# Entrepreneurial talent and intangibles explaining high-growth firms

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# Motivation

- This paper studies how entrepreneurial talent explains HGFs.
- Additionally, what determines entrepreneurial talent, which is proxied by entrepreneurial income.
- Those are analyzed together in a multiequation system.

# Literature

- Intangibles have been found to be an important determinant of growth (Eklund, 2020; Corrado et al., 2016).
- The high-tech sector is overrepresented among HGFs (Stam & Wennberg 2009).
- Human capital of entrepreneurs explains successful firms (Crook et al., 2011).
  - Especially in knowledge-based industries.
- Managers in HGFs are better educated and have longer work experience (Barringer et al., 2005).
- Entrepreneurs need strategic skills to generate persistent growth (Dillen et al., 2019).

# Hypotheses

- Following the importance of strategic skills, human capital, and IC:

1) HGFs need entrepreneurial talent, but the impact differs between skilled and unskilled entrepreneurs.
2) Entrepreneurial talent is enhanced both by employee-based and entrepreneurial IC.
3) Employee-based intangible capital is an important factor for firm growth.

# Data

- Unbalanced panel data of Finnish limited companies from 1995 to 2018.
  - Firm size: At least 5 employees on average.
  - 75,303 observations
  - Focused on knowledge-intensive firms (firms without any IC are excluded).
- Provided by Statistics Finland.
- Construction, agricultural, and financial and insurance firms excluded.

# Dependent variables

- 5% HGFs
  - Defined by Birch index $= (Emp_t - Emp_{t-3}) \times \left(\frac{Emp_t}{Emp_{t-3}}\right)$
  - HGF is a dummy variable: 1 for the highest 5% index values, and 0 otherwise.
  - 10% HGFs as a robustness check.
- Entrepreneurial talent
  - Proxied by entrepreneurial income.
  - Separated to entrepreneurs with a higher or technical education (skilled) and other entrepreneurs (unskilled).
  - Instrumented by entrepreneurial intangibles, IC spillovers, and a number of entrepreneurs.
- The results are estimated by a multiequation system with “cmp” in Stata.

# Results

| All | | | | |
|---|---|---|---|---|
| | 1 | | 2 | 3 |
| | HGF 5% | | EntIncomeSk | EntIncomeUnsk |
| EntIncomeSk | 0.055*** | Entrep, sk | 1.274*** | |
| | (0.012) | | (0.021) | |
| EntIncomeUnsk | 0.043*** | Entrep, unsk | | 1.359*** |
| | (0.014) | | | (0.011) |
| IC | 0.039** | IC | -0.166*** | -0.066*** |
| | (0.016) | | (0.018) | (0.009) |
| K | -0.011 | K | -0.004 | -0.019*** |
| | (0.008) | | (0.008) | (0.004) |
| Firm age | -0.018*** | Employees | -0.046** | -0.100*** |
| | (0.002) | | (0.022) | (0.013) |
| Employees | 0.425*** | Ent R&D | 0.108*** | 0.046*** |
| | (0.028) | | (0.009) | (0.006) |
| R&D subsidies | 0.169*** | Ent OC&ICT | 0.099*** | 0.058*** |
| | (0.057) | | (0.011) | (0.008) |
| Invest/L t-1 | 0.008 | R&D Spillover | -1.875*** | |
| | (0.005) | | (0.327) | |
| Invest/L t-2 | -0.007 | OC Spillover | -4.084* | |
| | (0.005) | | (2.350) | |
| Constant | -3.075*** | HighEdu | 0.057** | |
| | (0.083) | | (0.027) | |
| | | Constant | 2.296*** | 1.760*** |
| | | | (0.097) | (0.048) |
| Observations | | 75,303 | | |
| Pseudo loglikelihood | | -143,000 | | |
| Pseudo $R^2$ | | 0.694 | | |
| Rho 12 | | -0.060 | | |
| Rho 13 | | -0.050 | | |
| Rho 23 | | 0.068 | | |

Entrepreneurial income proxies entrepreneurial talent.

