The impact of public investment on output and public finances

Annabelle Mourougane,
Jarmila Botev, Jean-Marc Fournier,
Nigel Pain and Elena Rusticelli

Economic Outlook special chapter
Tools and analysis

There is fiscal space and it has risen

ECO WKP 1352

Fournier and Fall (2015)
Debt limit: a model with fiscal and market reactions to rising debt

Bi and Leeper (2013) debt limit: a stochastic model with a Laffer curve and projected public expenditure

Blanchard et al. (1990) Tax gap between current and sustainable tax rate with projected public expenditure

The composition of public finance can be improved

ECO WKP 1344

GDP effect: Convergence equation (Barro , 2015) with public spending mix

Decreasing marginal returns on public investment (ECO WKP 1347)

Inequality effect: Causa et al. (ECO WKP 1342) with public spending mix

Tax and growth (forthcoming)

The effect of a fiscal initiative on growth and public debt

ECO WKP 1351

Fiscal maquette with labour-market hysteresis and trade linkages

Fall and Fournier (ECO WKP 1230) Stochastic model augmented by public investment

NiGEM model with trade, financial flows, forward-looking expectations…

Roadmap

- Brief overview of the models

- Simulations : the impact of an increase in public investment on growth (and public finances)

Overview of the models

Models

Fall and Fournier:

- Long-term stochastic models
- Models for 23 OECD economies
- The efficiency of investment is a decreasing function of the initial capital stock level

Fiscal Maquette/ Yoda

- Semi-structural models for the G7 (and large EMEs) economies
- Labour-market hysteresis is explicitly modelled
- Some international spillovers

NiGEM :

- Fully-fledged macroeconomic model with comprehensive trade linkages
- Several policy options for monetary and fiscal policy
- Rational expectations

Yoda: Main equations of the model

Models

Growth equation

$$\Delta y_t = \Delta y_t^* + a_{y,gap} gap_{t-1} + a_{y,r} r_t - \lambda \overline{pb}_t + \text{spillovers} + \varepsilon_{y,t}$$

Phillips curve

$$\pi_t = a_{\pi,\pi} \pi_{t-1} + (1 - a_{\pi,\pi}) \pi_t^T + a_{\pi,gap} * gap_t + \varepsilon_{\pi,t}$$

Taylor rule

$$i_t = \text{Max}(\theta_1 i_{t-1} + (1 - \theta_1) * (i^* + \sigma_1 (\pi_t - \pi_t^T) + \sigma_2 * gap_t), \vec{\imath})$$

Public debt dynamics

$$\Delta d_t = \frac{(r_t - \Delta y_t)}{(1 + \Delta y_t)} d_{t-1} - pb_t$$

Yoda: two specificities

Models

Potential output – introduction of hysteresis

$$\Delta y_t^* = \Delta y_{t-1}^* - \mu * \frac{1}{\delta} \text{Min}\,(\text{gap}_{t-1}, 0) + \delta * (y_{t-1}^* - y_{ss}^* - \alpha ig) + \varepsilon_{y^*,t}$$

Kapadia (2005)

