
- A typical example is that of unions who set nominal wages in advance
- Expected price inflation → wage inflation → actual price inflation
- Curbing expectations plays a key role in disinflation

Figure 3: Comovements between actual and expected inflation



The long run

- In the long run, economists consider there should be a stable proportional relationship between real money balances and output
- This is because the demand for money is proportional to the volume of transactions
- And the nominal interest rate, which is the cost of holding money, does not vary with time:

$$M/P = kY$$

The long run (II)

- Consequence: the inflation rate is determined by the rate of money growth:

INFLATION = MONEY GROWTH – OUTPUT GROWTH

- Consequence: the Central Bank can control the long term inflation rate by picking an adequate growth rate of the money stock

From the short run to the long run

- Neither cost-push nor demand-pull shocks should lead to higher inflation in the LR, as long as money growth is unaffected
- Such shocks require adjustments in the ***levels*** of relative prices
  - Ex: real wages must fall if oil prices go up
- But inflation is the ***growth rate*** of prices
- BdF governor: « even with a crude oil price at 250$ per barrel, our simulations indicate a quick stabilization of inflation at our target of 2 % ».

Central bank reaction to short term shocks

- The CB controls aggregate spending through interest rates and the real money stock
  - Inverse relationship between the two
- A fixed money growth rule ensures that any inflationary burst is temporary and that inflation returns to its long term target
  - Automatic contraction of real balances
- Even in the short run, the CB can afford to eliminate any inflationary impact of the shock (« fine tuning »)
- The following numerical examples illustrate this

A simple model

- Wages depend on expected inflation (+) and output gap (+)
- Prices depend on wages (+) and oil price (+)
- Output depends on real money and some demand shock
- Expected inflation equals past inflation
- Rule #1: Money grows at 2% per year
- Rule #2: CB does whatever it takes to maintain inflation at 2 %
- We look at the effect of a permanent increase in oil prices that reduce GDP by 5% in the long run


Figure 4: Impact of an oil shock under a 2% money growth rule
0.06
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
Inflation
Output Gap

