Measuring the impacts of EU research funding

Measuring the Impacts of Federal Investments in Research
April 18-19, 2011
Washington D.C.

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Structure

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- About the European Union Framework Programmes

Traditional evaluation methods and their limitations

- Expert panels
- Programme participant surveys
- Interviews

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- Linking other data sources to programme participation
- Ex-ante modelling

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Introduction

About the European Union Framework Programmes

The EU Framework Programmes for Research and Technological Development:

- Are multi-annual programmes in support of European S&T and industrial competitiveness
- Provide funding for:
  - Research projects by trans-national consortia
  - Pan-European research mobility
  - The design of and access to large European research infrastructures
  - The coordination of national research programmes
- Are complementary to national research programmes – based on the rationale of *European Added Value*

Introduction

About the European Union Framework Programmes

- **Since 1984 there have been seven Framework Programmes**
- **The 7th Framework Programme (2007 to 2013):**
  - Has a budget of €50 billion => (7-8% of total government R&D funding in Europe)
  - Centres on 4 main components:
    - Cooperation (Collaborative research, Joint Technology Initiatives)
    - Ideas (European Research Council)
    - People (mobility fellowships)
    - Capacities
  - Funds a broad range of S&T fields (Health, ICT, Energy, Environment, Nanotech,…)

Traditional evaluation methods

- **Expert panels**
  - Opinion on programme success and failure
- **Interviews**
  - Experience and opinions of participants, national policy makers and programme managers
- **Surveys of programme participants**
  - Questionnaire about project outputs, outcomes, impacts etc.

Traditional evaluation methods

Some limitations

- **Panels and interviews**
  - Are valuable, but by their nature can be qualitative and subjective

- **Surveys of programme participants**
  - Provide a necessary and valuable tool, but …
  - Imposes a burden on respondents
  - Partial response rate (unless obligatory)
  - Attribution – can be difficult to unambiguously identify results of funding
  - Possible response bias/ subjectivity
  - Lack of control group

New Approaches
Some examples

- **Linking of different data sources to programme participation**
- **Ex-ante modelling of impacts**

New Approaches

Linking data – Scientific outputs

Search bibliometric databases for articles produced though programme funding:

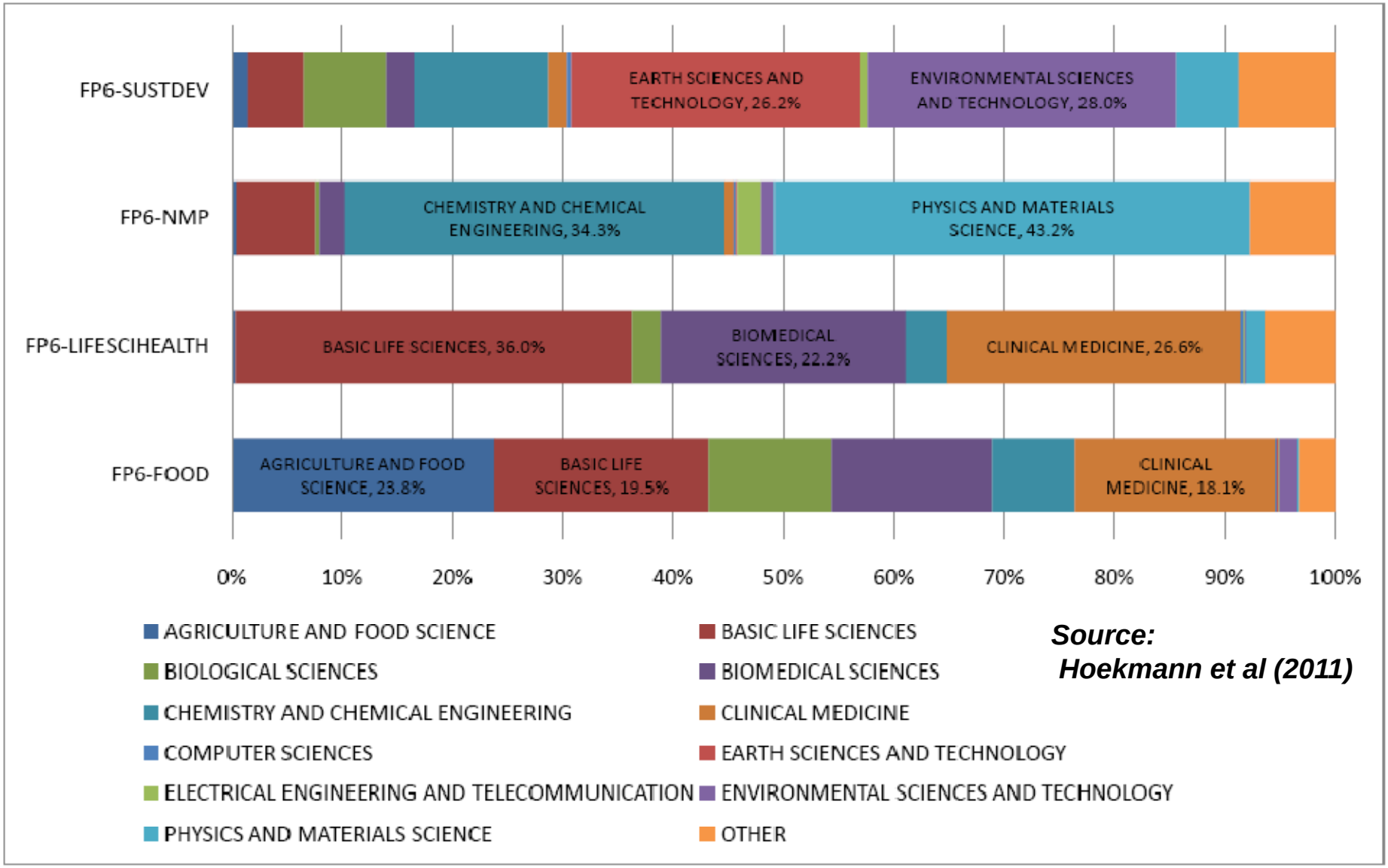
- **One such method used:**
  - Web of Science citation databases can be searched on grant activity and funding acknowledgements (since 2009)
  - Search the funding acknowledgement texts for names and abbreviations related to European institutions, EC RTD policies and EU Framework Programmes
  - Find contract numbers which we can link to specific programmes (biotech, energy, environment..)

