Productivity and HGEs: resilience and potential recovery from Covid-19 pandemic

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Joint JRC-EIB Workshop on High-Growth Enterprises

10th, January 2022

[1]Universitat Rovira i Virgili (Spain)

[2]Joint Research Centre - European Comission (Spain and Belgium)

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- **Covid-19 pandemic caused the halt of the economic activity** during a short period of time and an **acceleration of firms digitalisation.**
- **Aim:** Analysis **of how productive firms and HGEs were affected in the short term and long term in terms of permanent reduction of employment and also their digitalisation.**
- **Contributions:**
  - We show evidence on the **positive relationship between productivity and lower employment reduction** in the short and long term.
  - We observe a complex relationship between (innovative) HGEs and the probability of employment reduction.
  - **Covid-19 pandemic may accelerate the digitalisation but also the digital gap between companies.**

The effect of Covid-19 on employment

- Leader and laggard firms present different characteristics (Coad, 2011).

Laggard	Leader
• Steep hierarchy • Improve the efficiency rather than grow • Invest in advanced projects • Learn from possible failures of leaders	• Flat hierarchies • Aim to grow • More innovative • Smaller

  - **So less productive firms may be more likely to reduce their employment in the short and long term during the COVID-19 crisis.**

- Similarly, HGEs are usually small young and they have greater financial needs since they suffer trigger points that require investments to adjust their path of growth (Coad et al., 2021).

  - **HGEs may be more likely to reduce their employment in the short and long term during the COVID-19 crisis.**

The effect of Covid-19 on new digital technologies

- During crises, firms have incentives to accelerate their technological transformation (Hershbein and Kahn, 2018).
  - **More digitalised firms and firms in more digitalised sectors might be more likely to continue the adoption of NDTs in long term due to the COVID-19 shock.**
- COVID-19 pandemic obliges firms to redefine their strategy (Pantano et al., 2020; Ebersberger and Kuckertz, 2021) and it is interesting to understand if this change is going to persist into the future (Apedo-Amah et al., 2020) to HGEs and productive firms.
  - **HGEs and more productive firms are more prone to continue adoption of NDTs due to the COVID-19 pandemic.**
- As stated by Ferrando et al. (2019), this may be due to the fact that both groups of firms differ in their capacity to technologically innovate but also in their success of combining diverse intangibles.

EIBIS dataset

- Representative across all 27 Member States of the EU and UK.
- Four firm size classes (micro, small, medium, and large).
- Four sector groupings (manufacturing, services, construction, and infrastructure).
- 4 waves (2017-2020) with 12,000 firms participating in multiple waves.

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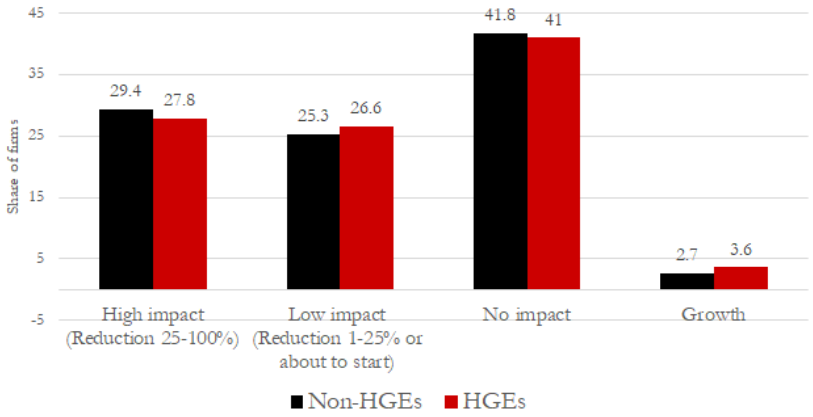
Definition of key variables