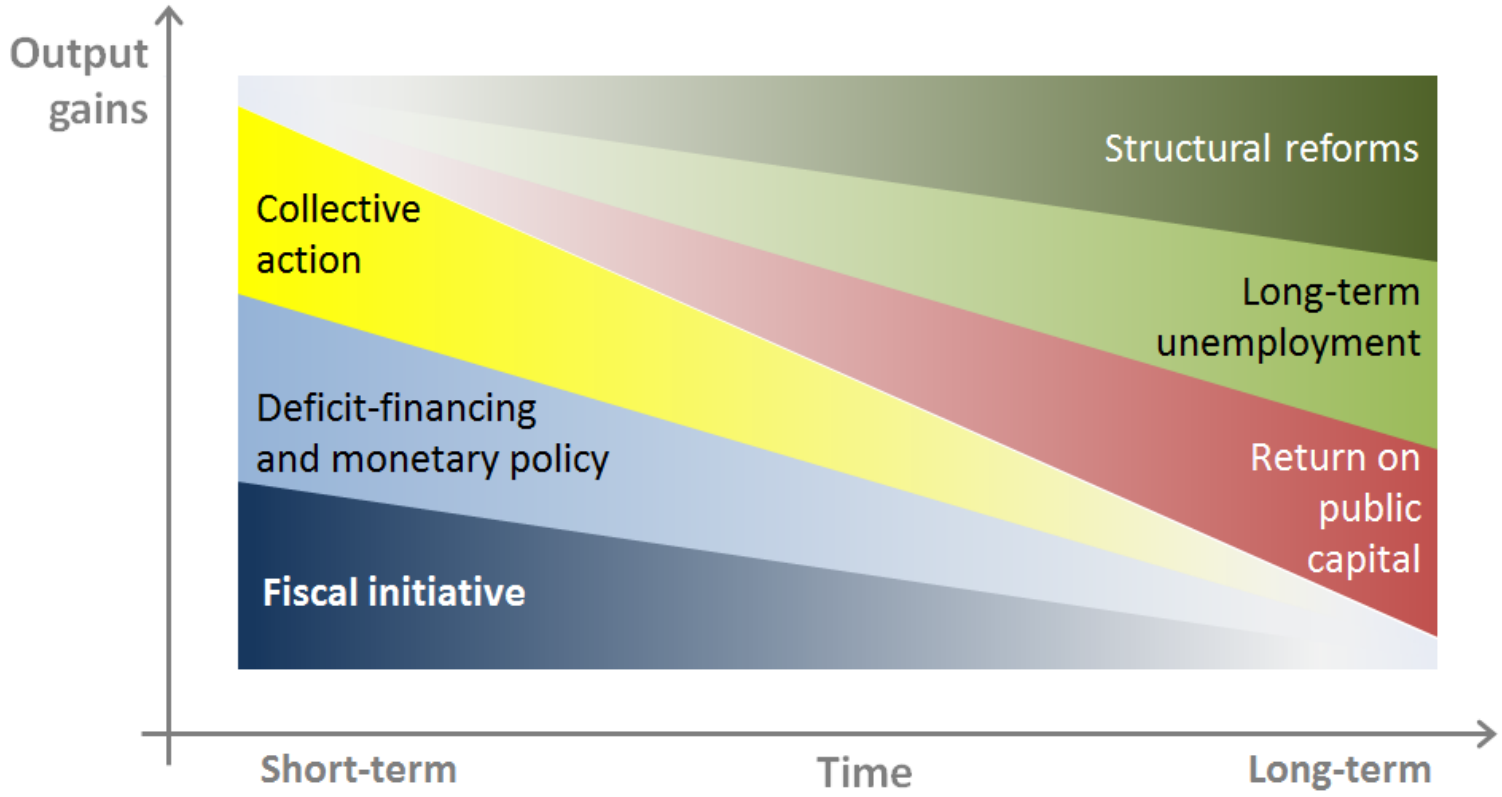
Long-term interest rate – introduction of fiscal risk

