

The Possible Unemployment Cost of Average Inflation below a Credible Target

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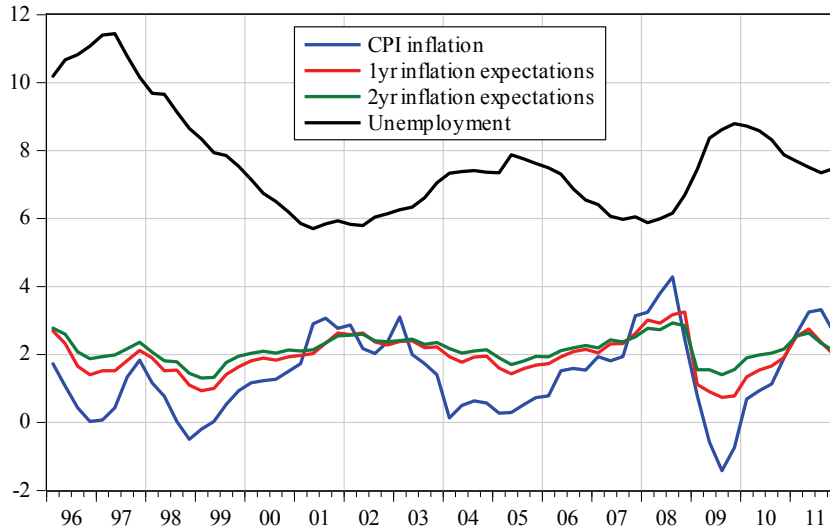
1

Issue

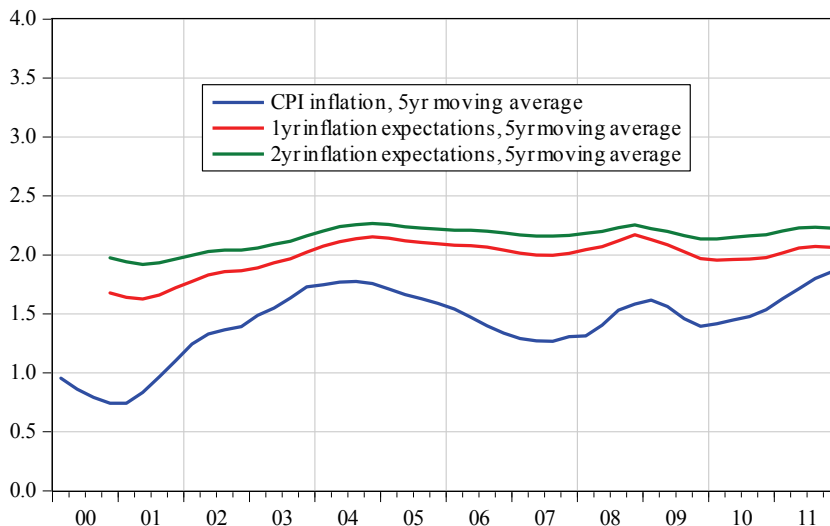
- Average inflation below target 1996-2011
- Average inflation expectations close to target 1996-2011
- If inflation expectations stuck at target when average inflation deviates from target, non-vertical long-run Phillips curve?
- Higher average unemployment from lower average inflation?
- Bias in estimates of sustainable unemployment rate based on historical averages?
- Conclusions for the future?

2

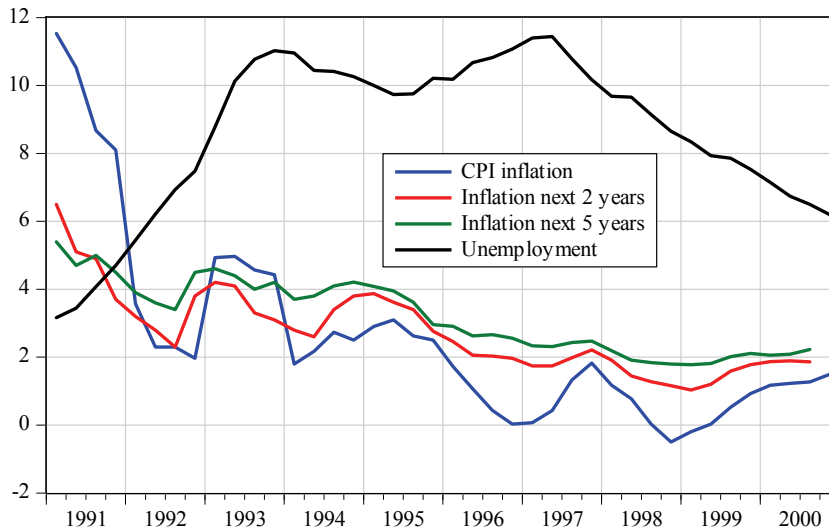
CPI inflation, CPI inflation expectations, and unemployment 1996-2011