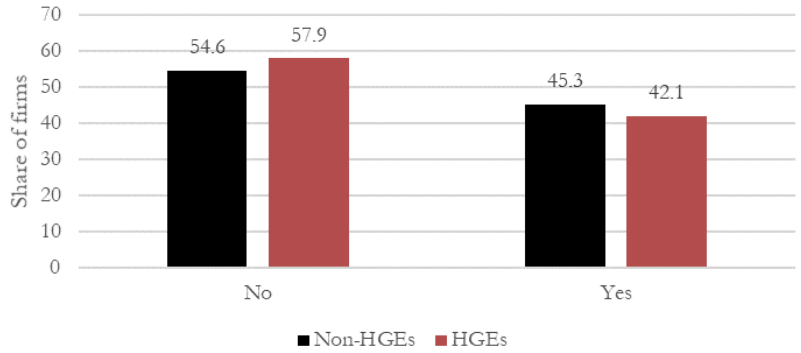
- HGE: Dummy identifying firms with cumulative 3-year growth of more than 33%, which would correspond to an annual growth rate of 10%.
- **Productivity**: Value added for worker.

Descriptive statistics - COVID-19 and changes in employment

Incidence of the Covid-19 on the employment reduction in the short term.

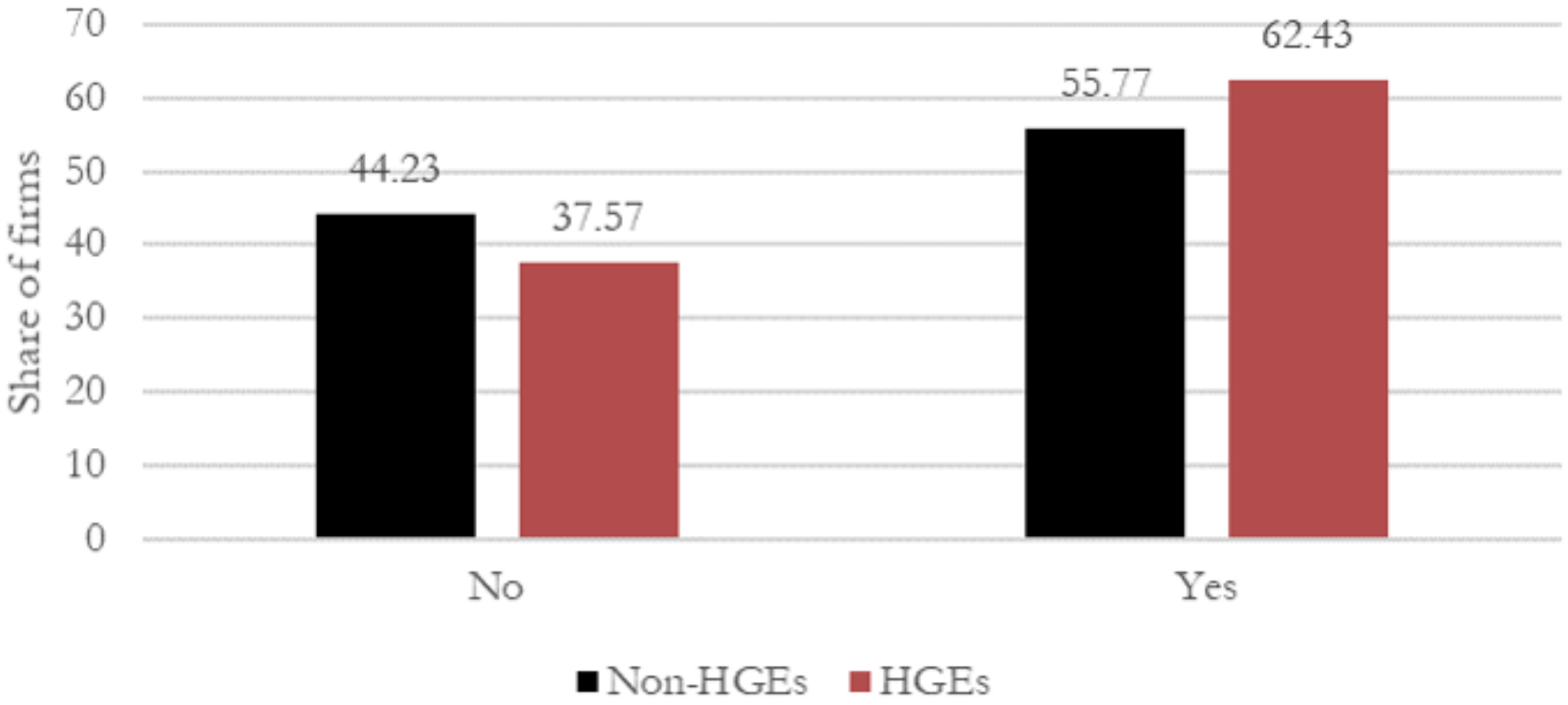


Expected incidence of the Covid-19 on the employment reduction in the long term.



Descriptive statistics - COVID-19 and changes in digitalisation

Expected occurrence of the digital increase due to Covid-19.



Probability of the impact on employment and digitalisation => Probit with robust standard errors.