- **Possible analyses:**
  - Volume and quality of scientific output of FP projects
  - Publication performance of FP participants compared with global averages
  - Articles produced by programme area

New Approaches

Linking data – Scientific outputs

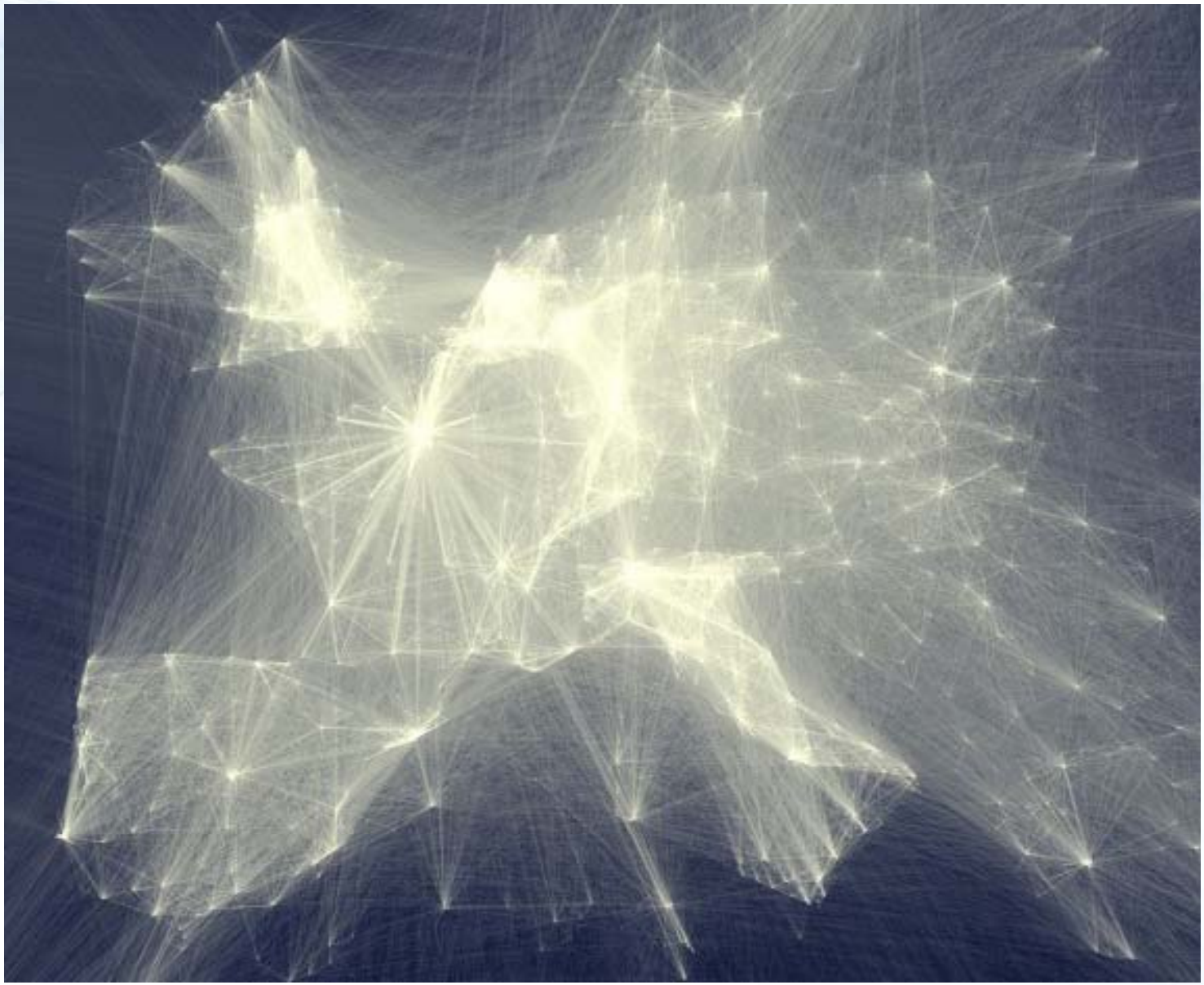
FP publications by scientific field



Source:
Hoekmann et al (2011)

New Approaches

networking



New Approaches

Linking data – Behavioural effects : networking

earch bibliometric databases for co-publications produced though programme funding:

Analyse the links generated between EU regions

Investigate the effects on networking of

- geographical distance
- language
- technological distance
- existing collaboration

Does the programme increase networking between poorly connected regions?

Does prior collaboration increase the chances of obtaining programme funding?

New Approaches

Linking data – innovation impacts

Linking the Community Innovation Survey to FP programme funding :

- CIS Survey of innovative activities covering:
  - 40 000 firms across Europe
  - 30 countries
- Harmonized Questionnaire
- Questions include:
  - R&D and innovation spending
  - New products and processes
  - Patenting
  - Cooperation on innovation
  - Eco-innovation