5-year moving averages: CPI inflation expectations close to 2 %, CPI inflation below 2 %

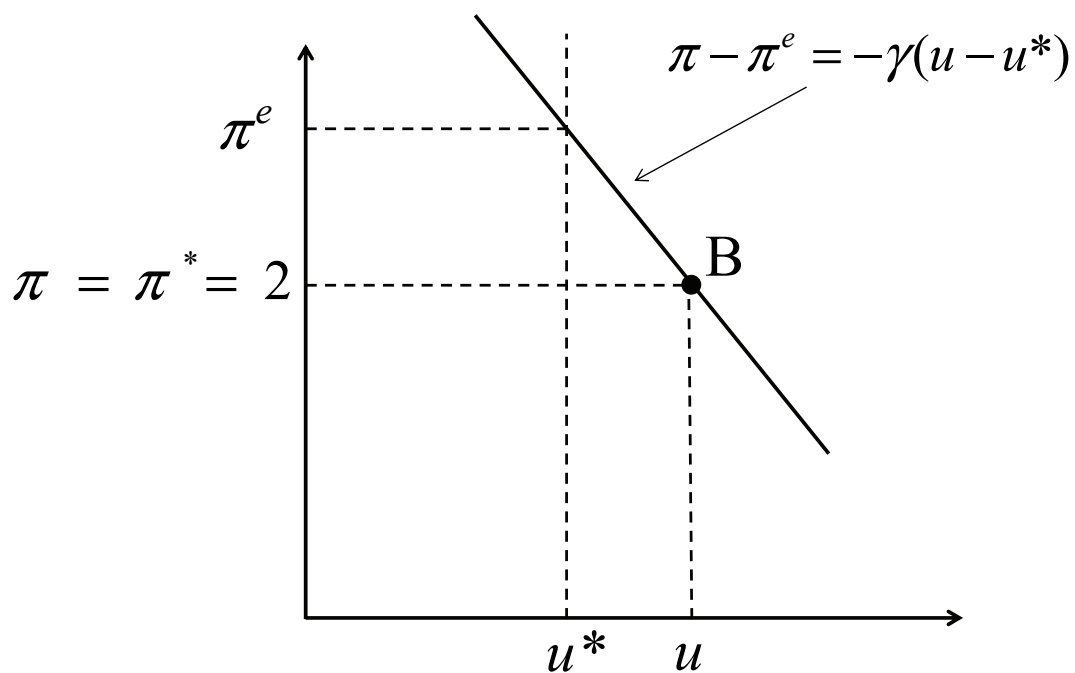


Before 1996: High CPI inflation expectations (Aragon)



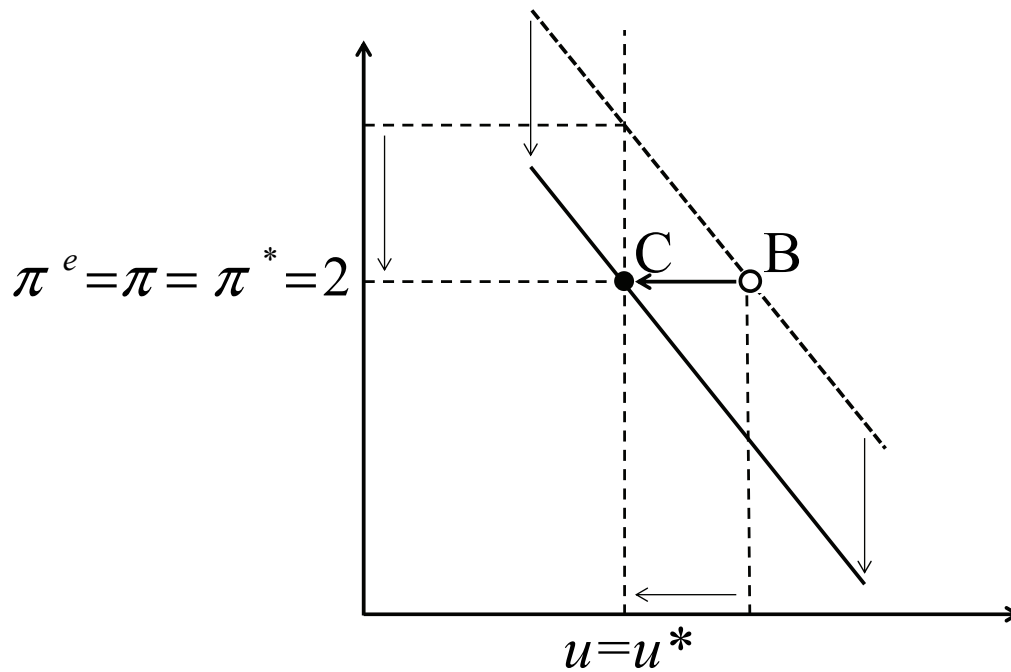
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First few years: Inflation target not credible, tight monetary policy, and high unemployment