$$irl_t = i_t + \text{term}_t + \text{risk}_\text{f} + \varepsilon_{i,t}$$

$$\text{risk}_\text{f} = \varphi d_{t-1}$$

Factors influencing an public investment

Simulation



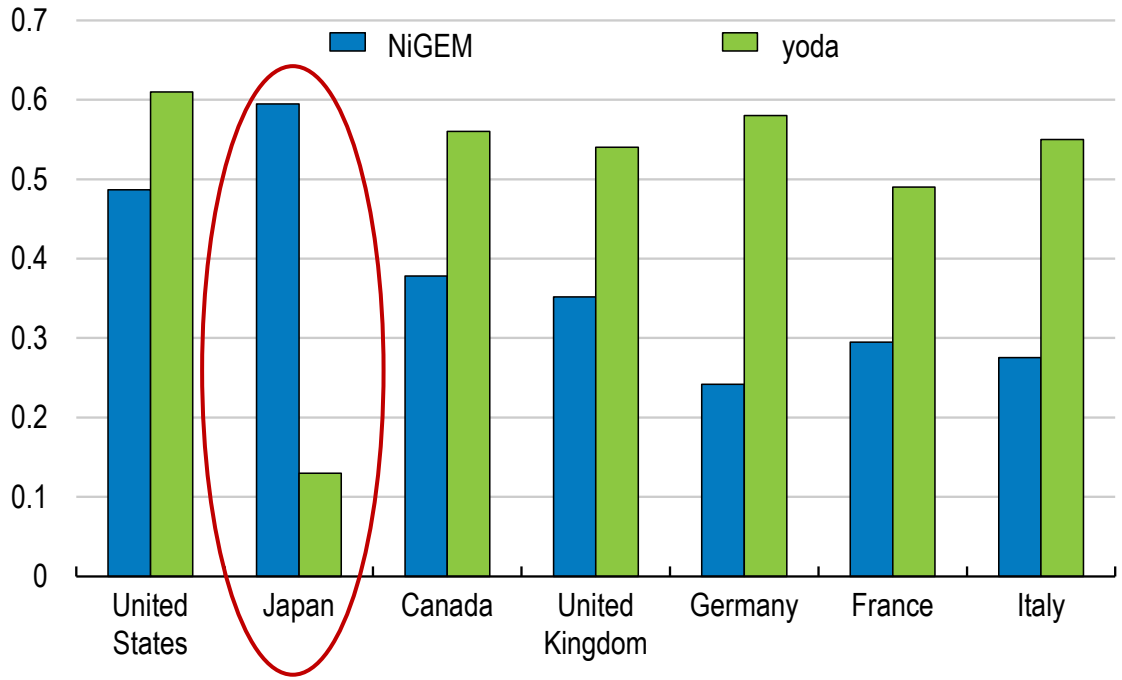
Note: The figure is illustrative and the relative gains of individual factors and the timing of their gains are not drawn to scale.

Short-term output gains

Simulation

Output gains following a 0.5% of GDP investment increase

Difference to baseline after one year, per cent



Note: The increase in public investment is deficit financed for a few years and subsequently budget neutral in all countries but Japan. It is budget neutral over the whole simulation period for Japan.

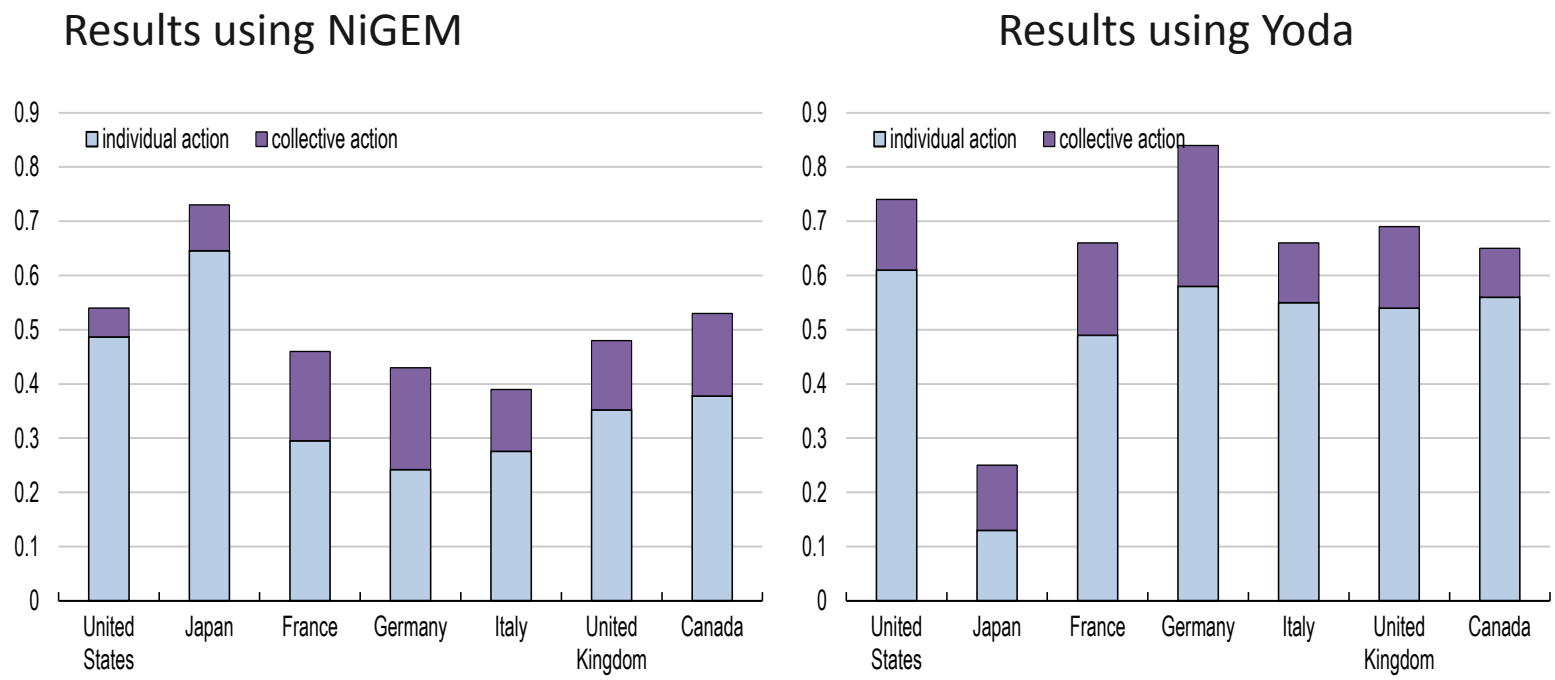
Source: OECD calculations using the Yoda and NiGEM models.