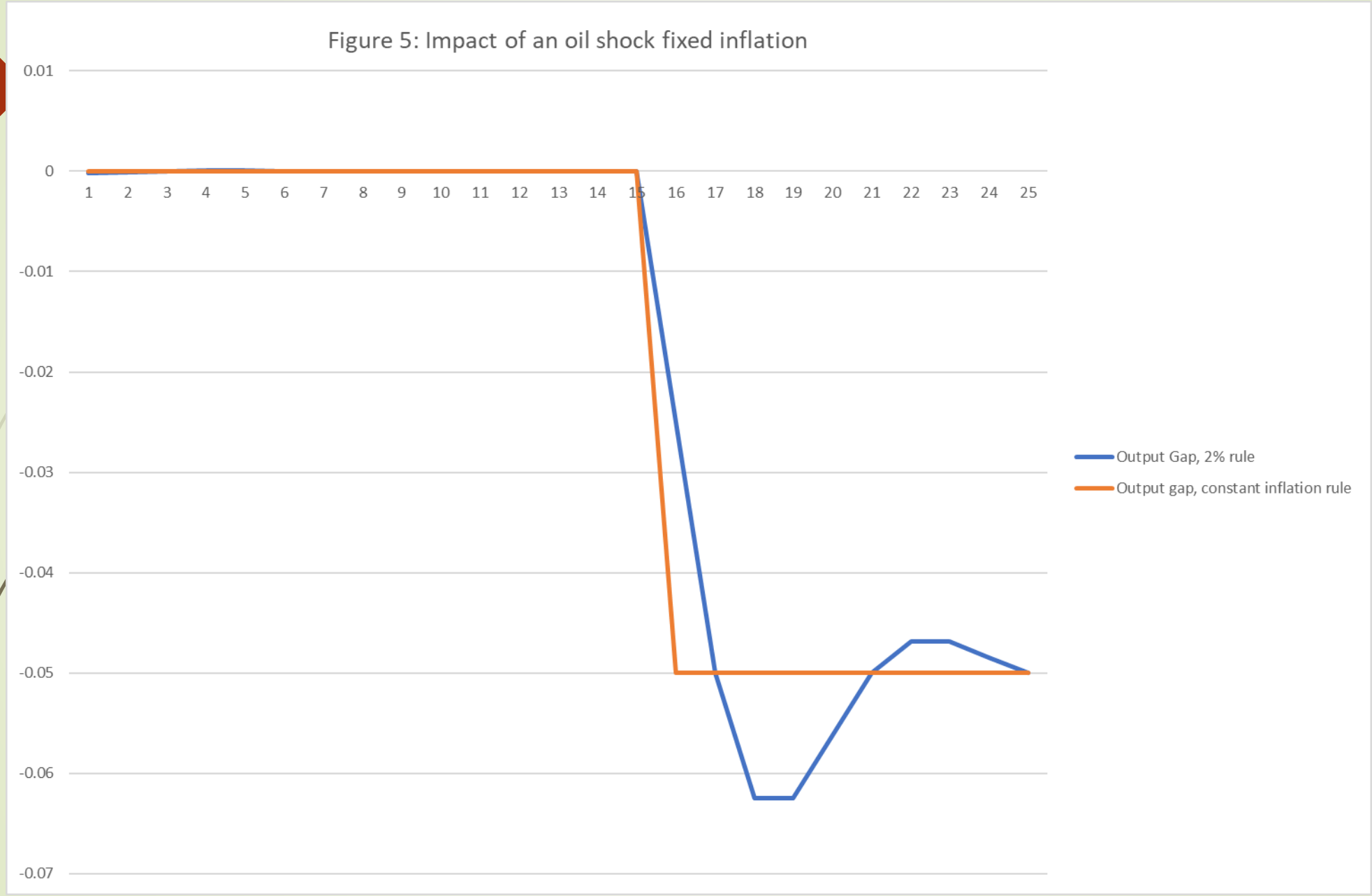


Figure 5: Impact of an oil shock fixed inflation
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Output Gap, 2% rule
Output gap, constant inflation rule

If the CB controls inflation, why do we observe episodes of permanent raises in inflation?

- Permanent raises in inflation happens when the CB tries to do something incompatible with a stable inflation rate.
  - Stagflation = accomodation of the wage-price spiral
  - Debtflation = monetary financing of budget deficit
- ***Hyperinflation*** occurs when the CB's attempts are inconsistent with the economy's fundamentals
  - Maintaining living standards in the face of an adverse oil or TOT shock
  - Financing a budget deficit in excess of the maximum possible level

Back to the simple model

- Rule #3: print whatever money prevents a recession to happen in response to the oil shock
- Since real wages depend on output, this in effect stabilizes real wages
- But they must fall for firms to break even with higher oil prices
- Wage/price spiral ensues, leading to exploding inflation
- For inflation to be stabilized, a permanent reduction in output must occur
  - Only way for price formation to be consistent with wage formation

