Re-estimating Potential GDP: New Evidence on Output Hysteresis
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Introduction
Potential GDP is one of the key concepts for policy-making decisions and forecasting. It is the level of output absent price/wage rigidities (flexible-price output). There is no consensus on the best estimation method for this counter-factual. The reduced-form approach is subject to Lucas Critique and the estimate does correspond to flexible-price output. The DSGE-based approach requires estimations for a large set of parameters, suffering from identification issues.

We propose a simple structural method to estimate potential GDP. Our approach is derived from a standard New Keynesian (NK) model, yet it is consistent with a wide range of structural assumptions. Moreover, it is not subject to the Lucas Critique, it does not resort to Bayesian estimation of the underlying model, and it is consistent with a large set of possible parametrizations. We estimate potential GDP for the US and use our series to contribute to the debate on the consensus on the best estimation method for policy-making decisions and forecasting.

Method
Underlying baseline DSGE model for our method is the textbook NK model with
1. Nominal wage rigidities (no price rigidities): Hence, τ = \( \mu_t \)
2. No capital: \( Y_t = A_t N_t Y^\alpha_t \)
3. TFP shocks: \( \log A_t = g + \log A_{t-1} + \sigma \epsilon_{dart} \)
4. Preferences: \( E_t \sum_{j=0}^\infty \delta^j \left[ \log (C_t+hC_{t-j}) - \frac{C_t}{\beta} \right] \)
5. Taylor Rule: \( R_t = R_f + c_1 \epsilon_t + c_2 \epsilon_{m} \)

The potential output growth \( \Delta y^*_t \) in the model is
\[
\Delta y^*_t = \theta_1 \Delta y^*_{t-1} + \theta_2 \epsilon_{dart}
\]
where
\[
\theta_1 = \frac{\alpha \phi c_{11}}{1+\alpha \phi c_{12}} \quad \theta_2 = \frac{1}{1+\alpha \phi c_{12}}
\]

Proposition 1: \( \theta_1 \) and \( \theta_2 \) can be estimated from the SVAR
\[
\begin{bmatrix}
\Delta y^*_t \\
\Delta y^*_{t-1}
\end{bmatrix} = B \begin{bmatrix}
\Delta y^*_{t-1} \\
\Delta y^*_{t-2}
\end{bmatrix} + C \begin{bmatrix}
\epsilon_{dart} \\
\epsilon_{m}
\end{bmatrix}
\]
where \( \epsilon_t \) is a weighted average of demand shocks. In particular,
\[
d_b = c_{11} - \frac{c_{11} c_{21}}{c_{22}} \\
d_1 = b_{11} - \frac{b_{12} c_{21}}{c_{22}}
\]
And \( \epsilon_{dart} \) can be calculated using forecast errors and \( C \).

To estimate \( C \), we use SVAR-IV as in Stock and Watson (2008) using Fernald (2007)’s TFP as an instrument variable for the baseline. We get a series for \( \mu_t^* \) assuming log utility and unit Frisch elasticity in line with Galí, Gertler, Lopez-Salido (2007).

A general picture
NK models are RBC models with an endogenous labor wedge \( \tau = n \mu - n \mu_n \). Note that \( \tau = (n \mu - n \mu_n) + (n \mu_n - n \mu_n) = \mu^p_t + \mu^w_t \) where \( \mu^p_t \) is price markup and \( \mu^w_t \) is wage markup.

\( \tau \) fluctuates over business cycles due to wage or price rigidities. It summarizes the propagation mechanism related to nominal rigidities.

Potential GDP and output gap
The estimated potential GDP and output gap (1950Q1-2019Q4) are given in the figure below.

Output Hysteresis
Output hysteresis hypothesis claims that demand shocks can have long lasting impacts on GDP. In other words, TFP and potential GDP can react to demand shocks. We provide new evidence supporting this view using our estimates.

Using local projection methods as in Jordà (2005),
\[
\log (Y^*_t) = \beta \epsilon_t + \text{Controls} + u_{i,t} \quad j \geq 0
\]
where \( \beta \) measures the impact of shock after \( j \) quarters in percentage points.

This indicates that demand shocks affect not only \( Y \) but also \( Y^* \) with a lag.

Conclusion
We provide a simple method to compute potential GDP. We show that
(i) Estimated potential GDP series are highly correlated with CBO’s but display important deviation during and after the Great Recession
(ii) Evidence indicating that demand shocks affect potential GDP