Collective action raises short-term output gains

Simulation

Output gains of a 0.5% of GDP investment increase

Difference to baseline after one year, per cent



Note: Collective action means simultaneous fiscal initiative in all G7 countries in Yoda and in the whole OECD in NiGEM.

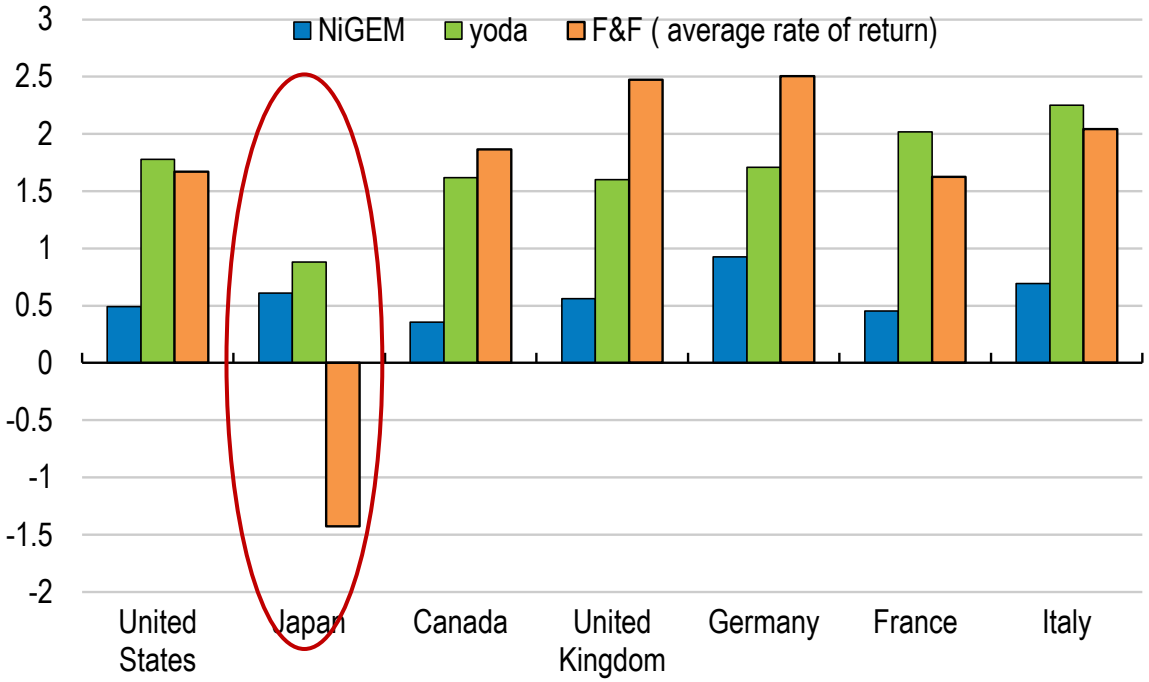
Source: OECD calculations using the FM and NiGEM models.

