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High-Growth Firms

Based on the chapter on HGF in the Science,
Research and Innovation Competitiveness Report

IRMA Workshop

Brussels, December 2016

Werner Hölzl

- **Main questions:**

- **Macroeconomic level:**

- Did the economic crisis affect the share of HGF across countries?
- Are country-level (development) indicators related to HGF shares?

- **Industry level**

- Is there a relationship between HGF shares and firm demography?
- Are HGF shares related to competitiveness and R&D?

- **Firm level**

- Is there a relationship between Innovation types and Country groupings?
- Is the innovation behaviour of HGF systematically different from non-HGFs that operate in the same country and industry?

- **Broad policy implications**

■ Main questions:

■ Macroeconomic level:

- Did the economic crisis affect the share of HGF across countries? **yes**
- Are country-level (development) indicators related to HGF shares? **yes**

■ Industry level

- Is there a relationship between HGF shares and firm demography? **~**
- Are HGF shares related to competitiveness and R&D? **yes**

■ Firm level

- Is there a relationship between Innovation types and Country groupings? **yes**
- Is the innovation behaviour of HGF systematically different from non-HGFs that operate in the same country and industry? **~**

■ Broad policy implications

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- Entrepreneurship Indicator project dataset
 - **HGF (20%) share**: time series for 10 countries (with gaps) 2007 up to 2012

 - HGF dataset
 - **HGF (10%)**: cross section 2012 for 27 Countries
 - Number of firms calculated from EIP and structural business statistics.

 - HGF definition:
 - Firms with at least 10 employees at t-3 and an annualized growth rate of at least 10% (20%) over 3 years.
 - Shares # HGF/ # firms with at least 10 employees