$$Prob(impact)_{i,t} = \alpha_{31} + \beta_{31}\ HGE_{it-1} + \beta_{32} LabProd_{it-1} + \cdots + \ Digit_{it-1}\beta_{33} + \epsilon_{3i,t}$$

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Definition of key dependent variables

a) Short-term impact on employment => High vs low impact, low impact vs. not change, growing vs. not impact.

b) Expected probability that Covid-19 will have a long-term impact on the reduction of employment.

c) Expected probability that Covid-19 will have a long-term impact on the digitalisation.

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a) HGE: Dummy identifying firms with cumulative 3-year growth of more than 33%, which would correspond to an annual growth rate of 10%.

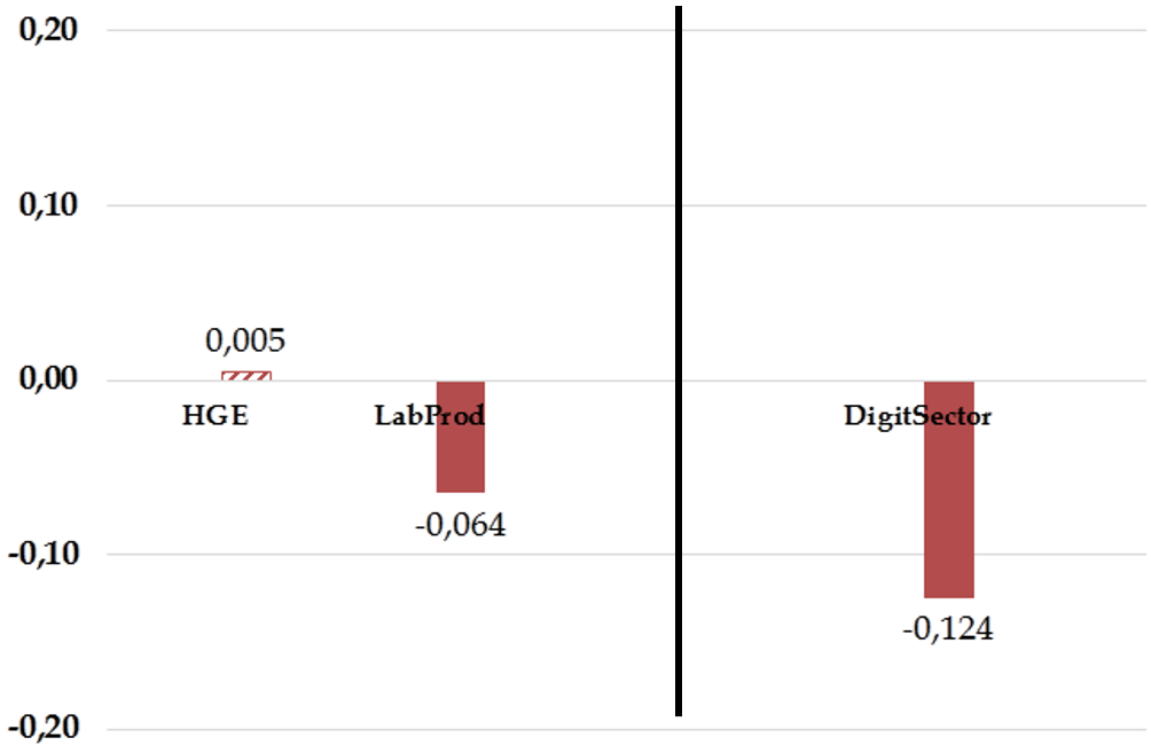
b) LabProd: value added for worker (logs).