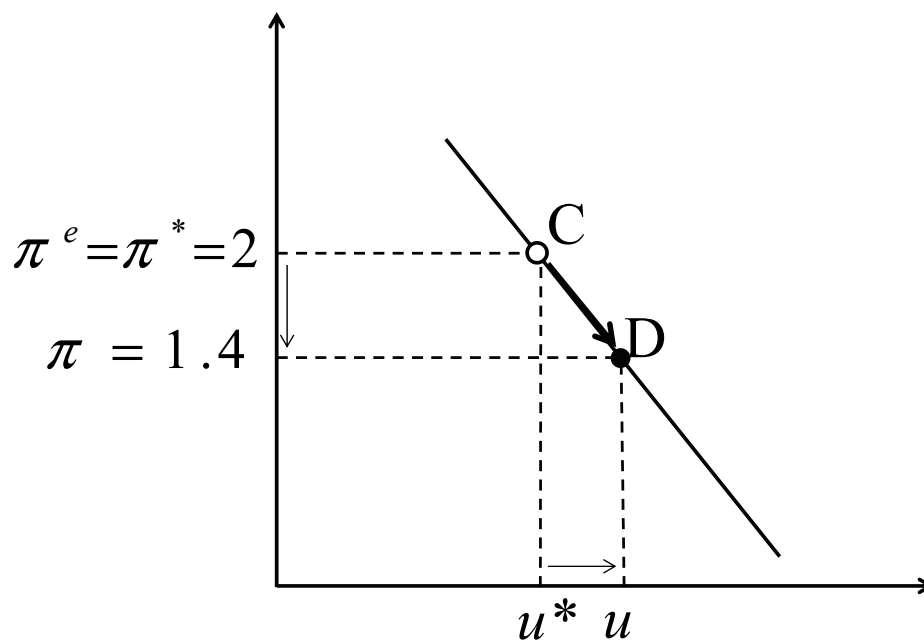
6

Inflation target gradually becomes credible



7

**From 1996: Inflation expectations stuck at 2 %,
but monetary policy still tight:
Inflation too low, and unemployment too high**



8

Estimate short-run Phillips curve, compute long-run Phillips curve

$$\pi_t - 2 = \beta_0 + \beta_1(\pi_{t-1} - 2) + \beta_2(\pi_{t-2} - 2) + \beta_3 u_t + \varepsilon_t$$

