Policy Interdependence in a Unifying Framework for a Monetary and Fiscal Union

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Fletcher School: Greece and the Euro
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1 Motivation

2 National policy options
   - Sovereign Entities of Different Sizes
   - Multipliers and Spillovers

3 Model, at last!
   - Model Specifics
   - Currency Union
   - Currency and Fiscal Union

4 Summary
Evolution of GDP in EZ crisis countries, Comparison with Finland, 1990-1996, and USA, 1929-1938

Greece: singularly weak performance, due to many factors, unique isolation. Geography, and economic complexity?
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Summary

Does the EU pay off? Does the EZ pay off?

- Whereas for the UK EU membership is a divisive question, that is not generally so. Consider this:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Germany</td>
<td>+ 23,116 euro</td>
<td>+ 1,893 billion euro</td>
</tr>
<tr>
<td>Netherlands</td>
<td>+ 21,003 euro</td>
<td>+ 346 billion euro</td>
</tr>
<tr>
<td>Greece</td>
<td>+ 190 euro</td>
<td>+ 2 billion euro</td>
</tr>
<tr>
<td>Spain</td>
<td>− 5,031 euro</td>
<td>− 224 billion euro</td>
</tr>
<tr>
<td>Belgium</td>
<td>− 6,370 euro</td>
<td>− 69 billion euro</td>
</tr>
<tr>
<td>Portugal</td>
<td>− 40,604 euro</td>
<td>− 424 billion euro</td>
</tr>
<tr>
<td>France</td>
<td>− 55,996 euro</td>
<td>− 3,591 billion euro</td>
</tr>
<tr>
<td>Italy</td>
<td>− 73,605 euro</td>
<td>− 4,325 billion euro</td>
</tr>
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20 years since its introduction and the euro remains controversial. cep has used the synthetic control method to analyse which countries have gained from the euro and which ones have lost out.
What is wrong with such a calculation?

Gasparotti and Matthias. “20 Years of the Euro: Winners and Losers.” CEP February 2019

- “Synthetic method involves matching countries with “control group:”
  Greece: Bahrain, Israel, Barbados, New Zealand, Gabon, Singapore

- Obviously, a Straw Man. To see impact one must account
  - for interconnectedness via trade and financial flows
  - for institutional underpinnings of joint policy determination
National policy options

1. Structural reforms improving productivity and external competitiveness

2. Fiscal policy

3. Countries interconnected through trade and common currency pose special policy questions:
   National fiscal policy generates cross-country spillovers

   1. monetary policy interconnectedness:
      Sensitivity of aggregate policy objective to country size determines attractiveness to currency union

   2. fiscal policy interconnectedness
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**Size heterogeneity**


2. European Commission represents states: *c.f.* US Senate

3. Qualified majority rules sensitive to relative populations, to account for size, heeding the criticism of democratic deficit
Fiscal multipliers and spillovers across countries vary and hard to estimate.  
But: 1% increase in German government spending: impact ranges from 0.05% increase in Greek GDP to 0.4% in Belgian GDP.

A somewhat overlooked aspect of interdependence: benefit to a country from another country’s fiscal policy looks like free lunch, to the recipient, but may cost the “source” economy.

This has not been as well researched, but the attractiveness of macro policy coordination during the Great Recession and during the Euro Zone sovereign debt crisis renewed interest.

Let’s take a look at the numbers, or rather pictures.
Fiscal multipliers and spillovers across countries vary and are hard to estimate. But: 1% increase in German government spending: impact ranges from 0.05% increase in Greek GDP to 0.4% in Belgian GDP. A somewhat overlooked aspect of interdependence: benefit to a country from another country’s fiscal policy looks like free lunch, to the recipient, but may cost the “source” economy.

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Domestic Fiscal Multipliers

Figure 1. Openness to Trade and Fiscal Multipliers

Note: Trade openness is defined as the sum of a country's exports and imports over GDP. Domestic fiscal multipliers correspond to the ones reported along the main diagonal of Table 1 above. The diameter of each bubble is proportional to the size of a country's GDP.

More trade openness associated with lower domestic multiplier. EU trade openness = .19! Thus Paul Krugman's argument in favor of EU-wide fiscal policy to fight the Great Recession.
Figure 9. Fiscal Spillovers from Germany Across Sub-Samples

Note: The figure plots fiscal spillovers from Germany in each of the remaining countries in our sample, across different sub-samples (x-axis). The spillover is calculated in response to a 1 percent increase in government spending in Germany. A marker indicates that the result is statistically significant.