Figure 6: Impact of an oil shock, output/real wage maintenance rule

Figure 7: Little accommodation of OPEC shock

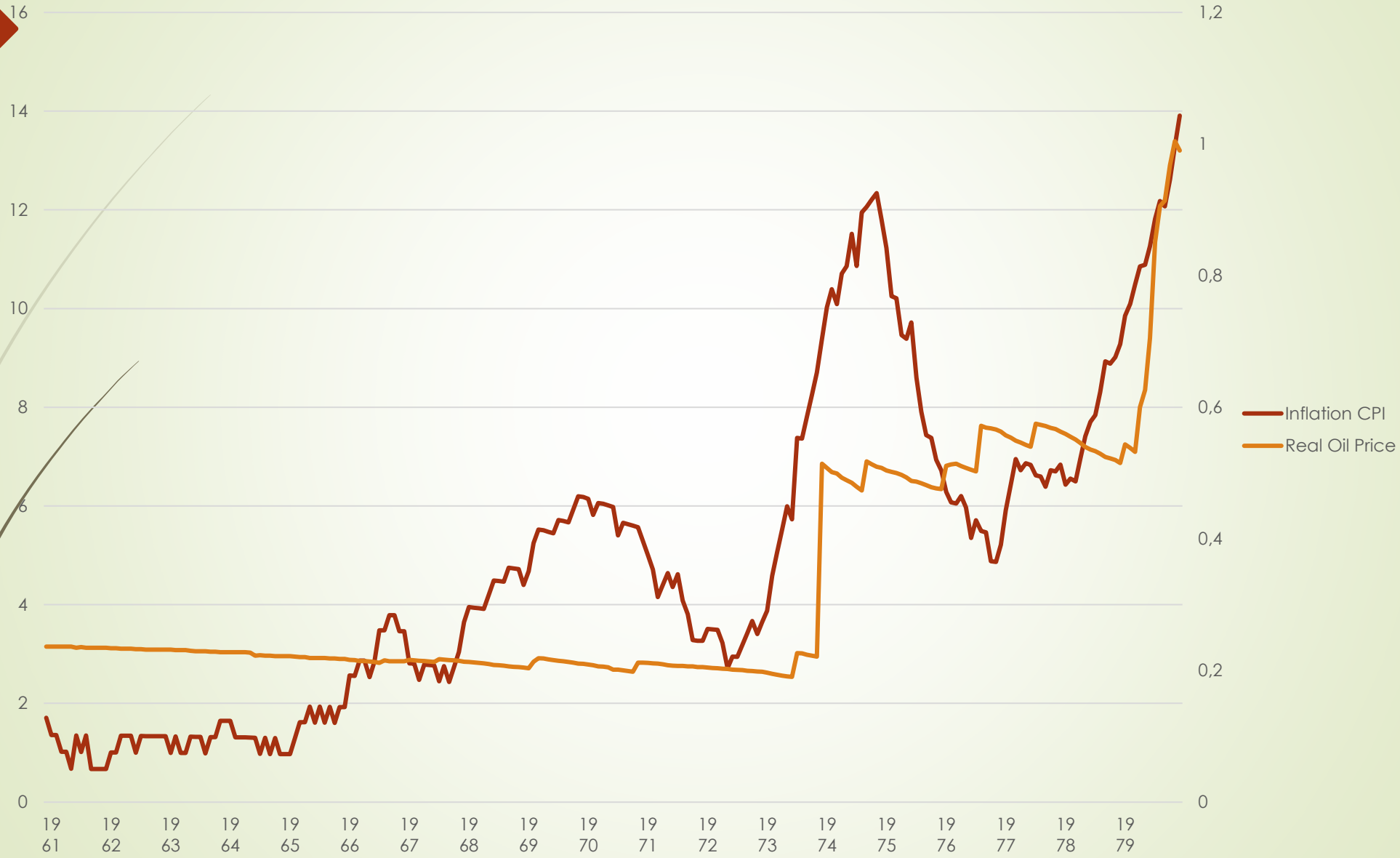
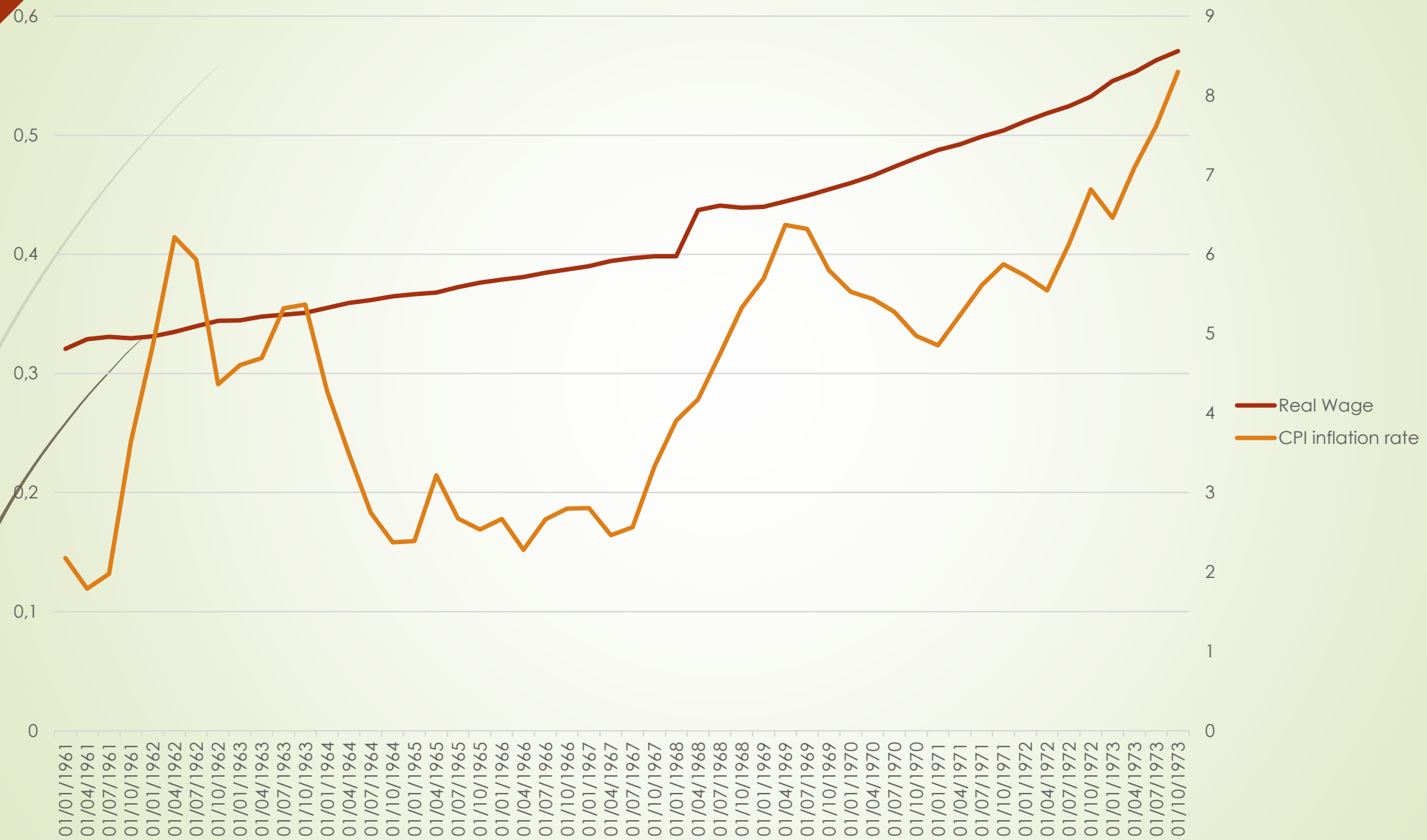