→ **Includes a question on receipt of FP programme funding**

New Approaches

Linking data – innovation impacts

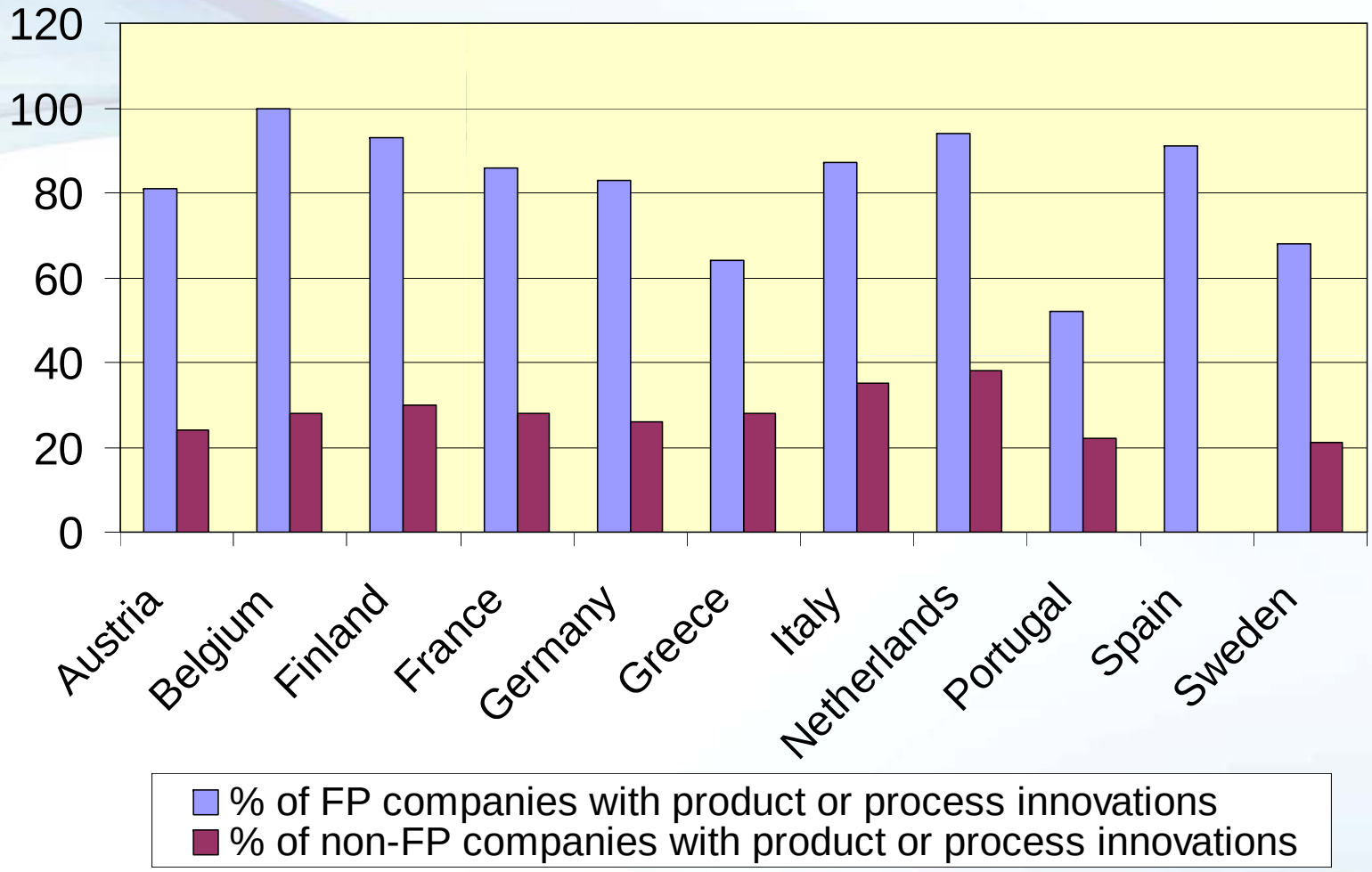
During the three years 2002 to 2004, did your enterprise receive any public financial support for innovation activities from the following levels of government? Include financial support via tax credits or deductions, grants, subsidised loans, and loan guarantees. Exclude research and other innovation activities conducted entirely for the public sector under contract.

	Yes	No
Local or regional authorities	☐	☐
Central government (including central government agencies or ministries)	☐	☐
The European Union (EU)	☐	☐
If yes, did your firm participate in the EU's 5th (1998-2002) or 6th (2003-2006) Framework Programme for Research and Technical Development	☐	☐

