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High-Growth Innovative Enterprises
Research and Policy Challenges

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INNOVA Measure Workshop

A set of stylzed facts

1. A small number of HGFs create a large share of new jobs
2. No high-tech overrepresentation
3. Not necessarily small but typically young
4. HG performance is not persistent over time
5. Very difficult to predict which firms are going to be HGFs
6. Different growth indicators select different groups of HGFs

Firm growth and innovation

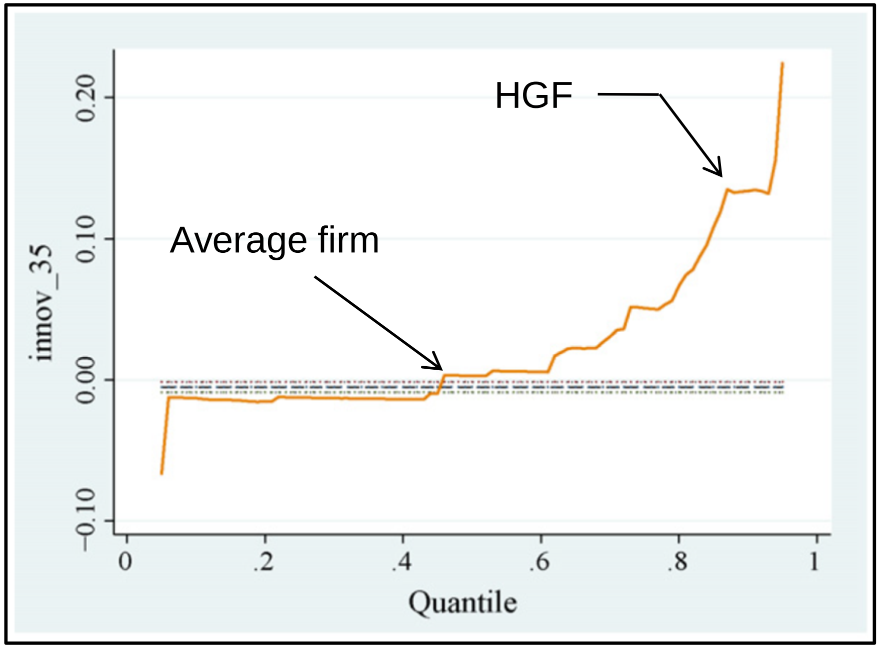
- Schumpeterian framework as an engine of change, with innovation as the main cornerstone of increases in productivity and economic growth

- The nexus between innovation and growth is complex (Vivarelli 2014; Calvino and Virgillito 2017, for exhaustive surveys)
  - Defining innovation and growth
  - Methodological issues (e.g., cross-sectionality, endogeneity)

- Scarce consensus between empirical contributions ("*Innovation is the key ingredient for the growth of firms*"??)

HGFs and innovation

- Looking beyond the effect of innovation on the "average growth"
- Compared to the "average firm", <u>innovation is of great importance for HGFs</u>



Variation in the coefficient on 'innovativeness' over the conditional quantiles. *Source*: Coad and Rao (2008)

A number of questions remain

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- Challenge #1: Innovation as a complex, multidimensional process
- Challenge #2: The role of moderating factors
- Challenge #3: Shrinking innovative firms
- Challenge #4: Good policies to support HGFs

Innovation is a very complex process (and growth as well)

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- Firms perform in-house R&D, acquire knowledge and technologies from external sources, develop and launch new products, implement new processes, or change organizational practices

- Innovation emerges as a multidimensional, complex and non-linear process, and different innovation variables cannot be seen as interchangeable proxies of this process

- *"[T]he complexity of R&D activities, together with the diversity of innovation strategies and the multiplicity of growth modes, requires a multidimensional approach to examine the contribution of innovations on firm growth"* (Audretsch, Coad, and Segarra 2014)

- Think more realistically → Innovation strategies as the source of HG

Innovation strategies

- Considerable heterogeneity in the way firms design innovation strategies, the decision being guided by a scarcity of resources (e.g., financial constraints or a lack of skilled personnel) or the difficulties in coordinating them efficiently

- Firms seem to grow more when
  - Utilising their custumers and end-users as sources of innovation (Wynarczyk and Watson 2005; Connell and Probert 2010)
  - Combining product and process innovations (Goedhuys and Veugelers 2012; Bianchini, Pellegrino, and Tamagni 2017)
  - Innovating persistently over time (Demirel and Mazzucato 2012; Deschryvere 2014; Triguero, Corcoles, and Cuerva 2014; Bianchini and Pellegrino 2017)

Innovation strategies

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- Innovation strategies and HG performance
  - Simultaneous and/or sequential combinations of activities
  - Existence of complementarities between innovation modes
  - Obstacles to innovation strategies
- Open innovation paradigm within the HGIEs framework
- Technological and non-technological innovations are highly interconnected but little is known about their complementarities and ultimate effects on firm growth

The role of moderating factors

- Innovation has <u>different effects</u> on the growth performance of different groups of HGFs
- Young vs. Mature HGFs → <u>(+) effect only for young firms</u> (Coad, Sagarra, and Teruel 2016)
- Manufacturing vs. Service HGFs → <u>(+) effect only for manufacturing firms</u> (Sagarra and Teruel 2014)
- More empirical and theoretical studies
- Other factors should be considered (e.g., institutional and framework conditions)

Shrinking innovative firms

- The literature focuses exclusively on “success stories”
- Not all innovative firm grow! Many firms, although highly innovative, lose jobs and market shares
- Just a matter of timing? Other dimensions of performance? Or weak market selection?
- High decline firms have not yet received the attention they merit

Policies supporting HGFs

- *"[T]he typical start-up is not innovative creates few jobs, and generates little wealth […] policy needs to focus more explicitly on generating more high growth firms"* (Shane 2009)