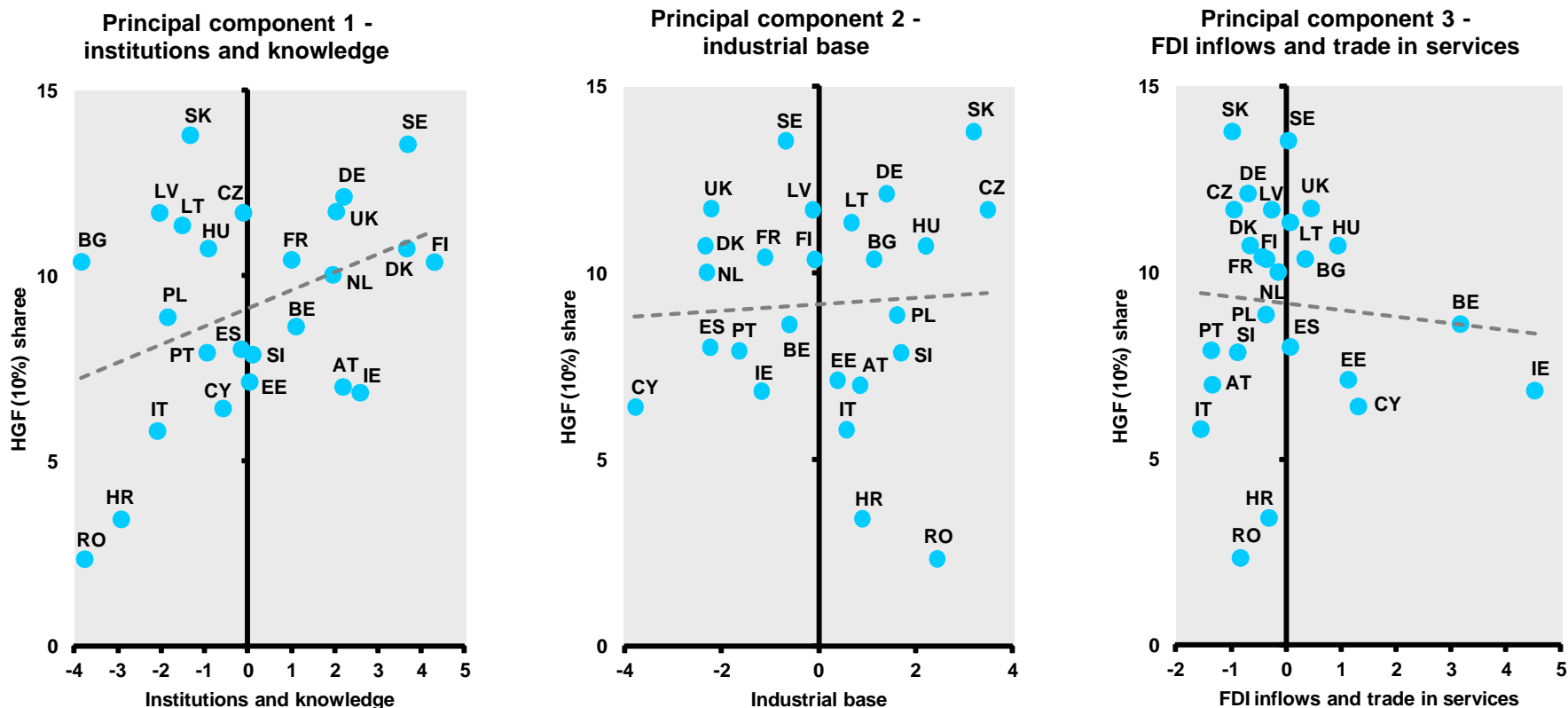
I macroeconomic factors

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- Data for 10 countries
 - **HGF(20%) share** – closely related to the **HGF (10%) share**
 - correlation coefficient .82 (2 digit level) 0.89 (1-digit level)
 - Indicator of economic crisis: **Output gap** in % from potential GDP (AMECO database)
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- **Results:**
 - output gap of -5% reduces the HGF share 0.8 pp (Mean HGF share in the sample: 3.9)
 - **Yes:** HGF shares react to economic downturns
 - In line with results on „growth“ and HGF shares.

- **Macroeconomic indicators of country capabilities are highly correlated with GDP and with each other.**
- **Impossible to draw clear conclusions by relating them with each other**
- **One solution: Principal component analysis to generate new variables that account for the correlation in the original indicators.**

	Principal component		Source
Government effectiveness	PC 1	inst	- Worldwide governance indicator database,
Regulatory quality	PC1	inst	- Worldwide governance indicator database,
Rule of Law	PC1	inst	- Worldwide governance indicator database,
R&D intensity	PC 1	inst	- Eurostat
Researcher intensity (per million people)	PC 1	inst	- Eurostat
Labour force with secondary education	PC 2	ind. base	Eurostat
Labour force with tertiary education	PC 1 PC 3		Eurostat
FDI flows as % of GDP	P 3		World Bank
Manufacturing share (% of GDP)	PC 2	ind. base	Eurostat
Employment in industry (% of total employment)	PC 2	ind. base	Eurostat
Trade in services (% of GDP)	PC 3		Eurostat
Domestic credit to private sector by banks	PC 1 PC 3		World Bank
Stock market capitalization (% of GDP)	PC 1	inst	- World Bank
Complexity of Exports	PC 1	inst	- WIFO calculations (Reinstaller et al. 2012)