c) Digit => DigitSector: Dummy identifying sectors with a mean expenditure in digitalisation larger than the total average.

=> ***Partial*** *and* ***Full digital level***: Dummy equal to 1 if the firm has adopted partially or fully NDTs.

Graph 1. Estimated coefficients of the effect of being a HGE *(HGE)*, labour productivity ***(LabProd)*** and digitalised sector ***(DigitSector)***. *Note: Independent variables refer to year 2019 while impact refers to early 2020. Diagonal bars represent non-significant coefficients.*

a) Probability of having reduced highly the workforce vs. suffering a low impact



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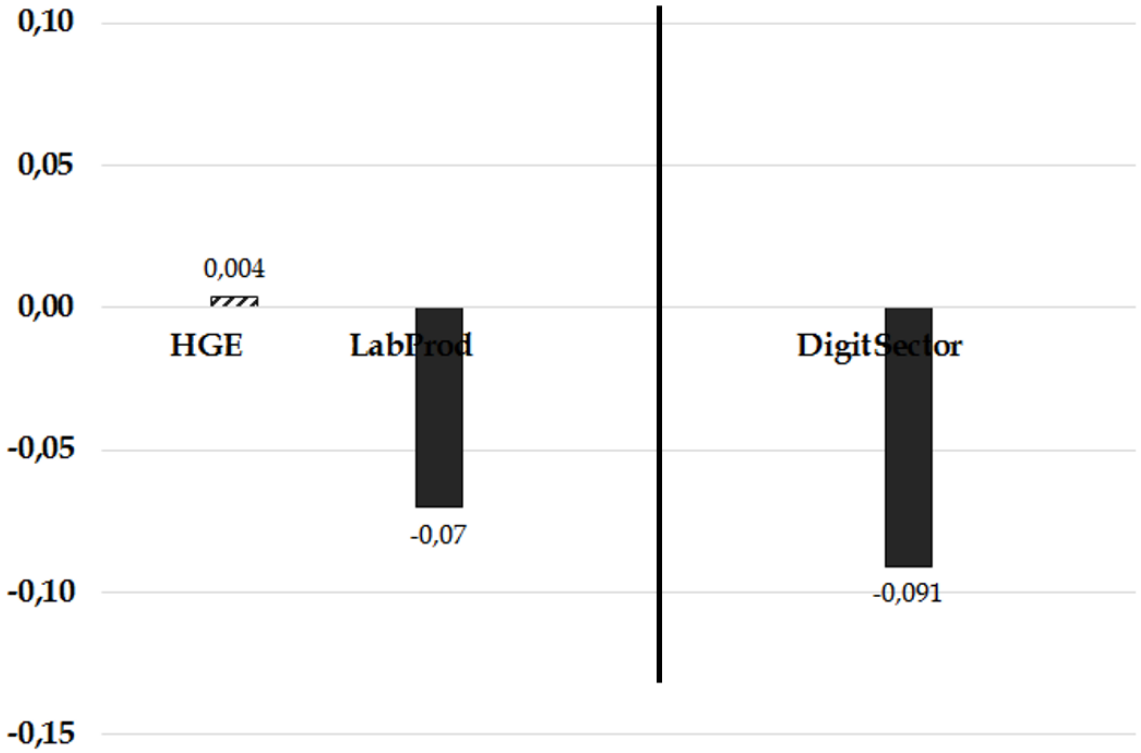
b) Probability of having reduced slightly the workforce vs. not having changed the workforce