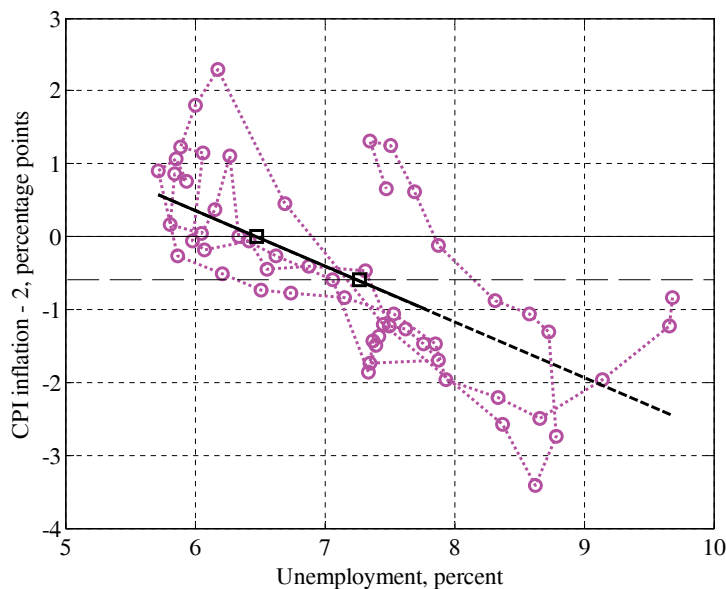
| Coefficient | Estimate | Std. Error | t-Statistic | Prob. |
|-------------|-----------|------------|-------------|--------|
| β_0 | 1.835275 | 0.528245 | 3.474290 | 0.0010 |
| β_1 | 1.127351 | 0.121112 | 9.308356 | 0.0000 |
| β_2 | -0.500917 | 0.110455 | -4.535029 | 0.0000 |
| β_3 | -0.283695 | 0.080984 | -3.503117 | 0.0010 |

Newey-West lag 4, R^2 0.84, adj R^2 0.83, S.E. 0.51, DW 2.12

$$\pi - 2 = \gamma_0 - \gamma u \quad \gamma_0 = \beta_0 / (1 - \beta_1 - \beta_2) \quad \gamma = -\beta_3 / (1 - \beta_1 - \beta_2)$$

$$\pi - 2 = 4.92 - 0.76 u$$

The long-run Phillips curve, 1998Q1-2011Q4



The unemployment cost of average inflation below a credible target

- "Near-rational" inflation expectations?
- Akerlof-Dickens-Perry (2000): For average inflation close to zero, a significant fraction of agents disregard inflation; behave as if inflation expectations are zero
- Here, for average inflation close to 2 %, a significant fraction of agents disregard deviation from 2 %; behave as if inflation expectations are 2 %
- Non-vertical Phillips curve applies for average inflation not too far from 2 % (± 1 %?)

The unemployment cost of average inflation below a credible target

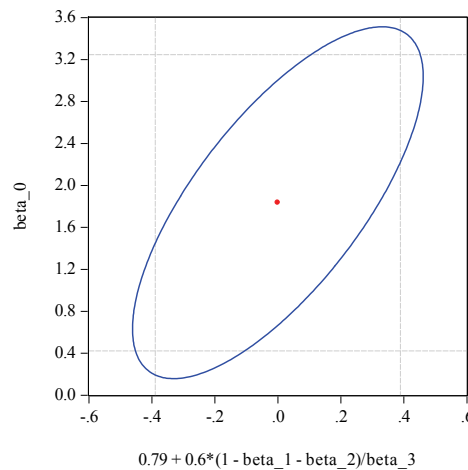
- 1997-2011 average CPI inflation 1.4 %
- Average inflation expectations about 2 %
- Downward-sloping long-run Phillips curve

$$\pi_t - 2 = 4.92 - 0.76 u_t$$

- 0.6 p.p. lower inflation gives $0.6/0.76 = 0.8$ p.p. higher unemployment on average during 1997-2011
- Robustness?

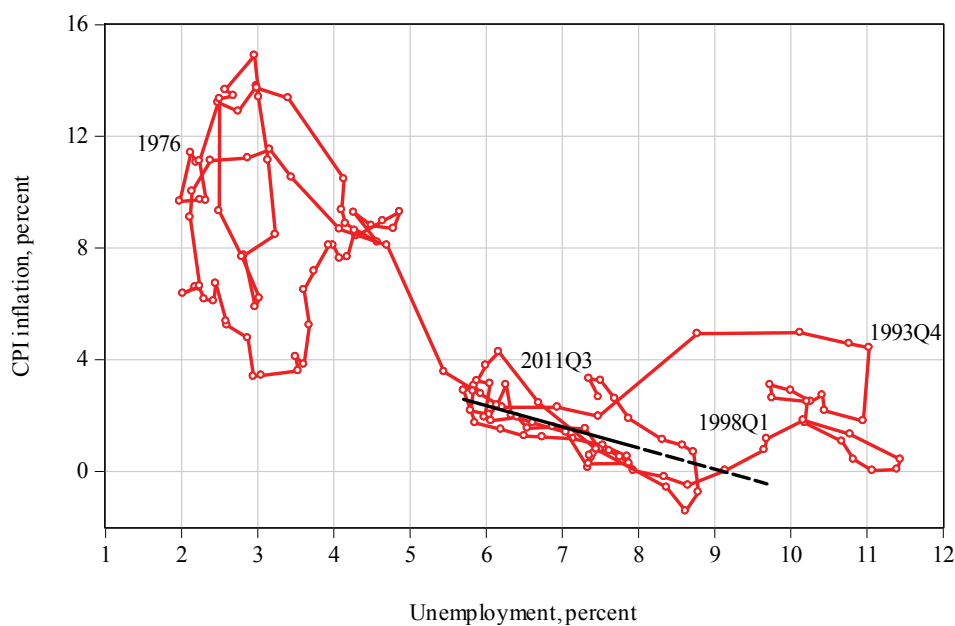
The unemployment cost of average inflation below a credible target