Figure 8: May 1968 Accomodation



Accomodating budget deficits

- Relevant when it is difficult to finance spending by either taxes or debt
- Money creation then driven by budget deficits
- The higher the deficit, the faster money growth and the greater the inflation rate
- Expected inflation in turn reduces money demand→Higher price level as people get rid of their balances
- For this reason, there is an « Inflation Laffer Curve »
  - Maximum level of deficit beyond which **hyperinflation** occurs

Figure 9: Deficits in Argentina

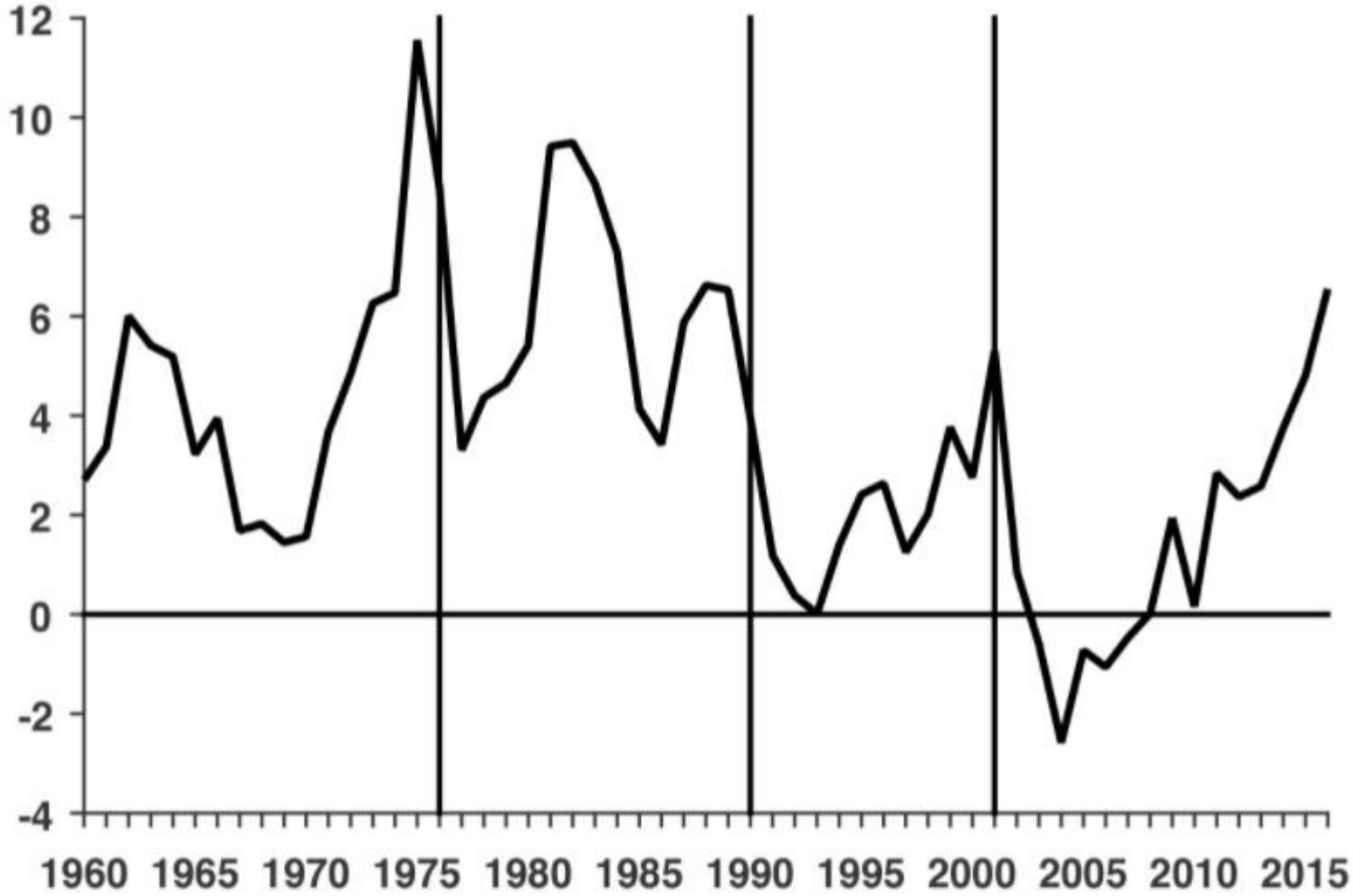


Figure 3. Government deficit, percent of GDP.

Source: Buera and Nicolini, in Kehoe and Nicolini, eds., *A monetary and Fiscal History of Latin America*

