Discussion of “Progress Towards Flexible Inflation Targeting” by Eggertsson and Woodford

MAY 23, 2024

Presentation at Riksbank conference

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This presentation reflects my own views, and not necessarily those of IMF staff, IMF Management, or the Executive Board

Overview: Welfare in DSGE models

- DGSE models can in principle provide stronger grounding for understanding why deviations of output from potential or of inflation from target are costly
  - Important advances in 1990s to derive utility-based welfare loss functions with same qualitative form as “ad hoc” loss functions used in macro models (Rotemberg and Woodford)
  - Useful intuition: output gap costly since marginal cost of work exceeds marginal benefits
- However, **DSGE models impose strong constraints on the welfare function** and may rule out reasonable welfare weights a priori (with little empirical basis)
- ***A key contribution of this paper is to show how alternative model specifications may provide more flexibility to account for “reasonable” welfare weights; also traces through implications of features such as limited risk-sharing for welfare.***
  - Rich and insightful paper that show limitations of current models and charts way forward

Welfare in workhorse NK model

Welfare in workhorse NK model

- First section of paper considers a “workhorse” one sector NK model in which a continuum of firms produce different varieties of a single good (say “bread”)
  - CES production function over the varieties
  - Efficiency requires producing all varieties in same proportion, which is what occurs under flexible prices
  - But with staggered pricing, producers of different varieties set different prices and hence there is costly dispersion in production that rises with inflation
- The framework implies high costs of inflation if the varieties are highly substitutable, and thus **can’t rationalize putting much weight on the output gap**

Utility-based welfare loss function

- Taking a deeper dive, the welfare loss depends on squared output gap **and output dispersion across producers**:

$$\frac{W_t - W_t^*}{U_c C} = -(slope_{MRS} - slope_{MPL})x_t^2 - \frac{1}{\theta} var_f y_t(f)$$

- Demand for producer's goods depends on relative price and elasticity θ :

$$\frac{y_t(f)}{y_t} = -\theta \frac{p_t(f)}{p_t}$$

- Hence relate cross-sectional output to price dispersion:

$$var_f y_t(f) = -\theta^2 var_f p_t(f) = -\frac{\theta^2}{\kappa} \pi_t^2$$

Optimal monetary policy with persistent inflation

- Expected welfare loss depends on variability of output gap and inflation:

$$\mathrm{E}\,\frac{W_t - W_t^*}{U_c C} = -(slope_{MRS} - slope_{MPL})Ex_t^2 - \frac{\theta}{\kappa}E\pi_t^2 \;(f)$$

- Output gap term captures losses as cost of work exceed marginal benefits. Coefficient turns out to be small (relative to inflation) under standard parameters:

$$slope_{MRS} = \frac{1}{\sigma} + \frac{\chi}{1-\alpha} = 2.5$$

$$slope_{MPL} = -\frac{\alpha}{1-\alpha} = -0.5$$

$$slope_{MRs} - slope_{MPL} = 3$$

Compute relative weight on output gap in loss function

- Expected welfare loss:

$$\mathrm{E}\,\frac{W_t - W_t^*}{U_c C} = -(slope_{MRS} - slope_{MPL})Ex_t^2 - \frac{\theta}{\kappa}E\pi_t^2 \;(f)$$

PC slope	Substitution elasticity	Coeff on inflation	Relative welfare wt on output gap
κ	$\vartheta = 1 + \frac{1}{markup}$	$\frac{\theta}{16\kappa}$	$\lambda = 3\frac{16\kappa}{\theta}$
.01	**11**	**69**	**.043**
	6	38	.08
	1	6.3	.48
.02	11	34	.087
	6	19	.16
	1	3.1	.96

- **Weight on output gap tiny relative to inflation** for reasonable estimates of markup (near 0.1.)

Approach in this paper

- EW consider a nested CES preference specification that can be interpreted as capturing many industries (bread, wine, meat) each with a continuum of varieties
  - Industries set prices at different times based on Calvo signal, but all firms within an industry get the same signal and reset prices identically
  - Hence all of the cross-sectional dispersion – that makes inflation costly -- is at the industry level. So **substitutability across industries** is what matters for welfare.
  - If have low substitutability of goods across industries (bread vs. wine), model can account for something close to 1:1 relative weights (even while accounting for high substitutability and low markups within industry).
- So no longer have a somewhat “arbitrary” feature – the average markup of producers with an industry – constraining the relative weights in the loss function