New Approaches

Linking data – innovation impacts

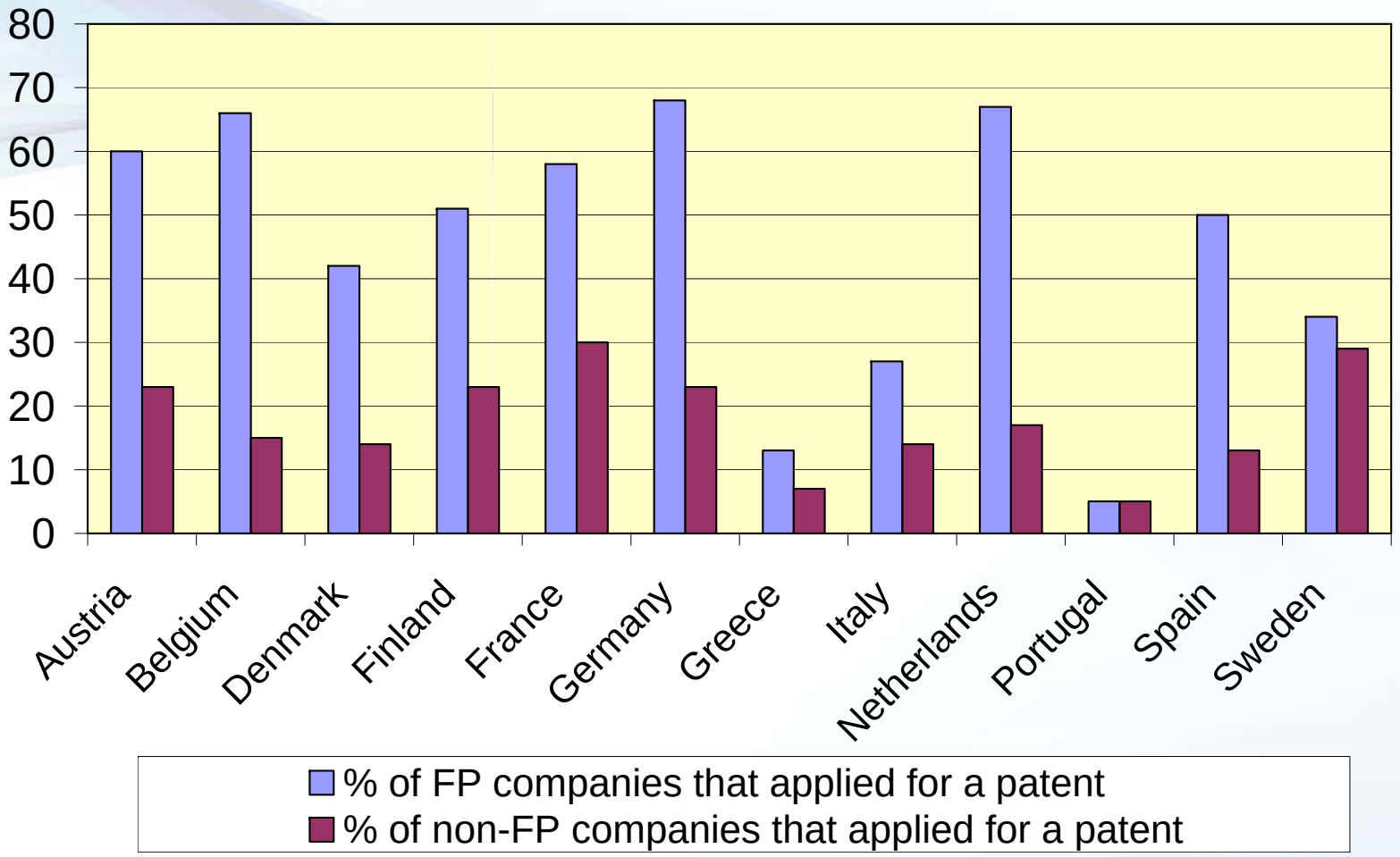
FP participants are more likely to generate product/process innovations