Significance levels
*<0.1
**<0.05
***<0.01

# Results for entrepreneurial talent

- Entrepreneurial talent is negatively related to employee-based intangible capital, but it is driven by entrepreneurs' intangible work.
  - Intangible-intensive firms may require less of the coordination and decision power offered by entrepreneurs, possibly due to the better self-guidance of intangible workers. It can also lead to lower hierarchical structure that could shift authority in decision making to employees, and thus result in lower entrepreneurial income.
  - Industries with large IC spillovers also have a lower amount of skilled entrepreneurial income. This may relate to the greater mobility of intangible capital workers (increasing knowledge spillovers) that weakens the entrepreneur's control over the firm.
- Entrepreneurs with master's or doctoral degrees are having higher entrepreneurial talent.

# Results for growth

- Entrepreneurial talent of both skilled and unskilled entrepreneurs has a positive impact on high-growth.
- Labor-based IC has a positive impact on growth.
- High-growth firms are thus dependent on innovative entrepreneurs and employees even if excluding firms without IC from the study.
- R&D subsidies support growth.

# Results in manufacturing and KIS

- In high-tech, only skilled entrepreneurial talent has a positive impact on growth.
- In low-tech, both skilled and unskilled entrepreneurial talent have positive impacts on growth.
- In KIS, only skilled entrepreneurial talent has a positive impact on growth.

- Thus, highly educated entrepreneurs are needed especially in knowledge-intensive industries.

# Hypotheses support/reject

1) HGFs need entrepreneurial talent, but the impact differs between skilled and unskilled entrepreneurs.
   - Supported.
2) Entrepreneurial talent is enhanced by both employee-based and entrepreneurial IC.
   - Supported for entrepreneurial IC, but rejected for employee-based IC.
3) Employee-based intangible capital is an important factor for firm growth.
   - Supported.

# Summary

- The key motivation was to study how entrepreneurial talent, proxied by entrepreneurial income, explains knowledge-intensive HGFs.
- The impact is positive, especially for skilled entrepreneurs (with technical or higher education).
- Thus, knowledge-intensive HGFs need a high quality entrepreneurial knowledge and skills to provoke high growth.
- Employee-based IC has a positive impact on growth, especially in knowledge-intensive industries: high-tech manufacturing and KIS.

# Implications

- The focus in the future should be towards having more tertiary educated entrepreneurs (that are minority) to foster higher growth at the economic-wide level.
- Also, it is important to have highly educated work force.
- The results give justification for the efforts of policy makers to support and enhance the R&D investments in the private sector, as R&D subsidies support growth especially in high-tech manufacturing.

# References


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# Thank you!



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# Appendix

| High-tech manufacturing | | | | |
|---|---|---|---|---|
| | 1 | | 2 | 3 |
| | HGF 5% | | EntIncomeSk | EntIncomeUnsk |
| EntIncomeSk | 0.070* | Entrep, sk | 1.118*** | |
| | (0.039) | | (0.044) | |
| EntIncomeUnsk | 0.034 | Entrep, unsk | | 1.252*** |
| | (0.040) | | | (0.026) |
| IC | 0.104* | IC | -0.206*** | -0.098*** |
| | (0.057) | | (0.041) | (0.027) |
| K | -0.047 | K | -0.040* | 0.003 |
| | (0.030) | | (0.021) | (0.013) |
| Firm age | -0.017*** | Employees | 0.016 | -0.118*** |
| | (0.004) | | (0.052) | (0.039) |
| Employees | 0.467*** | Ent R&D | 0.159*** | 0.052*** |
| | (0.092) | | (0.019) | (0.013) |
| R&D subsidies | 0.228** | Ent OC&ICT | 0.109*** | 0.053*** |
| | (0.101) | | (0.021) | (0.018) |
| Invest/L t-1 | 0.013 | R&D Spillover | -0.101 | |
| | (0.013) | | (1.077) | |
| Invest/L t-2 | 0.008 | OC Spillover | 5.467 | |
| | (0.014) | | (4.718) | |
| Constant | -3.877*** | HighEdu | 0.016 | |
| | (0.379) | | (0.057) | |
| | | Constant | 2.882*** | 1.713*** |
| | | | (0.295) | (0.181) |
| Observations | | 10,939 | | |
| Pseudo loglikelihood | | -21,900 | | |
| Pseudo $R^2$ | | 0.468 | | |
| Rho 12 | | -0.044 | | |
| Rho 13 | | -0.022 | | |
| Rho 23 | | 0.050 | | |