- Point estimate 0.79 p.p.
- 95 % conf. interval $0.79 \pm 0.29 = [0.50 \ 1.08]$ p.p.
- 99 % conf. interval $0.79 \pm 0.39 = [0.40 \ 1.18]$ p.p.



13

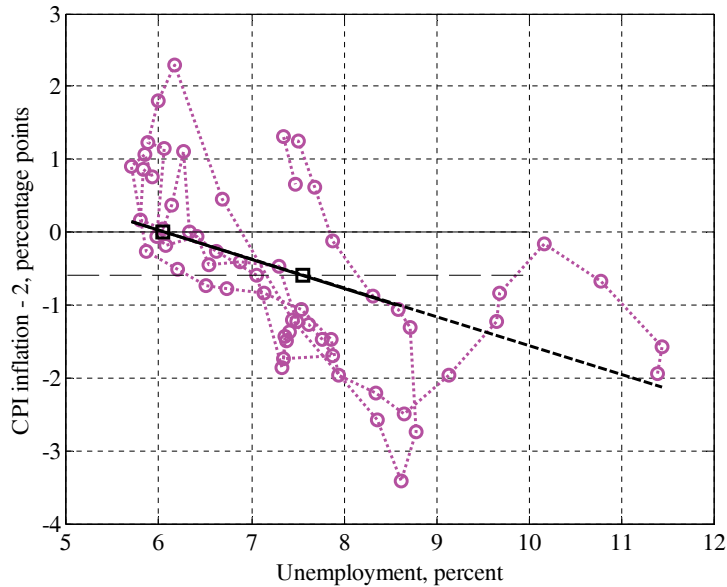
CPI inflation and unemployment, 1976-2011 Long-run Phillips curve, 1998-2011