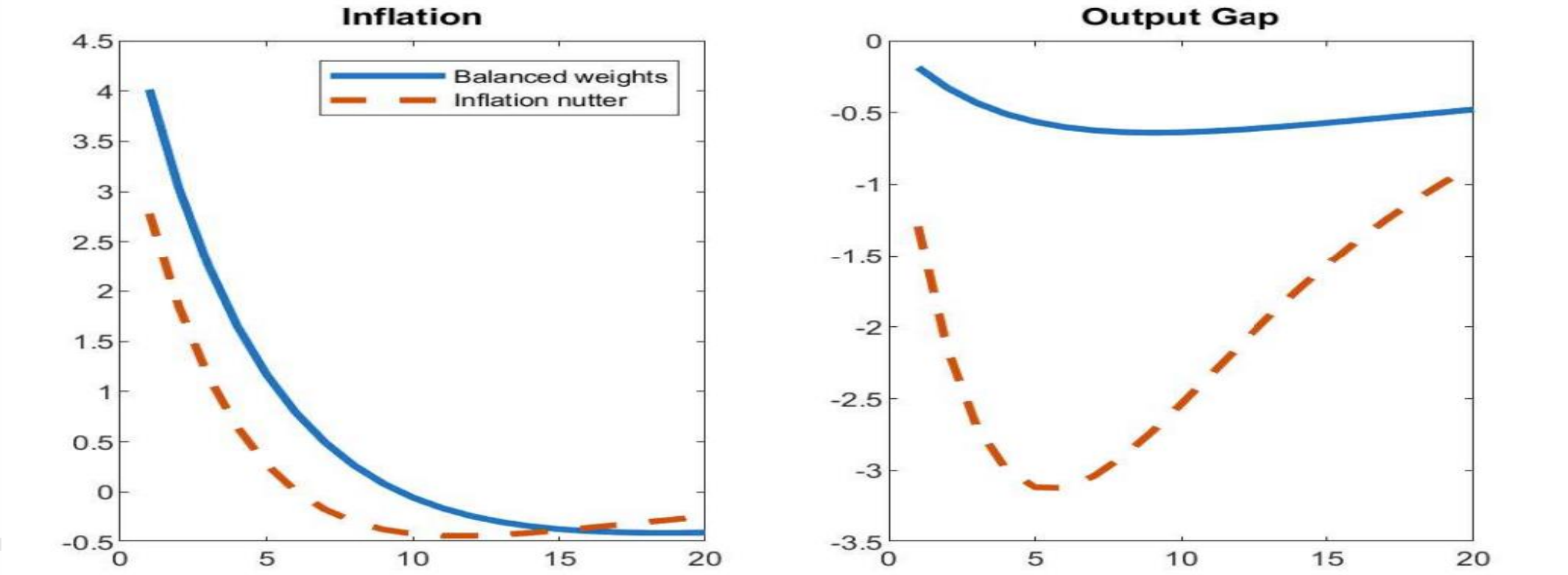
Implications for policy

Supply shocks increasing focus of central banks

- **Supply shocks are likely to continue to be more volatile than pre-pandemic**
  - Restructuring of global supply chains
  - Greater trade fragmentation
  - Climate transition
- **Given inflation surge, central banks will have to focus more on how to respond to supply shocks**
  - Relative weight on output/inflation can matter enormously for optimal policy (unlike pre-pandemic environment when demand shocks dominated)

Consequences of different welfare weights

- **Simulate optimal response to cost-push shock using alternative welfare weights**
  - Low weight on output gap of 0.1 (“workhorse” model) suggests putting the economy in recession, in sharp contrast to balanced weights
  - So EW framework can matter a lot for policy advice



Consequences of different welfare weights (con't)

- While simulation illustrates that weight on output gap can matter a lot, it is important to note that policies such as output gap targeting can still perform well under some conditions even if the loss function weight is small if multiple sources of rigidity (DeBartoli, Kim, Linde, and Nunes 2018)

Implications for welfare analysis in DSGE models

Some general lessons (including from literature)

- First, it's important to be attentive to the possibility that the model may pose strong a priori restrictions on welfare weights ("do no harm")
  - EW helpful in pinpointing these restrictive aspects
- Second, should recognize that models that have identical implications for key behavioral equations – and fit the data equally well – can have very different welfare implications.
  - "Macroeconomic equivalence and microeconomic dissonance" by Kim, Levin, Lopez-Salido, and Nelson (2008)
  - Kinked demand versus specialized factors of production imply same PC, but…
  - Must be more solid basis for choosing between them
- Third, useful to compare results from utility-based to those from "ad hoc" loss function
  - Svensson's approach of asking policymakers **what outcomes "look good" for inflation and the output gap** very appealing (Svensson, "Optimal Inflation Targeting," 2007). Chart out opportunity set of policymakers

Concluding comments

- Have focused on first part of EW, which highlights restrictive features of workhorse model for welfare weights and proposes a very useful generalization
- Remainder of paper helpful in highlighting key features – including imperfect risk sharing -- often missing from loss functions in current models
  - Points way to follow-up, which should consider other reasons for why inflation is costly (tax distortions; assets of low income households poorly hedged against inflation risk, etc)
- Overall, a very rich paper that will help push forward understanding of why business cycle fluctuations are costly and how to quantify these costs