Vary substantially, depend on mutual trade and financial flows.
Evidence from 10 EZ countries

Dabla-Norris et al. (2017)

- Inverse relationship between the size of domestic fiscal multipliers and trade openness.
- Fiscal spillovers are larger:
  - when the source economy is large;
  - among countries that are highly integrated through trade or financial linkages;
  - when the spillover-receiving economy is small and has a narrow export base.
An argument

Blanchard et al. (2016): in conditions of liquidity trap, core fiscal expansion to offset austerity effects in periphery.
Reis (2016) adds: must have a negative relationship between net exports and the real exchange rate. Then:
increasing core spending will increase its real exchange rate, boosting exports and output in the periphery.
German fiscal expansion would have been procyclical.
Crisis countries not in liquidity trap: hints of spending increases would have increased the interest rates.
Uhlig (2016): dismisses these arguments as politically irrelevant. However, fiscal expansion did take place due to refugee crisis.
In absence of federal budget, spillovers must be recognized as a tool.
Germany recognizes benefits from keeping company with countries like Greece; help holding down the exchange rate!
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This paper: different sizes and strategic interactions

- Back to Cassela (1992): Two countries in a currency union: monetary policies operate as strategic substitutes, and the cooperative Nash equilibria require that the smaller of the two countries be given larger, relative to its population, weight in aggregate welfare.

- Extended Casella (1992), allow for a fiscal system [Sibert (1992); Farhi and Werning (2016), Ioannides (2016); (2017)] Model accommodates market reforms and technological progress of the TFP growth type.

- Allow for a fiscal union in the form of international fiscal policy coordination
  Then fiscal policies, assuming currency union, may be strategic substitutes or complements.
Digression on Strategic Aspects of Spillovers

Uncoordinated national macro policy creates spillovers (externalities): each country takes the other country’s policy as given. *Coordinated* policy, by a common central bank or fiscal authority (compact), *recognizes* spillovers.

- Policies are strategic substitutes, if the other country’s policy decreases the marginal effectiveness of your own.
- Policies are strategic complements, if the other country’s policy increases the marginal effectiveness of your own.
- Thus: if policies are strategic substitutes, policy setting by the authority that improves one country harms the other. So, if the relative weights for the two countries are too asymmetrical, the smaller country might find it unattractive to participate. Strategic substitutability a sufficient condition for this.

It is an important feature of EU/EZ policy interdependence.
• If fiscal policies are strategic substitutes, we are back to giving smaller country greater weight in aggregate welfare.

• If they are strategic complements, then the policies are unrestricted.

Define fiscal policy is defined in terms of proportional wage income tax, and efficiency of taxation differs across countries. Condition depends crucially on the elasticity of substitution between different varieties of the private tradeable good in the economy, equal to the elasticity of demand when the number of varieties is large.

When this parameter tends to its upper bound, the economies approach perfect competition, international trade vanishes, opportunity from international cooperation becomes irrelevant.
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Model specifics

- Countries A, B; sizes $2 - \sigma, \sigma$ Policy weights $2 - \gamma, \gamma$.

$$U_j = (1 - g) \ln \left( \sum_{i=1}^{n} c_{ij}^{\theta} \right)^{1/\theta} + g \ln \Gamma_j, \quad j = A, B, \ 0 < \theta < 1,$$

Composite good, tradeable varieties, IRS using labor. Terms of trade do not depend on size, benefits from trade do. Benefits from from common monetary policy?

- if cross-country spillovers are strategic complements, all cooperative equilibria may be Pareto-superior to the Nash, the outcome of uncoordinated actions.

- if cross-country spillovers are strategic substitutes, cooperative equilibria would be Pareto-superior to the Nash equilibrium, the outcome of uncoordinated actions, only if smaller country is given more than proportional power.
Model: Currency Union

- Currency union involves transfer of seignorage: population weights, $2 - \sigma, \sigma$, vs policy weights $2 - \gamma, \gamma$.

$$\max_{m_A, m_B} : (2 - \gamma) U_A(m_A, m_B) + \gamma U_B(m_A, m_B)$$

subject to: free trade, international monetary equilibrium with fixed exchange rate, public good financed by seignorage.

- Optimal monetary policy:

$$m_A = \min \left\{ 2 - \sigma, (2 - \gamma) \frac{g^\theta}{1 - g + g^\theta} \right\}, \quad m_B = \min \left\{ \sigma, \gamma \frac{g^\theta}{1 - g + g^\theta} \right\}.$$

- See Fig. 3A: $\frac{\gamma}{2} \left( \frac{\sigma}{2} \right)$ minimum weight in monetary union, as function of size.