Figure 10: Inflation in Argentina

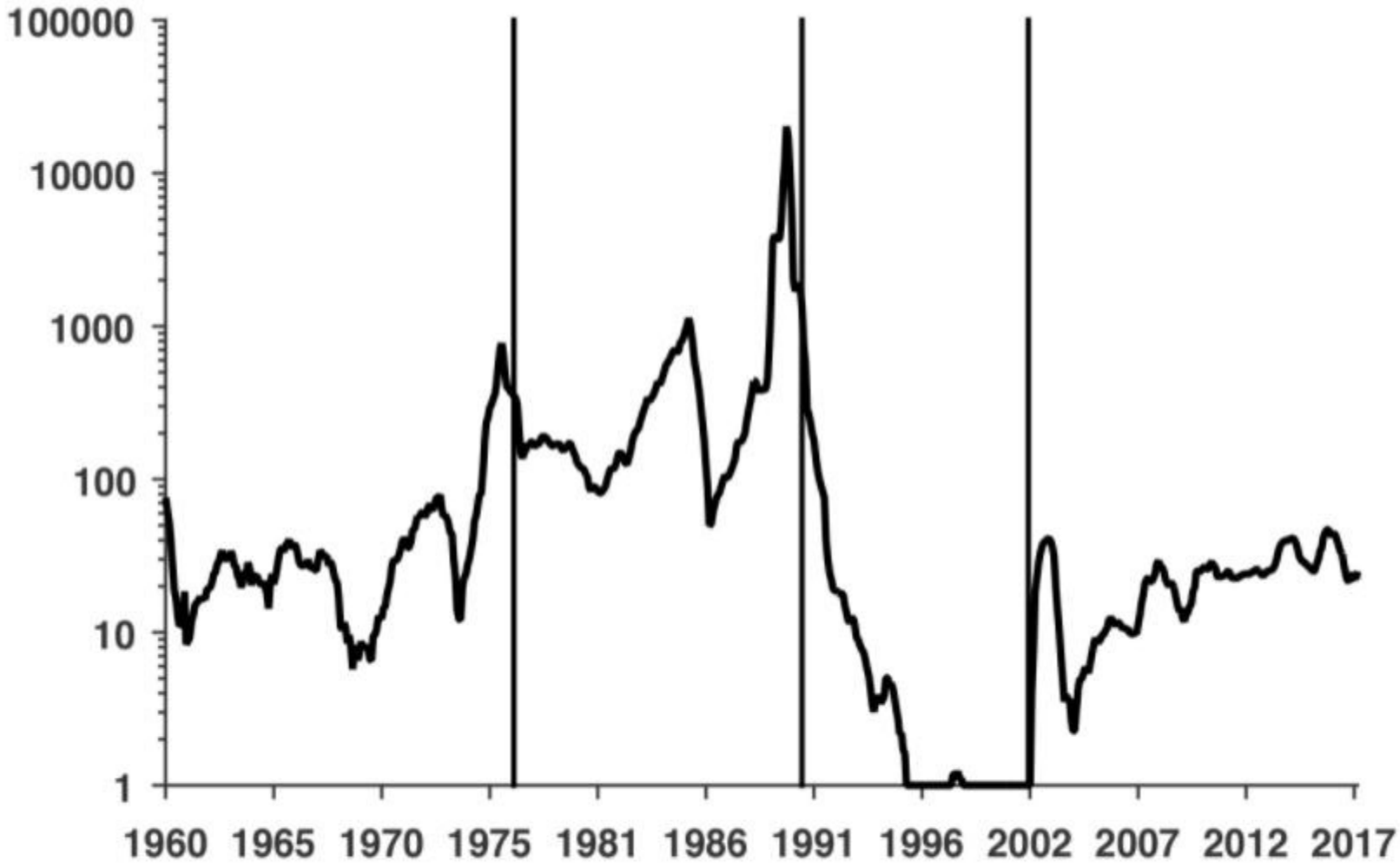