HGFs (10%) and principal components of country capabilities



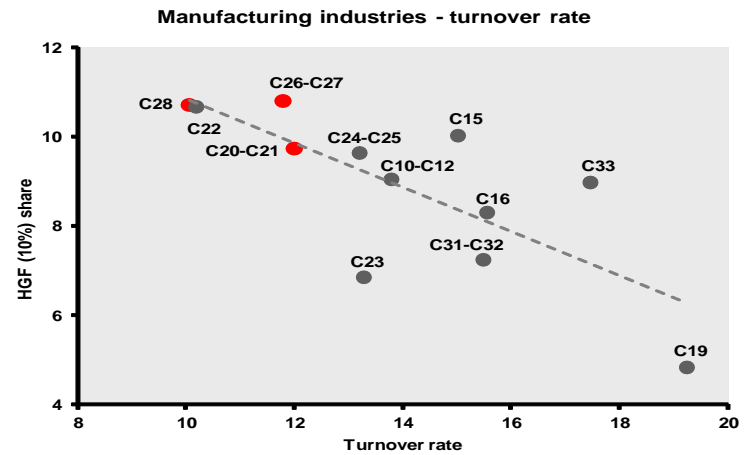
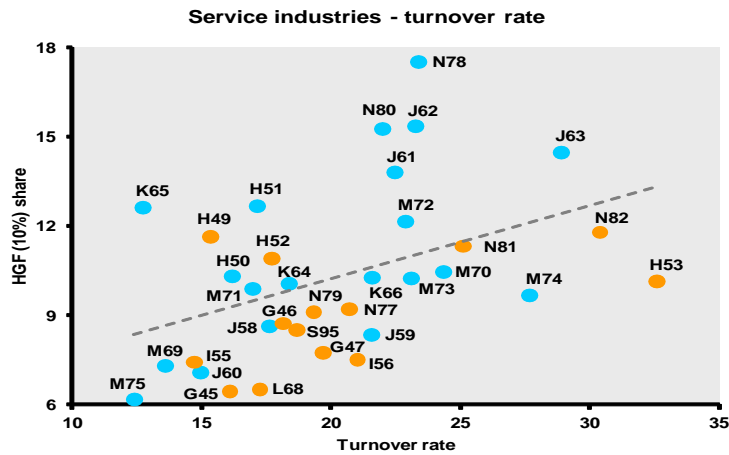
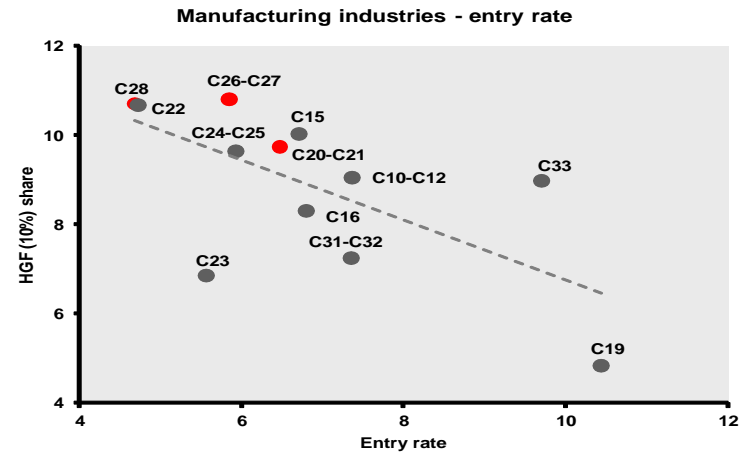
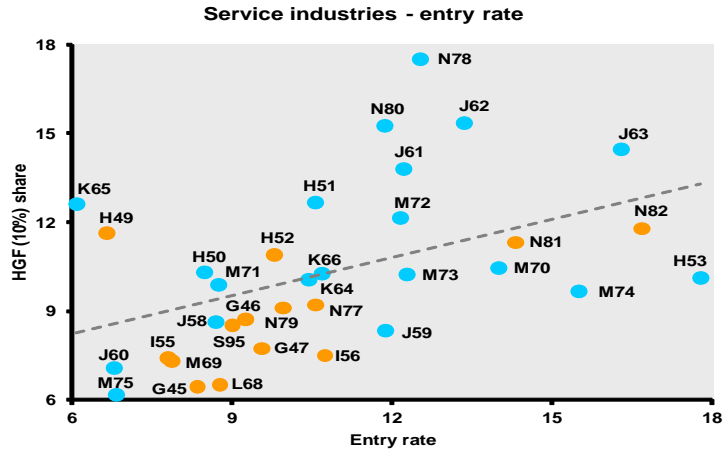
Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research Policies
 Data: Eurostat, World Bank, BACI database; WIFO calculations

Science, Research and Innovation Competitiveness report 2015

Yes, country level indicators relating to institutions and knowledge (competitiveness) are positively related to HGF shares

II industry factors

Is there a relationship between HGF shares and firm demography?