Long-term output gains

Simulation

Output gains of a 0.5% of GDP public investment increase

Difference to baseline in the long term, per cent



Note: Yoda and F&F assume budget neutrality is achieved by increasing non-distortionary taxes, while it is achieved through an increase in labour taxes in NiGEM. The increase in public investment is deficit financed for a few years and subsequently budget neutral in all countries but Japan. It is budget neutral over the whole simulation period for Japan.

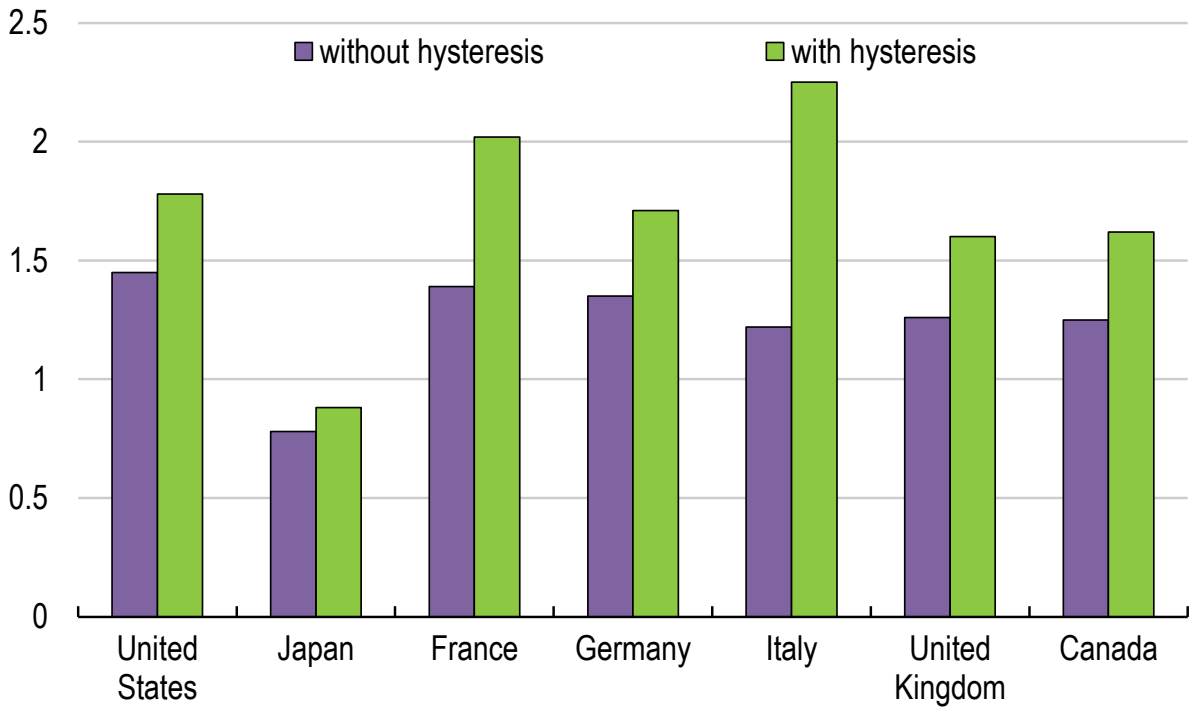
Source: OECD calculations using F&F, NiGEM and Yoda models.