New Approaches

Linking data – innovation impacts

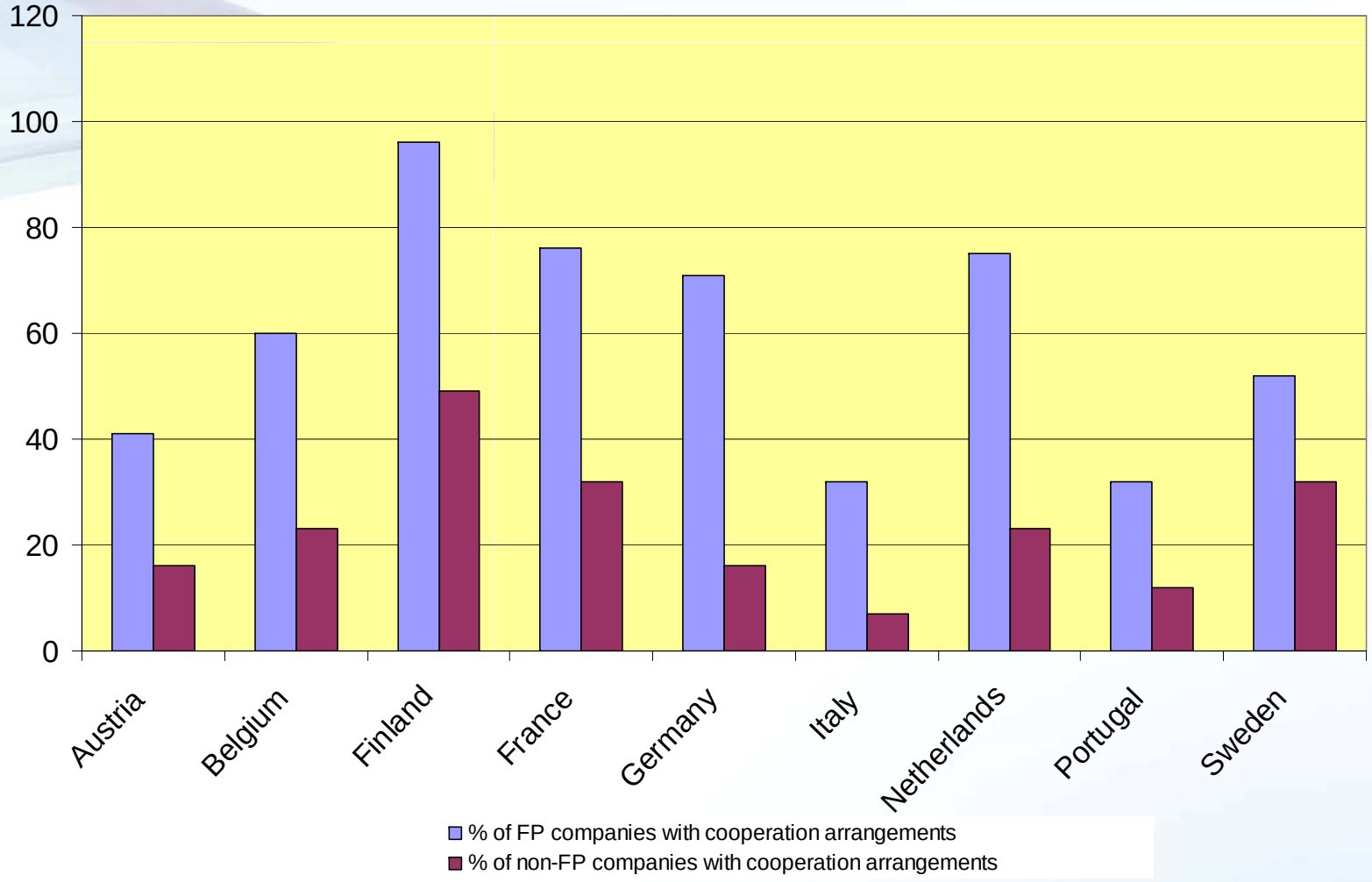
FP participants are more likely to apply for a patent



New Approaches

Linking data – innovation impacts

FP participants are more likely to collaborate



New Approaches
Modelling

Ex-ante modelling of macro-economic effects of future funding scenarios:

- Use of NEMESIS econometric model
  - Assess the macro-economic impact of the FP until 2030 under different scenarios
- Provided results on the impact of the FP on:
  - GDP
  - Extra-European imports and exports
  - Overall and research employment
  - R&D intensity
- Used for the ex-ante impact assessment of the 7th Framework Programme

New Approaches
Modelling

Projected economic impacts of FP7
(by 2030 - as compared to a scenario of business-as-usual growth in FP funding)

Indicators	Discontinuing the FP and no national compensation	Doubling funding under FP7, moderate growth thereafter	Doubling funding under FP7, rapid growth thereafter
Extra GDP (%)	**- 0.84**	**+ 0.45**	**+ 0.96**
Extra GDP when taking account of increases over time in the quality of products (%)	**- 1.31**	**+ 0.69**	**+ 1.66**
Extra employment (#)	**- 840,000**	**+ 418,000**	**+ 925,000**
Extra jobs in research (#)	**-87,000**	**+ 40,000**	**+ 214,000**
Increase in R&D Intensity (% of GDP)	**- 0.089**	**+ 0.059**	**+ 0.228**
Change in exports to outside Europe (%)	**-1.92**	**+0.64**	**+1.57**
Change in imports from outside Europe (%)	**+ 1.43**	**- 0.27**	**- 0.88**

Conclusions

Some promising approaches:

- Linking programme participants with official government statistical surveys
- Linking programme participants with bibliometric databases
- Developing bibliometric measures of behavioural networking effects, which are hard to capture through surveys
- Macro-econometric modelling as an ex-ante tool for estimation of long-term economic impacts

Thank you for your attention