— KIS
 — LKIS
 — High-Tech
 — Low-Tech

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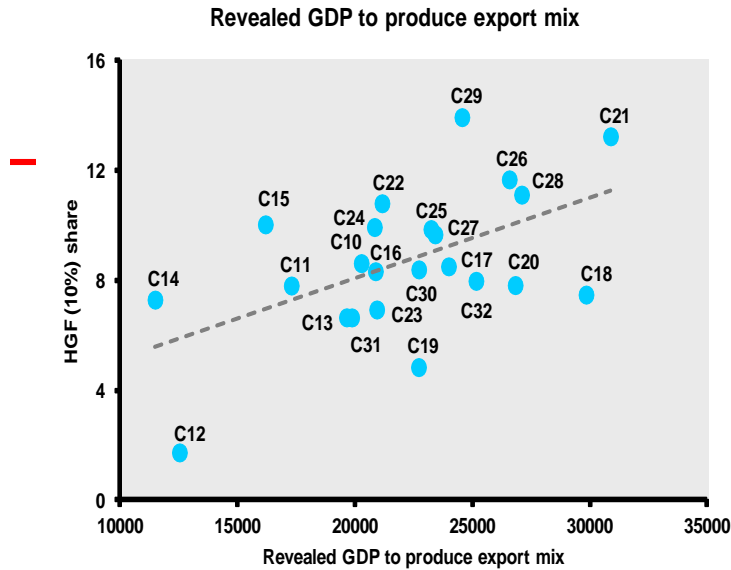
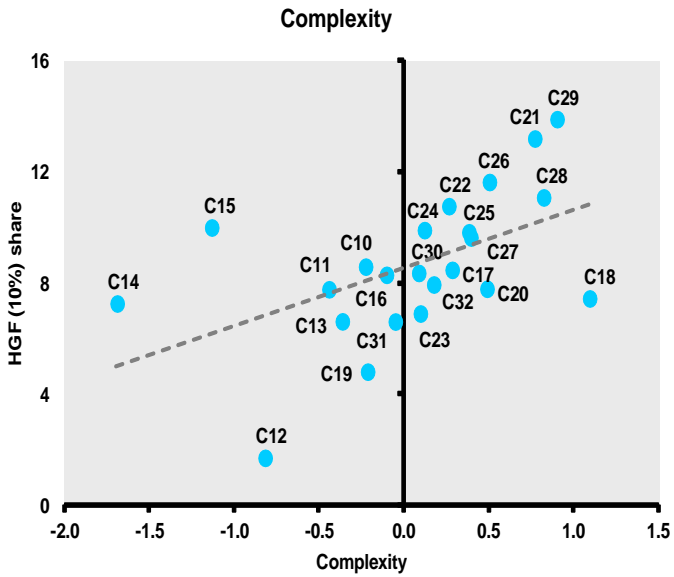
- **Positive relationship HGF share and entry rate in service industries**
- **Negative relationship HGF share and entry rate in manufacturing industries**
- **Sunk costs related to tangible and intangible capital**

- **Basic idea: products exported by a country provide information on international competitiveness**

- **Two indicators:**
 - **Complexity**: indicator based on network theory
 - **Expected productivity of the export basket** – productivity of products is calculated on the basis of the GDP countries exporting these products & then aggregated (Hausmann et al. 2007)

- **Dataset: BACI database (232 countries and 5109 products, 1996-2012, natural resources were excluded, marginal exports set to 0)**

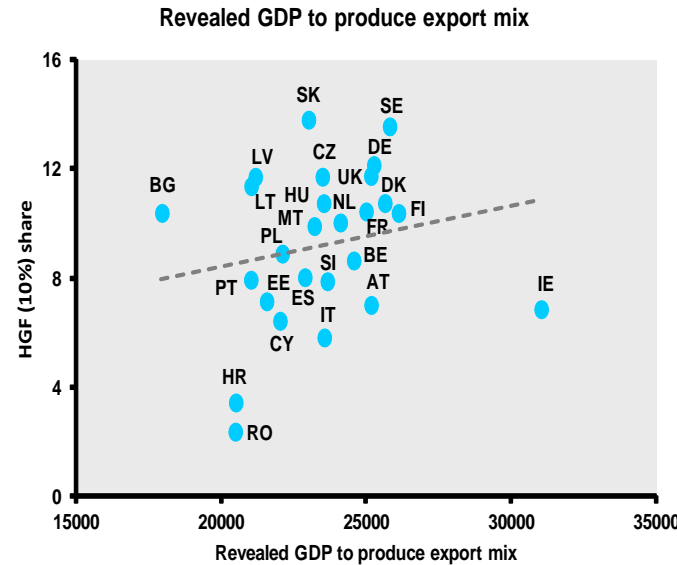
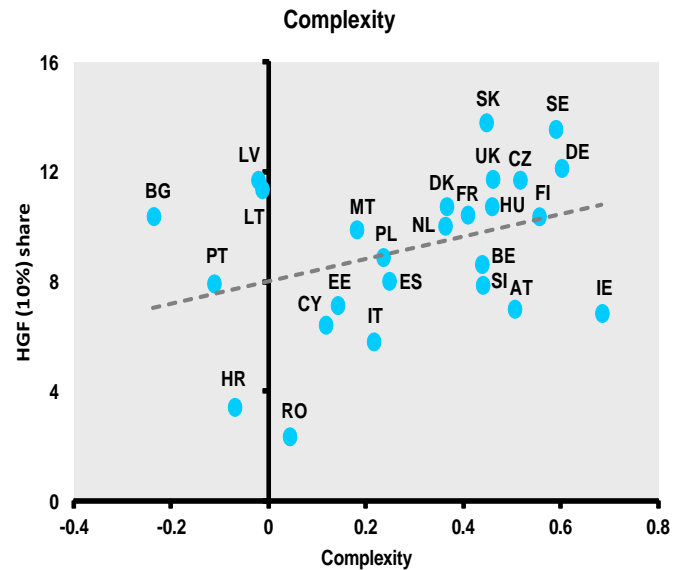
(a) Industries (aggregated across countries)

