Renewable electricity support and market integration

by

Thomas Tangerås

Research Institute of Industrial Economics (IFN)

37th IAEE International Conference
June 15-18, 2014
1. Introduction

- Two cornerstones of EU energy policy are
  1. Create a well-functioning European internal market for electricity
  2. Transform the EU into a “green” economy based upon a reliable and environmentally sustainable supply of energy

- These objectives cannot be viewed separately from one another
  1. The EU has imposed binding national targets for the renewable share of total energy consumption
  2. Electricity makes up a significant share of final energy consumption
  3. The member states have thus implemented policies to promote the production of electricity from renewable energy sources, RES-E
  4. RES-E mechanisms are main drivers of investment in new generation
  5. Electricity price changes affect the profitability of investing in cross-border transmission capacity
  6. Cross-border interconnection capacity determines the degree of market integration
2. Contribution

- I construct a theoretical model of a multinational electricity market with endogenous transmission capacity and
  - derive a number of new empirical predictions, welfare results and policy implications concerning market integration in particular
  - consider national policy makers’ incentives for introducing RES-E policies
- The current literature either
  - assumes perfect integration by ignoring transmission bottlenecks (e.g. Amundsen and Mortensen, 2001; Fischer and Newell, 2008; Böhringer and Rosendahl, 2010; Amundsen and Bergman, 2012)
  - or treats bottlenecks as exogenous (e.g. Traber and Kemfert, 2009)
  - ignores the incentives of national policy makers
  - or treats national policy makers as “price takers” (e.g. Ogawa and Wildasin, 2009)
3. The objectives of increased RES-E production and market integration are mutually inconsistent

- Governments can choose between a host of instruments to promote investments in renewable electricity
- This menu of instruments leaves room for national policy makers to pursue additional objectives unrelated to RES-E production
- National policy makers can increase surplus
  - in an electricity importing country by introducing certificates or feed-in-tariffs which serve to reduce the import price of electricity
  - in an electricity exporting country by a production tax on non-renewable electricity production which serves to increase the export price of electricity
- A unilateral pursuit of such domestic RES-E policies decreases cross-border price differences, with negative consequences for congestion rent, transmission investment and thereby market integration
4. RES-E policy adoption among EU member states

- One might expect electricity importing countries to have been keener on renewable portfolio standards and feed-in-tariffs than electricity exporting countries and therefore introduced them at an earlier stage.

<table>
<thead>
<tr>
<th></th>
<th>Import</th>
<th>Balanced</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early adopters</td>
<td>GR, IT, LU, PT</td>
<td>AT, DE, DK, ES</td>
<td>FR</td>
</tr>
<tr>
<td>Late adopters</td>
<td>FI, GB, HU, LV, NL, RO, SK</td>
<td>BE, BG, CY, IE, MT, SE</td>
<td>CZ, EE, LT, PL, SI</td>
</tr>
</tbody>
</table>

- Four of the early adopters (Greece, Italy, Luxembourg and Portugal) were net importers of electricity.
- All net exporters except for one (France introduced a RES-E policy in 2001) were late adopters.
5. What are the policy implications?

• Trade policy concerns speak in favour of prohibiting RES-E mechanisms
• Environmental or other externalities sometimes justify RES-E support policies on welfare economic grounds
• Coordinating investments at a centralized level is difficult
  – Requires of the central authority that it knows the distribution of costs and benefits of renewable electricity throughout the economy
  – Political distortions may arise even at the central level
  – Violates subsidiarity principle
5. What are the policy implications?

- A harmonization of and reduction in the number of policy instruments would reduce the risk of distortions under decentralized policy making
  - Suggestion: Create an integrated market for green certificates. Trade in certificates increases efficiency by reallocating renewable investments to their most socially beneficial location
- Harmonization may be incapable of fully eliminating all distortions arising from decentralized policy making
- In this case, subsidies to transmission investment at the central level are one way of increasing market integration and efficiency
6. Energy policy in the EU beyond 2020

- The process of establishing an energy policy beyond 2020 provides an opportunity to reassess current policy and possibly modify it along the lines discussed here.
- A future harmonization perhaps is unavoidable.
- A recent Opinion concluded that national RES-E mechanisms violate the free movement of goods and services.
- If the EU court accepts this Opinion, it could become difficult to uphold national support systems.
- One solution is an EU-wide mechanism which provides equal access to all producers of renewable electricity.
- A properly designed integrated support system would furthermore increase the efficiency of electricity supply in the EU.