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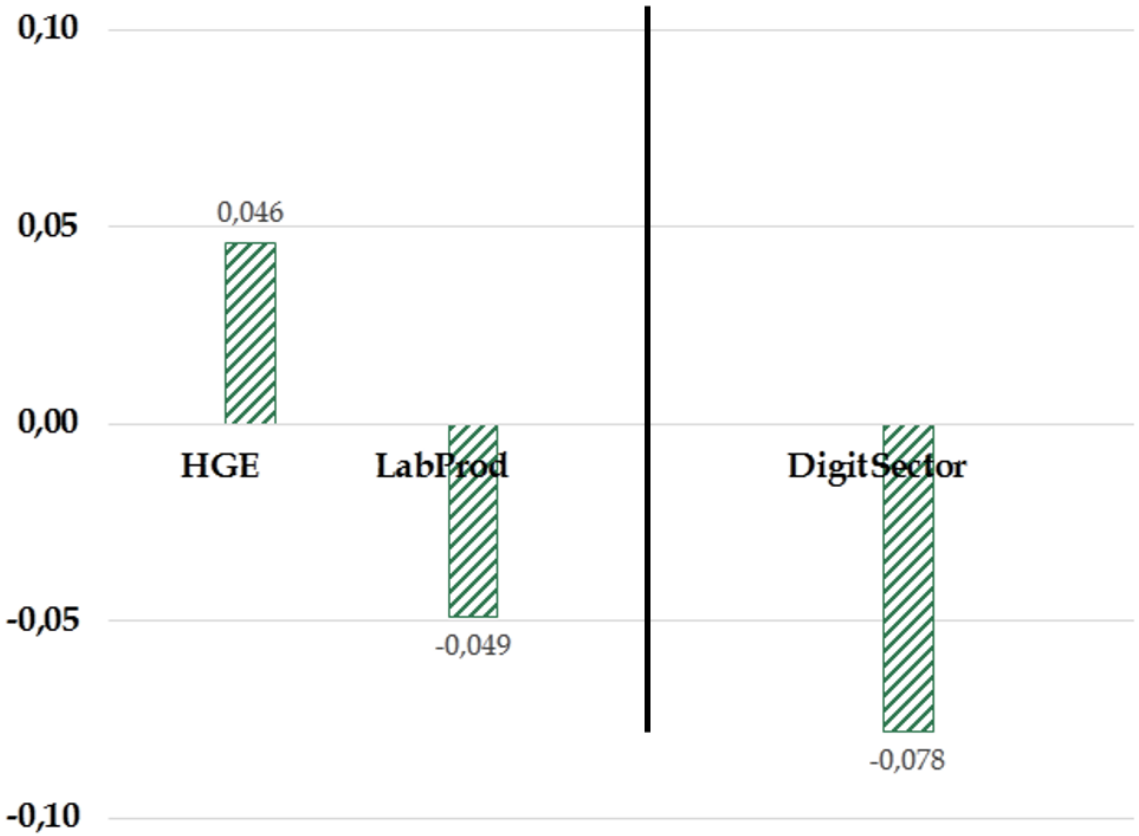