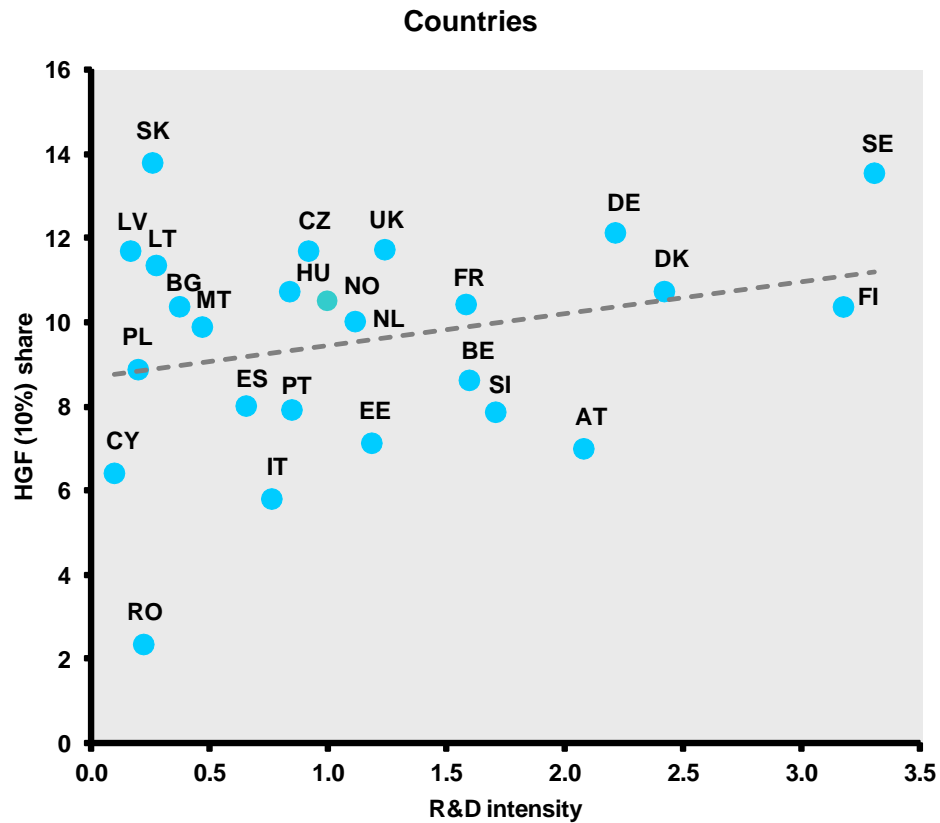
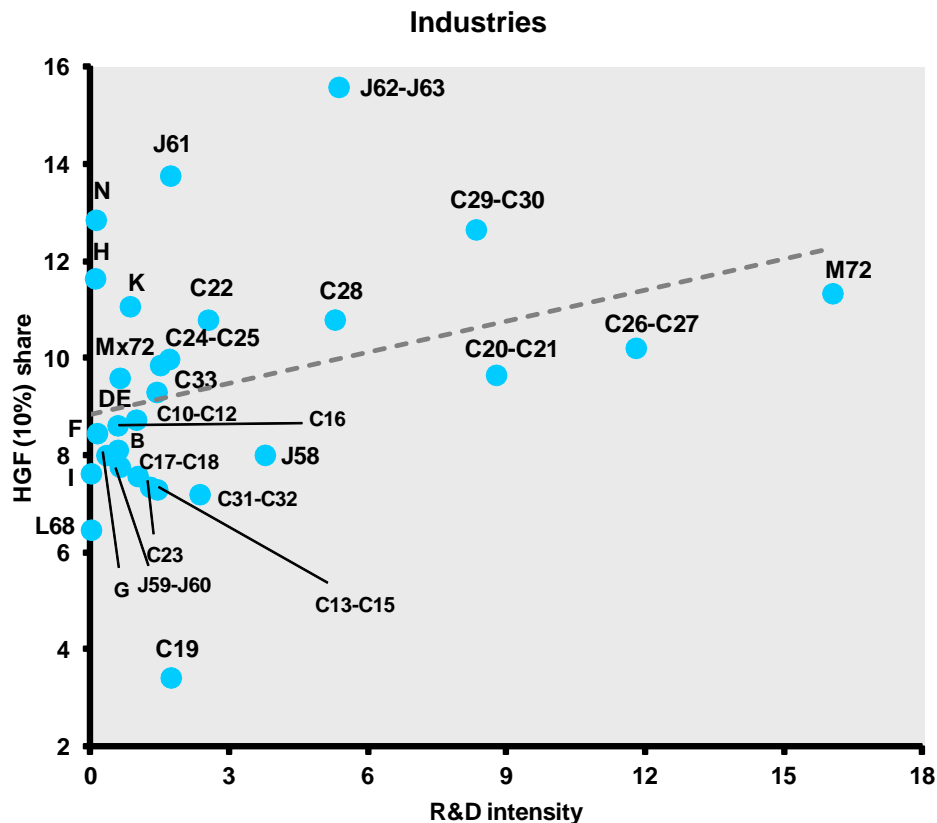