- The suggestions offered to policy-makers are often very broad, with a tendency to focus on "what NOT to do"

- An increasing debate within the community on WHAT ARE good public policies to support HGFs (e.g., Bravo-Biosca, Criscuolo, and Menon 2016; Connel and Probert 2010; Mason and Brown 2013; NESTA 2009; Nightingale and Coad 2014)

Policies supporting HGFs

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- “Technology push” vs. “Market pull” schemes
  - Shift resources from programs that support only in-house R&D to programs that bind companies and their end-users more closely together
- More balance between support to
  - Small start-up vs. Large organizations
  - Manufacturing vs. Service firms
- Targeted support to companies with growth ambitions

Policies supporting HGFs

- “Entrepreneurial recycling” and leadership skills
  - Cultivate relationships with serial and successful entrepreneurs to encourage them to support HGFs (e.g., act as business angels, form venture capital funds, serve as non-executive board members)
- “Anchoring” strategies
  - Monitor the way in which foreign acquisition affects the performance and economic impact of HGFs in any given local economy
- Context matters!

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Backup -- Policies supporting HGFs (1/3)

- From "technology push" schemes to new "market pull" schemes
  - Shift resources from programs that support only in-house R&D
  - Binding companies and their end-users more closely together
  - Reduce the importance of multi-partner collaborative grant model and enforce bilateral contracts with lead customers
  - Enhance government technology procurement programmes
- More balance between support to
  - Manufacturing vs. Service firms
  - Small start-up vs. Large organizations

Backup -- Policies supporting HGFs (2/3)

- <u>Identify firm's growth capabilities</u>
  - From generic to targeted support, with priority to companies with growth ambitions
  - Reinforce ties with business development agencies to identify trigger points
- "<u>Entrepreneurial recycling</u>"
  - *"[P]olicies designed to increase the total number of new businesses disproportionately attract the worst entrepreneurs"* (Shane 2009, p.144)
  - Cultivate relationships with serial and successful entrepreneurs to encourage them to support HGFs (e.g., act as business angels, form venture capital funds, serve as non-executive board members)

Backup -- Policies supporting HGFs (3/3)

- Increase leadership skills
  - Foster connections between entrepreneurs (they prefer to obtain advices from their peers more than policy-makers and consultants)
  - Financial support conditional upon the creation of non-executive Boards of Directors
- "Anchoring" strategies
  - Monitor the way in which foreign acquisition affects the performance and economic impact of HGFs in any given local economy
  - No aggressive strategies but mechanisms designed to foster positive spill-overs from FDI (e.g., foster local suppliers linkages)
- Context matters
  - Customise and shape policies to the peculiarities of the economic and entrepreneurial eco-system

Backup -- Other (relevant) challenges
Data quality and arbitrary choices (1/2)

- Data issues
  - Representativeness: "*We started with all firms that, in November 1996, […] had at least 20 employees*" (Delmar, Davidsson, and Gartner 2003)
  - Unit of observation: "*It is not entirely clear whether the business units reporting are enterprises or establishments*" (Holzl 2014)
  - Country-specific bias: "*Data [Netherlands 2001-2011] might be affected by breaks in the longitudinal structure of the business register*" (Criscuolo, Gal, and Menon 2014)
- Balanced vs. Unbalanced panel
  - "*We consider only continuing firms […]. Firms that entered midway through 1996 or exited midway through 2002 have been removed*" (Coad 2007)

Backup -- Other (relevant) challenges
Data quality and arbitrary choices (2/2)

- M&A
  - *"We exclude firms that have undergone any kind of modification of structure, such as merger or acquisition"* (Bottazzi, Coad, Jacoby, and Secchi 2011)
- Dealing with real exit
  - *"Firms that terminated their operations during the period are excluded"* (Delmar, Davidsson, and Gartner 2003)
- Outliers

Backup -- Other (relevant) challenges
Defining high-growth (1/3)

- Three arbitrary choices to make:
  - Focal variable: sales, employment, total assets, productivity, profits, etc.
  - Growth indicator: absolute, relative, log-difference, Birch index, DHS index, etc.
  - Time horizon : $s_{t+k} - s_t$, where k conventionally (but not necessarily) is 1
- HGFs according to OECD definition: "*All enterprises with average annualised growth greater than 20% per annum, over a three year period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover*"
- Not all HGFs are gazelles: "*All enterprises up to 5 years old with average annualised growth greater than 20% per annum, over a three year period, should be considered as gazelles*"

Backup -- Other (relevant) challenges
Defining high-growth (2/3)

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- *"We thus define the HGFs as the 10% of the firms in the data set that exhibit the highest average annual increase in absolute employment"* (Davidsson and Henkerson 2002)
- *"In order to be selected as a high-growth firm, we set the criterion that a firm had to be among the top 10% (cf. Storey, 1998) of all firms in terms of "annual average" on one, or more, of six growth indicators"* (Delmar, Davidsson, and Gartner 2003)
- *"We use a relative cut-off methodology for gazelle counts and employ a relative cut-off point of the top 10 % and 5 % of growing SMEs"* (Holzl 2009)
- *"We define as high-growth (HG) firms those companies whose average growth rate over the examined period falls into the top 10 % of the average growth rates distribution, in terms of at least one of the two growth measures (sales or number of employees)"* (Bianchini, Bottazzi, and Tamagni 2017)

Backup -- Other (relevant) challenges
Defining high-growth (3/3)

- <u>Sensitivity of results</u> depending on which growth indicators are used to identify HGFs
  - Are HGFs the same firms irrespective of definition? NO
  - Is the economic contribution of HGFs the same irrespective of the definition? NO
  - Do relevant firm-level variables have the same influence on the probability of a firm being a HGF irrespective of the definition? NO