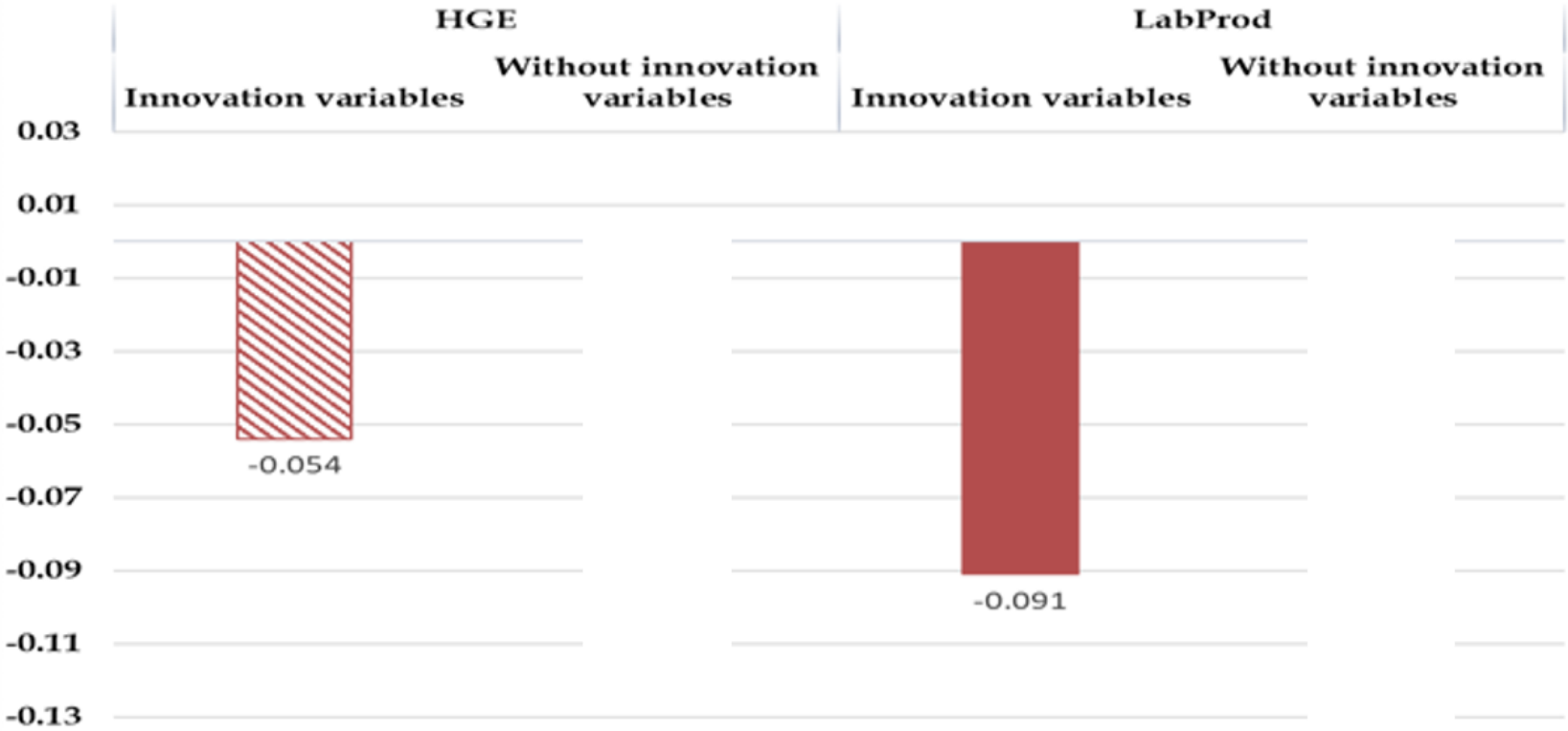
c) Probability of having increased the workforce vs. not having changed the workforce