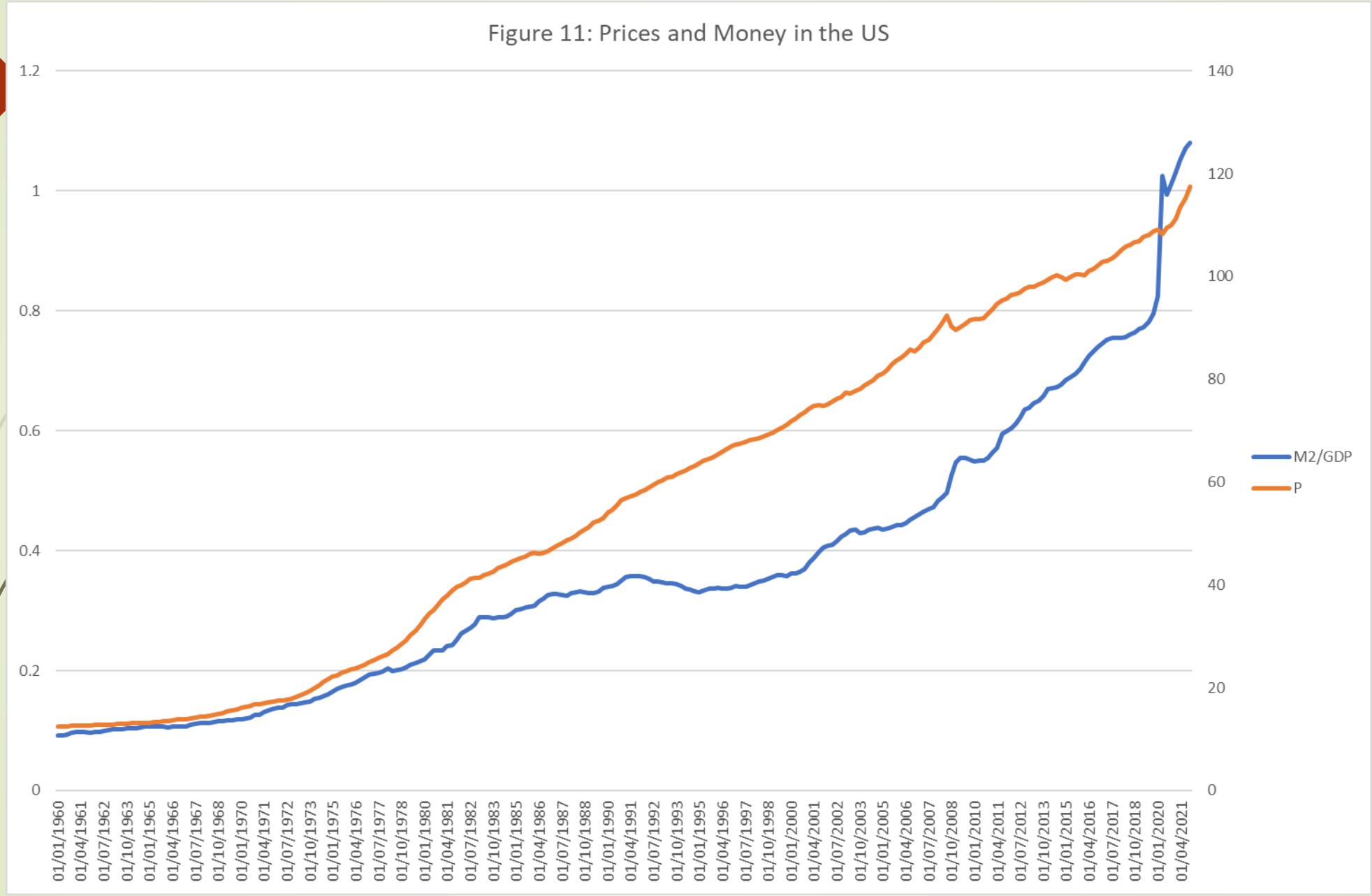
Figure 2. Inflation, log scale.

Source: Buera and Nicolini, op. cit.