| Low-tech manufacturing, energy | | | | |
|---|---|---|---|---|
| | 1 | | 2 | 3 |
| | HGF 5% | | EntIncomeSk | EntIncomeUnsk |
| EntIncomeSk | 0.103*** | Entrep, sk | 1.110*** | |
| | (0.034) | | (0.045) | |
| EntIncomeUnsk | 0.082** | Entrep, unsk | | 1.290*** |
| | (0.034) | | | (0.019) |
| IC | 0.007 | IC | -0.174*** | -0.045** |
| | (0.050) | | (0.058) | (0.018) |
| K | 0.029 | K | 0.026 | -0.001 |
| | (0.032) | | (0.025) | (0.010) |
| Firm age | -0.012*** | Employees | -0.042 | -0.153*** |
| | (0.004) | | (0.074) | (0.027) |
| Employees | 0.388*** | Ent R&D | 0.092*** | 0.058*** |
| | (0.086) | | (0.020) | (0.012) |
| R&D subsidies | 0.052 | Ent OC&ICT | 0.143*** | 0.080*** |
| | (0.110) | | (0.026) | (0.014) |
| Invest/L t-1 | 0.006 | R&D Spillover | -1.286 | |
| | (0.011) | | (0.943) | |
| Invest/L t-2 | -0.005 | OC Spillover | 1.021 | |
| | (0.010) | | (10.045) | |
| Constant | -3.909*** | HighEdu | 0.088 | |
| | (0.326) | | (0.056) | |
| | | Constant | 1.988*** | 1.391*** |
| | | | (0.350) | (0.116) |
| Observations | | 25,619 | | |
| Pseudo loglikelihood | | -47,400 | | |
| Pseudo $R^2$ | | 0.503 | | |
| Rho 12 | | -0.160 | | |
| Rho 13 | | -0.055 | | |
| Rho 23 | | 0.074 | | |

| KIS | | | | |
|---|---|---|---|---|
| | 1 | | 2 | 3 |
| | HGF 5% | | EntIncomeSk | EntIncomeUnsk |
| EntIncomeSk | 0.048*** | Entrep, sk | 1.404*** | |
| | (0.015) | | (0.028) | |
| EntIncomeUnsk | 0.019 | Entrep, unsk | | 1.405*** |
| | (0.018) | | | (0.020) |
| IC | 0.035* | IC | -0.136*** | -0.055*** |
| | (0.020) | | (0.021) | (0.013) |
| K | 0.005 | K | -0.002 | -0.023*** |
| | (0.010) | | (0.009) | (0.006) |
| Firm age | -0.020*** | Employees | -0.083*** | -0.075*** |
| | (0.003) | | (0.029) | (0.019) |
| Employees | 0.387*** | Ent R&D | 0.086*** | 0.048*** |
| | (0.039) | | (0.012) | (0.009) |
| R&D subsidies | -0.016 | Ent OC&ICT | 0.068*** | 0.053*** |
| | (0.100) | | (0.014) | (0.011) |
| Invest/L t-1 | 0.006 | R&D Spillover | -2.305*** | |
| | (0.007) | | (0.398) | |
| Invest/L t-2 | -0.013** | OC Spillover | -6.942** | |
| | (0.007) | | (2.917) | |
| Constant | -2.787*** | HighEdu | 0.019 | |
| | (0.127) | | (0.038) | |
| | | Constant | 2.388*** | 1.748*** |
| | | | (0.136) | (0.077) |
| Observations | | 25,727 | | |
| Pseudo loglikelihood | | -48,700 | | |
| Pseudo $R^2$ | | 0.610 | | |
| Rho 12 | | -0.041 | | |
| Rho 13 | | -0.013 | | |
| Rho 23 | | 0.050 | | |