Yes, positive relationship

But impossible to make causal claim (institutions and knowledge matter)

(b) Countries (aggregated across industries)





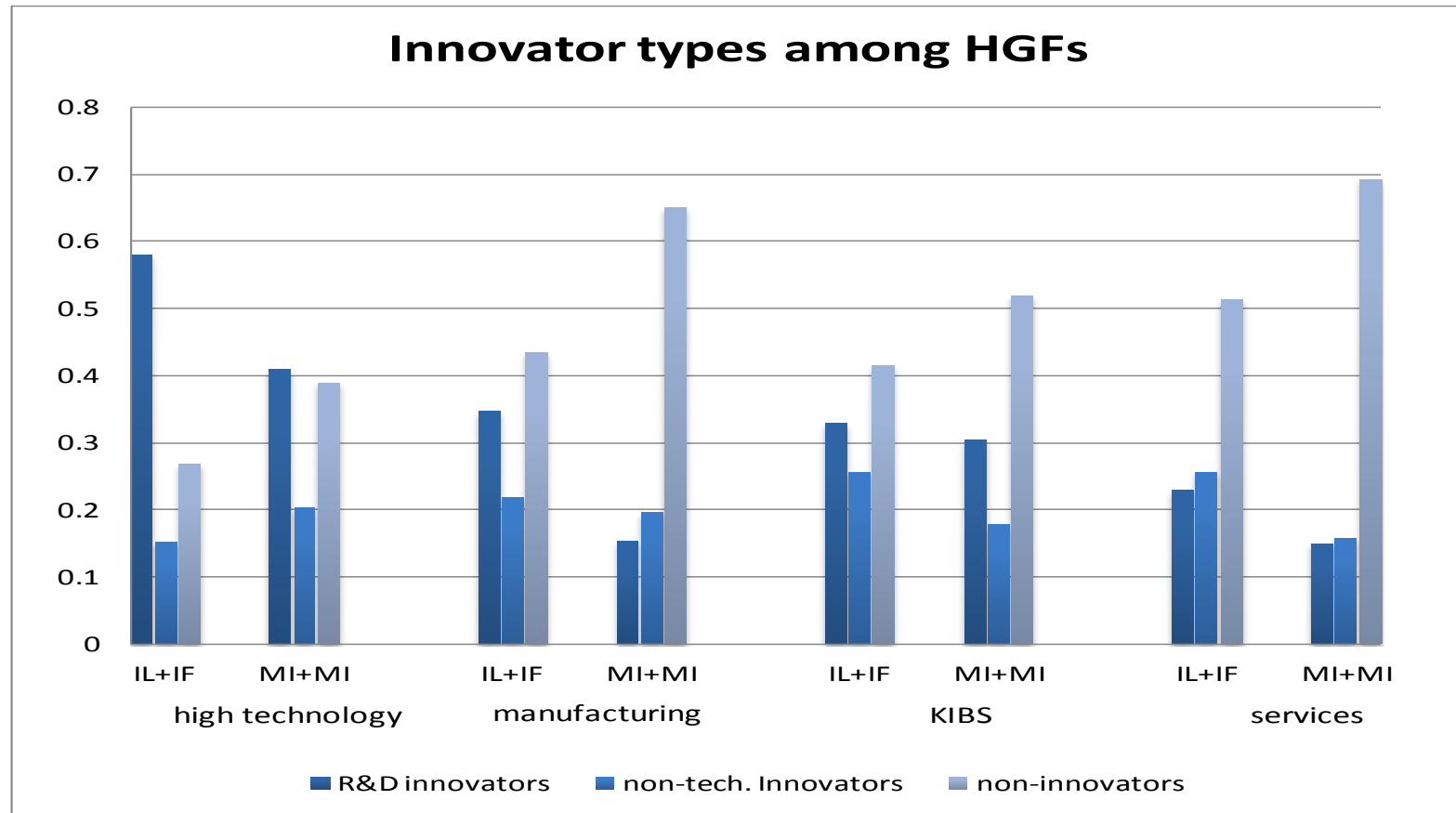
Science, Research and Innovation Competitiveness report 2015