14

Earlier start, 1997Q1-2011Q4

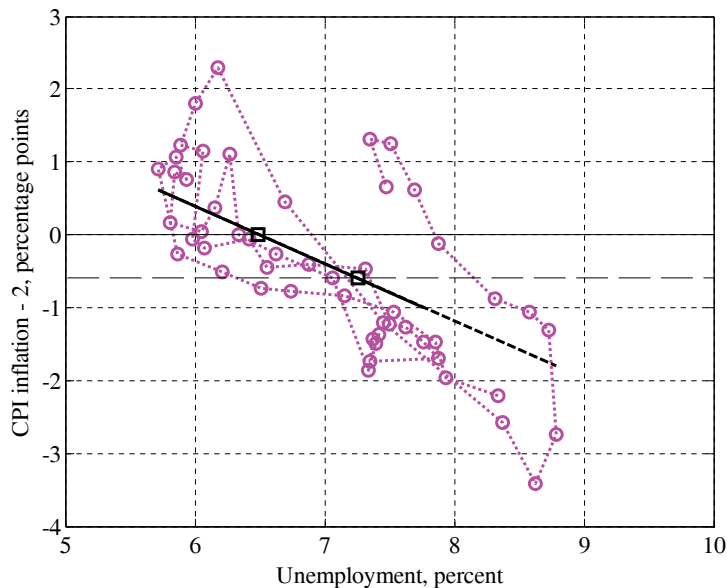
Flatter, higher unemployment cost



15

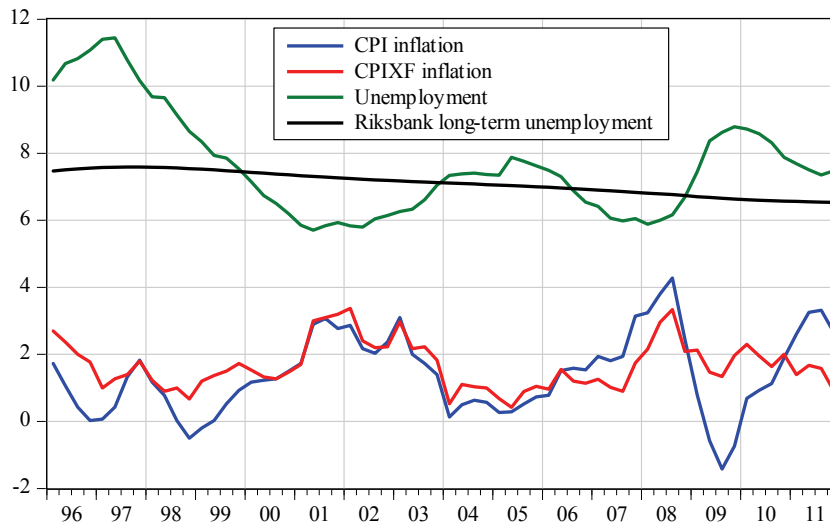
Later start, 1999Q1-2011Q4

Not much steeper, not much lower unemployment cost



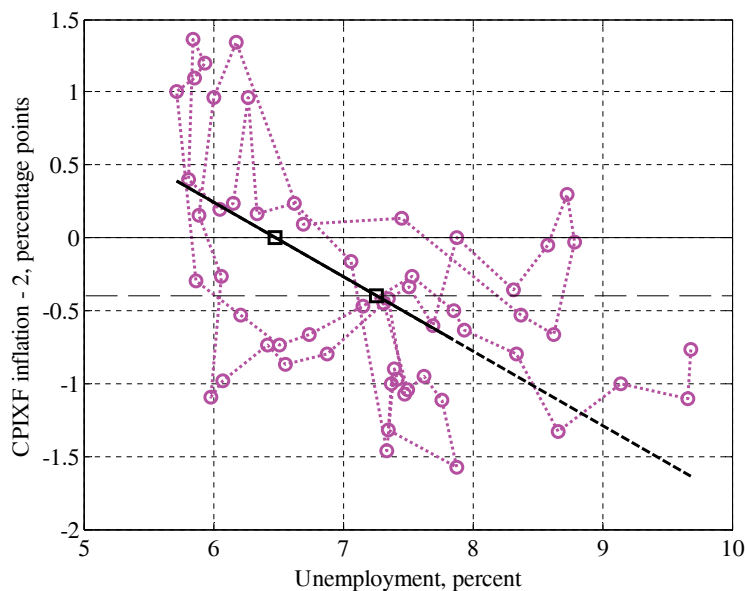
16

Consider CPIXF inflation and gap to Riksbank long-term unemployment