High long-term unemployment enhances the impact of a public investment increase

Simulation

Long-term output gains of a 0.5% of GDP investment increase

Difference to baseline, per cent

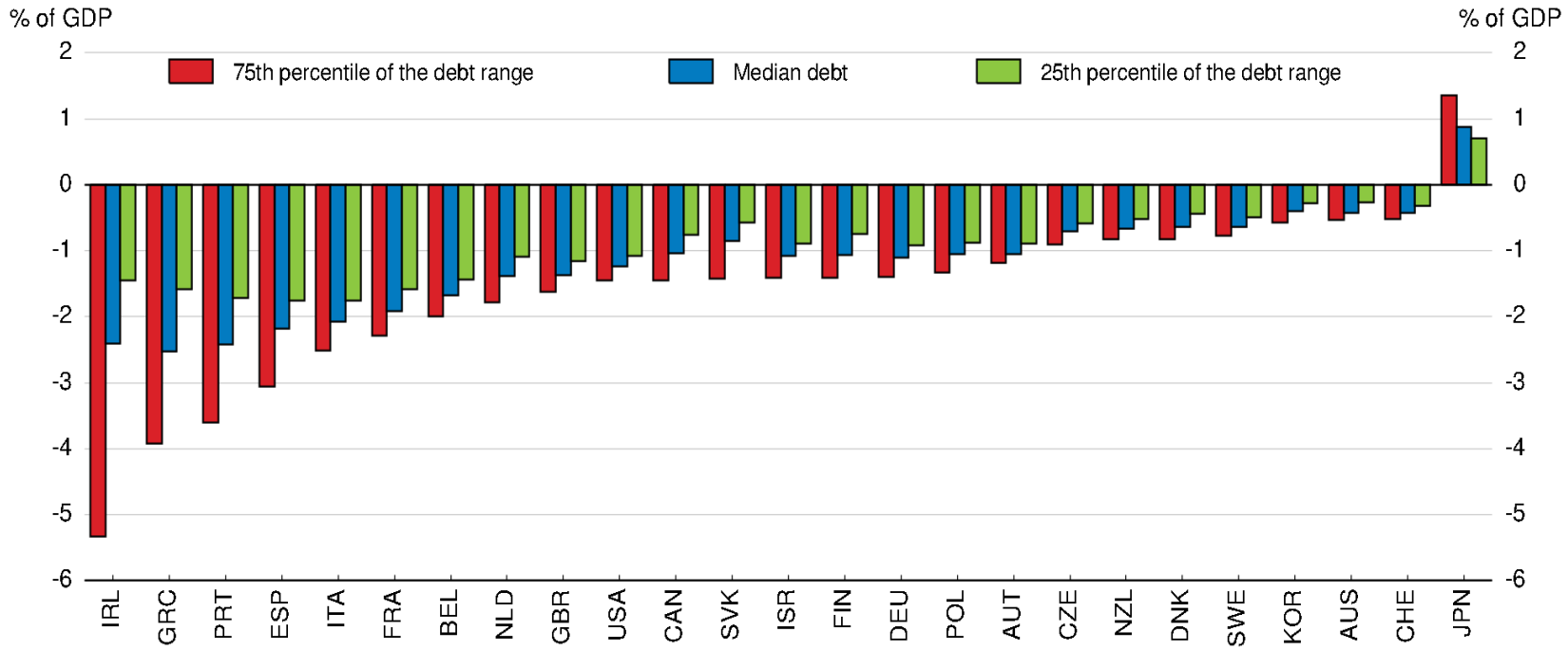


Source: OECD calculations using Yoda.

Complementary structural reforms reduce uncertainties around public debt

Simulation

Reduction of debt in 2040, relative to a no-change scenario



Note : Uncertainty is reduced when the 75th percentile goes down more than the 25th percentile

Source: OECD calculations using the F&F model.

Further information

Mourougane, A., J. Botev, J.-M. Fournier, N. Pain and E. Rusticelli (2016), "Can an increase in public investment sustainably lift economic growth?", *OECD Economics Department Working Papers*, No. 1351, OECD Publishing, Paris.

www.oecd.org/eco/using-fiscal-levers-to-escape-the-low-growth-trap.htm