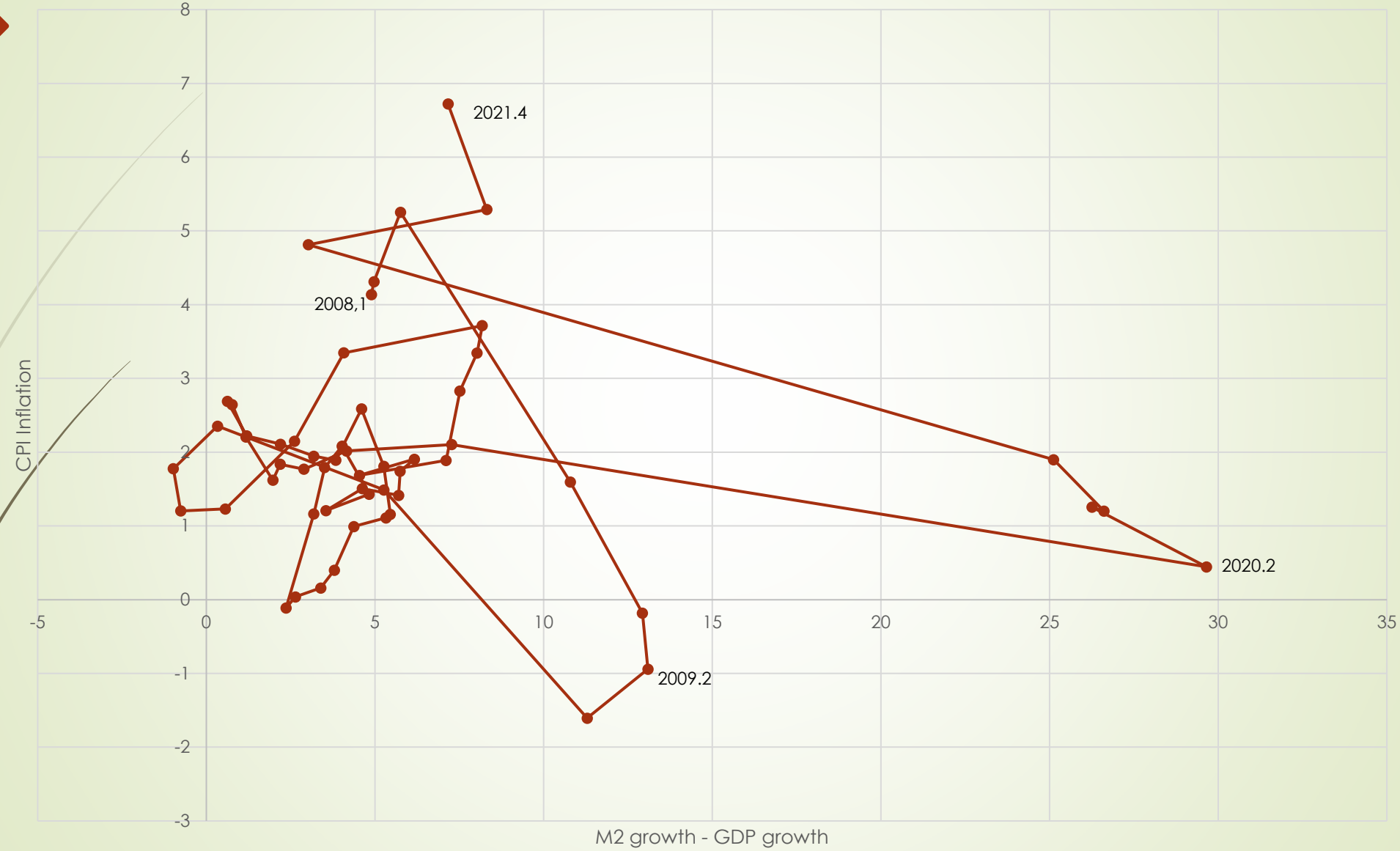
How does the monetary theory fare in practice

- There should be a tight connection between the price level and the ratio between money and GDP
- On average inflation should equal the growth rate of money minus that of GDP
- Fluctuation in velocity due to movements in interest rates should remain short-lived

Figure 11: Prices and Money in the US



CPI Inflation and money growth in the QE era



Three main lessons

- Connection between money stock and the price level not tight in the short run
  - Velocity unstable due to financial innovation
  - Explains why central banks moved from money stock targeting to inflation targeting
- Politically controlled Central Banks accomodate cost-push and demand-pull inflation
  - Explains why central banks became increasingly independent to fight inflation bias
- QE has led to a huge increase in money with no inflationary pressure
  - Needs an explanation

Why no inflation during QE?

- Globalization theory: Cheap imports from China curb price inflation
- Liquidity trap theory: Money disconnected from prices

The China fallacy

- China imports have ***level*** effects on ***relative*** prices
- Imported prices in local currency should move 1 for 1 with domestic CPI
- China imports should therefore not be able to stop an inflation surge due a change in the monetary policy regime

An example

- European shirts are 5 times more expensive than Chinese ones
- Price level in Europe doubles
- Demand for Chinese shirts goes up and balance of payments deteriorates
- To restore equilibrium, Euro has to depreciate by 50%
- Chinese imports 5 times cheaper but their price has doubled in Euros

What if China prevents Yuan appreciation?