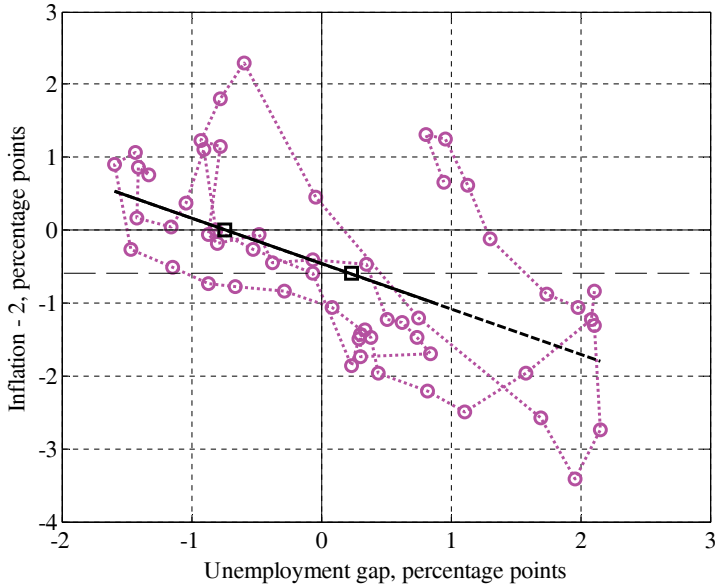
17

With CPIXF inflation, 1998Q1-2011Q4 Flatter curve, similar unemployment cost

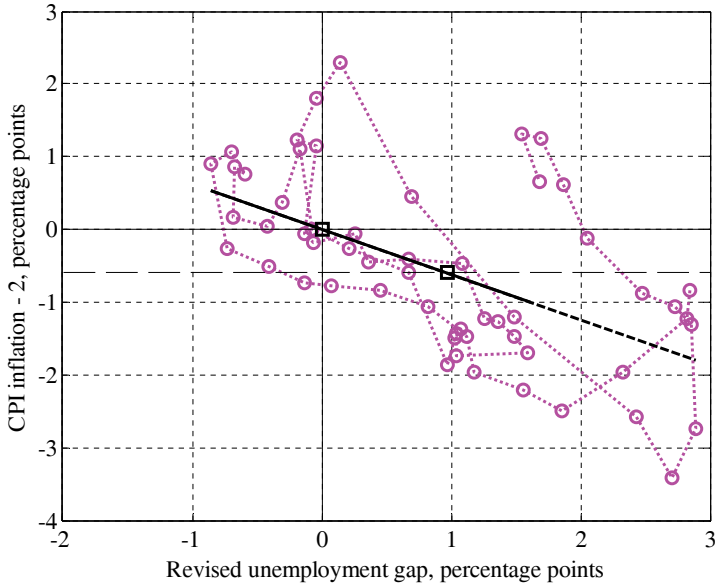


18

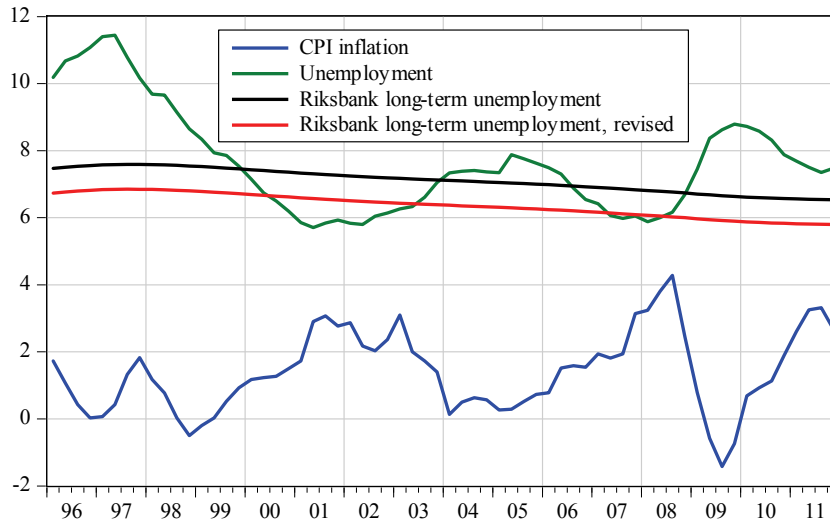
With Riksbank unemployment gap, higher cost, possibly overestimate of long-term unemployment