Graph 2. Estimated coefficients of the effect of being a HGE *(HGE)* and labour productivity *(LabProd)*. Dependent variable probability of reducing permanently the workforce due to Covid-19 pandemic. *Note: Independent variables refer to year 2019 while impact refers to long-term after 2020. Diagonal bars represent non-significant coefficients.*



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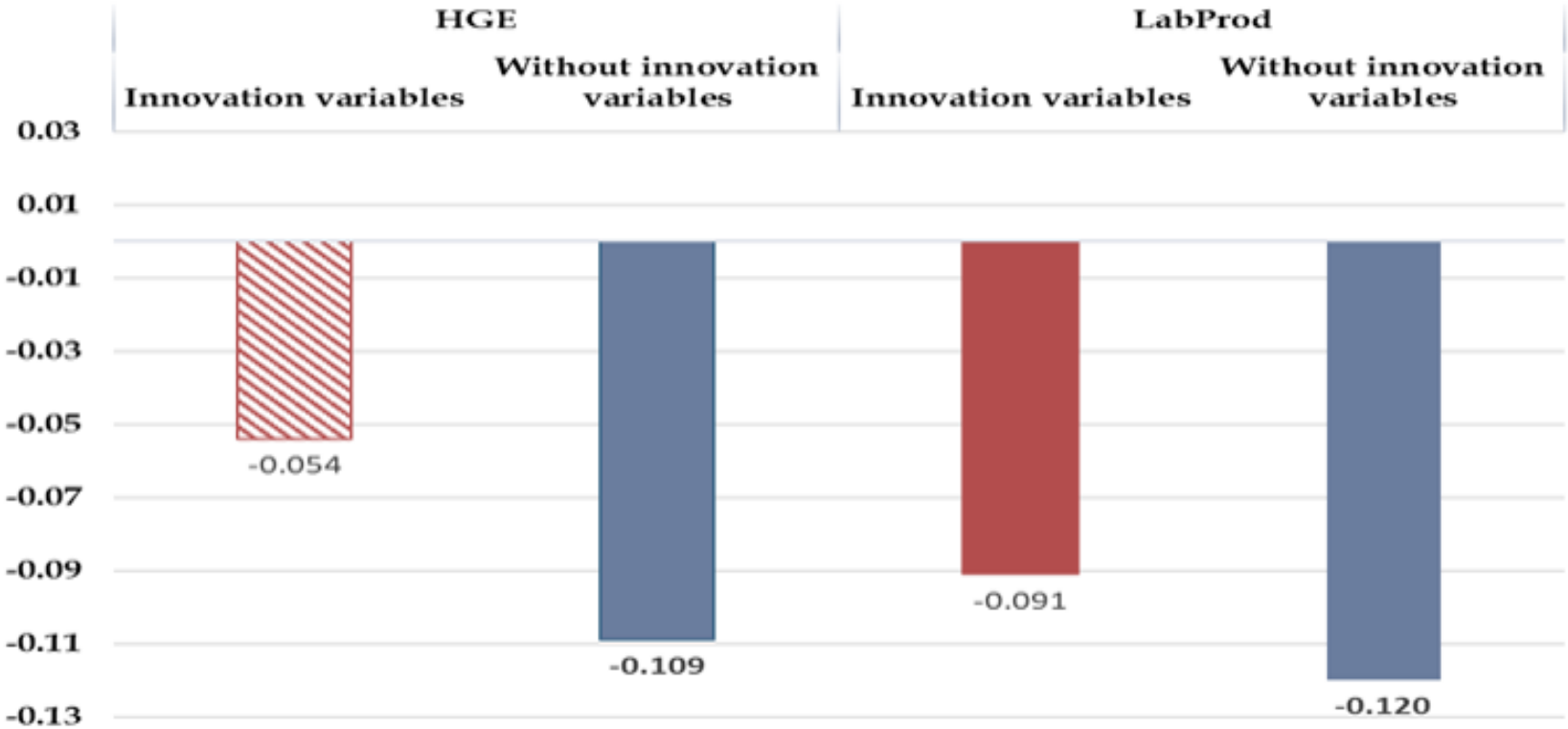