- It has to print Yuans to maintain parity
- Appreciation pressure remains as long as shirts are more than 5 times cheaper
- Equilibrium restored only when price level in China has doubled too (through imported inflation)
- Parity unchanged, Chinese shirts 5 times cheaper, but their price has doubled

Liquidity trap

- Money is hoarded by the private sector
- Costless because the riskless nominal interest rate has fallen to zero
- Monetary injections have no effect on aggregate demand
- Hence no transmission to the price level
- This is a curse for a CB which wants to stimulate output
- But a blessing to a CB which is bailing out governments or large companies

Why don’t people spend the liquidity?

- They would if they expect that the additional liquidity will not be withdrawn in the future, or that inflation would be higher in the future
- Otherwise, excess saving due to expected implicit tax associated with future withdrawal of liquidity (« Ricardian Equivalence »)
- Reverse credibility problem: people expect CB to revert to its traditional price stability mandate as soon as inflation picks up

Why inflation now?

- Short run: impulse from adverse global supply shock triggered by Covid measures
- Long run: increasingly hard to believe that CBs can abandon asset purchases
  - Risk of stock and housing market crash
  - Risk of Greek style sovereign debt crisis
- 1970-s style indexation mechanisms may return, along with strong political pressure to accomodate

Is there a risk of hyperinflation?

- Estimating money demand curve allows to compute
  - The inflation rate that maximizes seignoriage
  - The associated government revenues
- Consensus « optimal » inflation: 300 % per annum
- Consensus maximum seignoriage: 10% of GDP
- This is the maximum deficit that can be financed by money printing
- Any attempt to finance more than that leads to hyperinflation

Figure 13: Seignoriage and money creation during Belarus high inflation

Years	Maximizing money growth rate, % change	Actual money growth rate, period average (end of period), % change	Actual inflation, period average, (end of period), % change	Actual real money growth rate, period average (end of period), % change	Maximum revenue from S, period average as a % of GDP	Actual revenue from S, period average (end of period), as a % of GDP	Actual revenue from IT, period average (end of period), as a % of GDP
1995	323.88	473* (457.43)	566.57 (244.18)	-93.57 (213.25)	9.92	** (3.61)	** (2.47)
1996	323.88	126.01 (75.42)	52.66 (39.13)	73.35 (36.29)	9.92	2.9 (2.44)	1.21 (1.26)
1997	323.88	88.79 (96.41)	63.88 (63.42)	24.91 (32.99)	9.92	2.53 (3.00)	1.82 (1.97)
1998	323.88	100.21 (102.14)	73.2 (181.74)	27.01 (-79.6)	9.92	2.87 (2.04)	2.1 (3.63)
1999	323.88	172.59 (204.05)	293.8 (251.3)	-121.21 (-47.25)	9.92	2.43 (2.27)	4.13 (2.8)
2000	323.88	142.7 (125.23)	168.9 (107.97)	-26.2 (17.3)	9.92	1.92 (1.93)	2.27 (1.66)
2001	323.88	130.1 (120.02)	61.38 (46.35)	68.72 (73.67)	9.92	2.54 (2.73)	1.2 (1.06)
2002	323.88	59.01 (40.1)	42.76 (34.87)	16.25 (5.3)	9.92	1.77 (1.42)	1.28 (1.24)

Table 6: Maximum annual revenue from seigniorage and inflation tax and actual revenue from seigniorage and inflation tax compared[19]

Source: Korosteleva, J., « Maximising Seigniorage and Inflation Tax: The Case of Belarus", WP, Bath University

Budget deficits in the QE era

Government surplus as a % of GDP

Year	USA	Germany	France	UK
2009-01-01	-9.8	-3.2	-7.2	-10.0
2010-01-01	-8.6	-4.4	-6.9	-9.2
2011-01-01	-8.3	-0.9	-5.2	-7.5
2012-01-01	-6.6	0.0	-5.0	-7.6
2013-01-01	-4.0	0.0	-4.1	-5.5
2014-01-01	-2.8	0.6	-3.9	-5.5
2015-01-01	-2.4	1.0	-3.6	-4.5
2016-01-01	-3.1	1.2	-3.6	-3.3
2017-01-01	-3.4	1.3	-3.0	-2.4
2018-01-01	-3.8	1.9	-2.3	-2.2
2019-01-01	-4.6	1.5	-3.1	-2.3
2020-01-01	-15.0	-4.3	-9.2	-12.5
2021-01-01	-12.1			