Revised Riksbank unemployment gap and long-run Phillips curve, 1998Q1-2011Q4

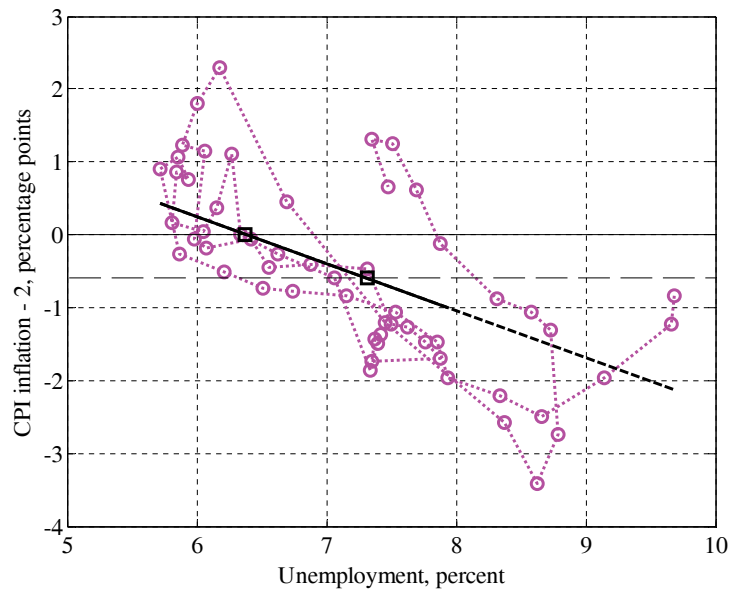


Revised Riksbank long-term unemployment gap,



21

With lagged unemployment Flatter curve, higher unemployment cost



22

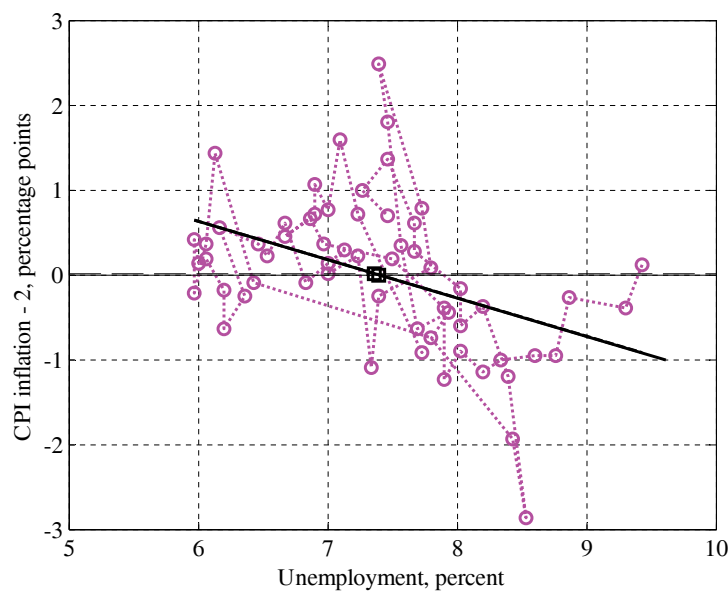
Other countries

■ Average inflation in other countries?

| | |
|-------------------------------|------|
| CA average CPI 1996-2011 | 2.02 |
| UK average RPIX 1995-2003 | 2.48 |
| UK average CPI 2004-2007 | 2.01 |
| UK average CPI 2008-2011 | 3.39 |
| US average core CPI 2000-2011 | 2.02 |
| US average core PCE 2000-2011 | 1.86 |

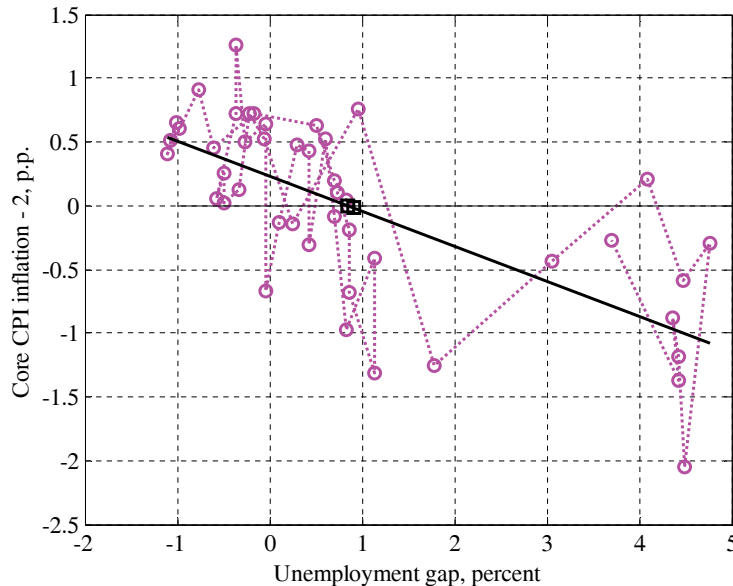
Canada, 1997Q1-2011Q4

Average inflation on target 2 %



US, 2000Q1-2011Q4 (Fuhrer 2011)

Average inflation 2 %



25

Conclusions for the future?

- Swedish (Prospera) inflation expectations not rational
- "Near rational"?
Stuck at 2 % for average inflation not too far from 2 %?
- Stable inflation expectations of 2 per cent good:
Easier to stabilize unemployment without too much variation in inflation
- Important to hold average inflation close to 2 per cent
- Too low average inflation can entail large real economic costs
- Better with price-level targeting, average inflation targeting over a longer period?

26

- Government bill (1997/98:40, p. 1):
“**without prejudice to the objective of price stability**, [the Riksbank] should support the objectives of general economic policy with the purpose to achieving sustainable growth and **high employment.**”