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research Policies
 Data: Eurostat, OECD; WIFO calculations, R&D intensities are average values for the years 2009 to 2012
 Note: (1) Industry values are unweighted averages across countries.

Yes. Positive association between HGF shares and competitiveness and R&D (at least for manufacturing industries)

III Firm level

Is there a relationship between Innovation types and Country groupings?



■ Yes:

- More R&D innovators among HGFs in Innovation leader and follower countries
- More R&D innovators among HGFs in more knowledge intensive sectors (high-tech & KIBS)

Is the innovation behaviour of HGF systematically different from non-HGFs that operate in the same country and industry?

- **Matched sample analysis of information sources for innovation activities reveals:**
 - Internal sources most important followed by market, other and research sources
 - Large differences across sectors and country groups
 - Small differences between HGFs and non-HGFs within country-groups and industries
 - Small statistically significant differences for high technology manufacturing and innovation leaders
 - for information sources in the area of research (universities, government labs) and market sources (private supplier)
- ~. There are some differences but the main message is: **Country and Industry context matters most for the use of innovation sources of both HGFs & non-HGFs**

... and does this matter for policy?

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- **HGFs are affected by economic downturns.**
 - **HGF shares are positively associated with R&D activities and competitiveness as well as institutional quality.**
 - **HGF shares are weakly and heterogeneously related with entry and firm turnover**
 - **The innovation behaviour of HGFs is contest-specific and not systematically different from non-HGFs operating in the same country and industry.**

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 - **Regulations (single market), financing & labour market frictions, Institutions (government effectiveness) matter**

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 - **Entrepreneurial ecosystem with appropriate knowledge bases.**
 - **Entrepreneurship does not arise out of thin air.**
 - **System failures in the innovation system and the entrepreneurial ecosystem are important.**

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 - **... but also the creation of opportunities for HGFs**
 - Entrepreneurial ecosystem with appropriate knowledge bases.
 - Entrepreneurship does not arise out of thin air.
 - System failures in the innovation system and the entrepreneurial ecosystem are important.
 - **And what about R&I policies?**
 - R&I are important for HGFs but also to support the development and diversification of knowledge bases more in general
 - It might not be necessary to support HGFs by new instruments ...many policies tend also to support HGFs as long they are effectively embedded in the entrepreneurial ecosystem.

Thank you