- With national currencies, per capita public good greater in B. If $\gamma = \sigma$, public good per capita equalized, country suffers more the cost of coordination.
Model: Currency Union with National Fiscal Systems

• Public good financed from national tax and seignorage:
  \[ \Gamma_j = m_j + (2 - \sigma)\kappa_j\tau_j, j = A, B. \]

• Governments \( j \) sets, given monetary policy,
  \[ \tau_J = \arg\max : U_j(m_A, \tau_A; m_B, \tau_B) \]

• Central bank, taking national fiscal policies as given, sets:
  \[ \max_{m_A, m_B} : (2 - \gamma)U_A(m_A, m_B) + \gamma U_B(m_A, m_B). \]

• Optimal monetary policy satisfies:
  \[ \Gamma_A = m_A + (2 - \sigma)\kappa_A\tau_A = \min \left\{ 2 - \sigma, (2 - \gamma)\frac{g\theta}{1 - g + g\theta} \right\}, \]
  \[ \Gamma_B = m_B + \sigma\kappa_B\tau_B = \min \left\{ \sigma, \gamma\frac{g\theta}{1 - g + g\theta} \right\}. \]

• Optimal national fiscal policies

- Public good financed from national tax and seigniorage:
  \[ \Gamma_j = m_j + (2 - \sigma)\kappa_J\tau_j, \ j = A, B. \]

- Governments \( j \) sets, given monetary policy,
  \[ \tau_J = \operatorname{argmax} : U_j(m_A, \tau_A; m_B, \tau_B) \]

- Optimal national fiscal policies, taking monetary policy as given:
  \[
  \frac{1}{2 - \sigma} \frac{1}{1 - \tau_A} - \frac{1}{2 - (2 - \sigma)\tau_A - \sigma\tau_B} = \frac{\kappa_A(1 - g + g\theta)}{(1 - g)\theta} \left[ \frac{1}{2 - \gamma} - \frac{1}{2} \right]; \\
  \frac{1}{\sigma} \frac{1}{1 - \tau_B} - \frac{1}{2 - (2 - \sigma)\tau_A - \sigma\tau_B} = \frac{\kappa_B(1 - g + g\theta)}{(1 - g)\theta} \left[ \frac{1}{\gamma} - \frac{1}{2} \right].
  \]

  Can establish properties of optimum national tax rates at Nash equilibrium.

- Interactions between monetary policy and national fiscal policies
- Can define union-wide fiscal policy as fiscal policy coordination.
Model: Currency Union with Fiscal Union as Fiscal Policy Coordination

Let \((2 - \varpi, \varpi)\) fiscal policy weights:

\[
\frac{2 - \varpi}{2 - \sigma} \frac{1}{1 - \tau_A} - \frac{2}{2 - (2 - \sigma)\tau_A - \sigma\tau_B} = \frac{\kappa_A(1 - g + g\theta)}{(1 - g)\theta} \left[ \frac{2 - \varpi}{2 - \gamma} - 1 \right];
\]

\[
\varpi \frac{1}{\sigma} \frac{1}{1 - \tau_B} - \frac{2}{2 - (2 - \sigma)\tau_A - \sigma\tau_B} = \frac{\kappa_B(1 - g + g\theta)}{(1 - g)\theta} \left[ \frac{\varpi}{\gamma} - 1 \right].
\]

Condition, if positive: strategic complements; if negative: strategic substitutes:

\[
(2 - \sigma)\sigma(1 - g) \left[ -\frac{1}{\theta} \frac{(2 - \sigma)\kappa_A\sigma\kappa_B(1 - g + g\theta)^2}{4(1 - g)^2} + \frac{1}{(2 - (2 - \sigma)\tau_A - \sigma\tau_B)^2} \right] \geq (<) 0.
\]
Model cont’d

- Allow for debt finance: Provision of the public good:

\[
\Gamma_A = \ell \Gamma_A = m_A + (2 - \sigma)[\kappa_A \tau_A + \delta_A d_A - \rho_A D_A,-1];
\]

\[
\Gamma_B = \ell \Gamma_B = m_B + \sigma[\kappa_B \tau_B + \delta_B d_B - \rho D_B,-1].
\]

Tax revenue and borrowing enter as substitutes. Strategic considerations hold.

- Allow for structural reforms:
  - Market reforms: remove arbitrary restrictions on the number of varieties, let free entry: level effect on welfare
  - Model growth in TFP via improvements in fixed and variable costs of production: growth effect on welfare
  Catastrophic failure of current account unless move in tandem.
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Catastrophic failure of current account unless move in tandem.
Summary

• In absence of federal budget, spillovers must be recognized as a tool.
• They are not well understood, even across US states, and in presence of a federal fiscal system.
• If recognized, they must heed the size argument: more influence to a smaller country.
References

Ioannides, Yannis M. 2016.
Ioannides, Yannis M. 2017.