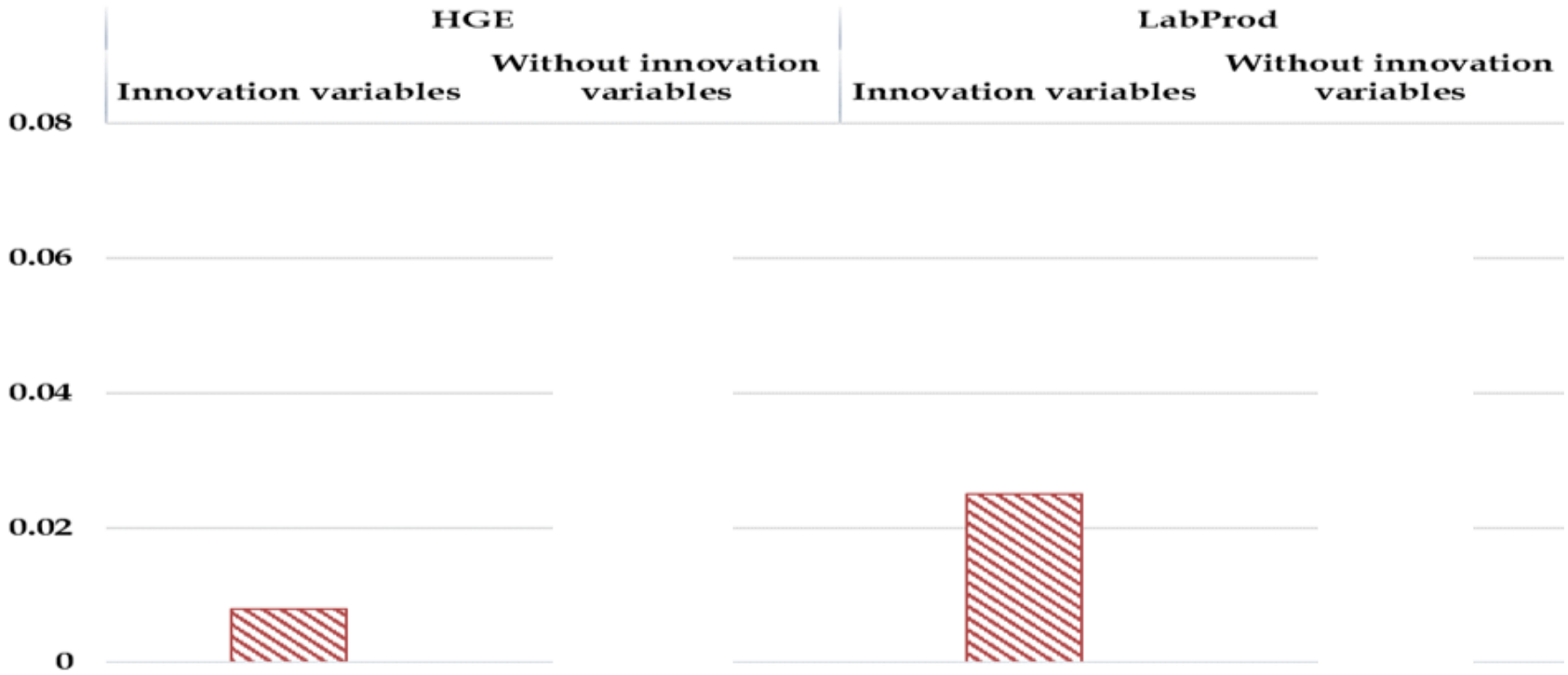


Graph 3. Estimated coefficients of the effect of being a HGE *(HGE)* and labour productivity in logs *(LabProd)*. Dependent variable probability of digitalising due to COVID-19 pandemic. *Note: Independent variables refer to year 2019 while impact refers to long-term after 2020. Diagonal bars represent non-significant coefficients.*



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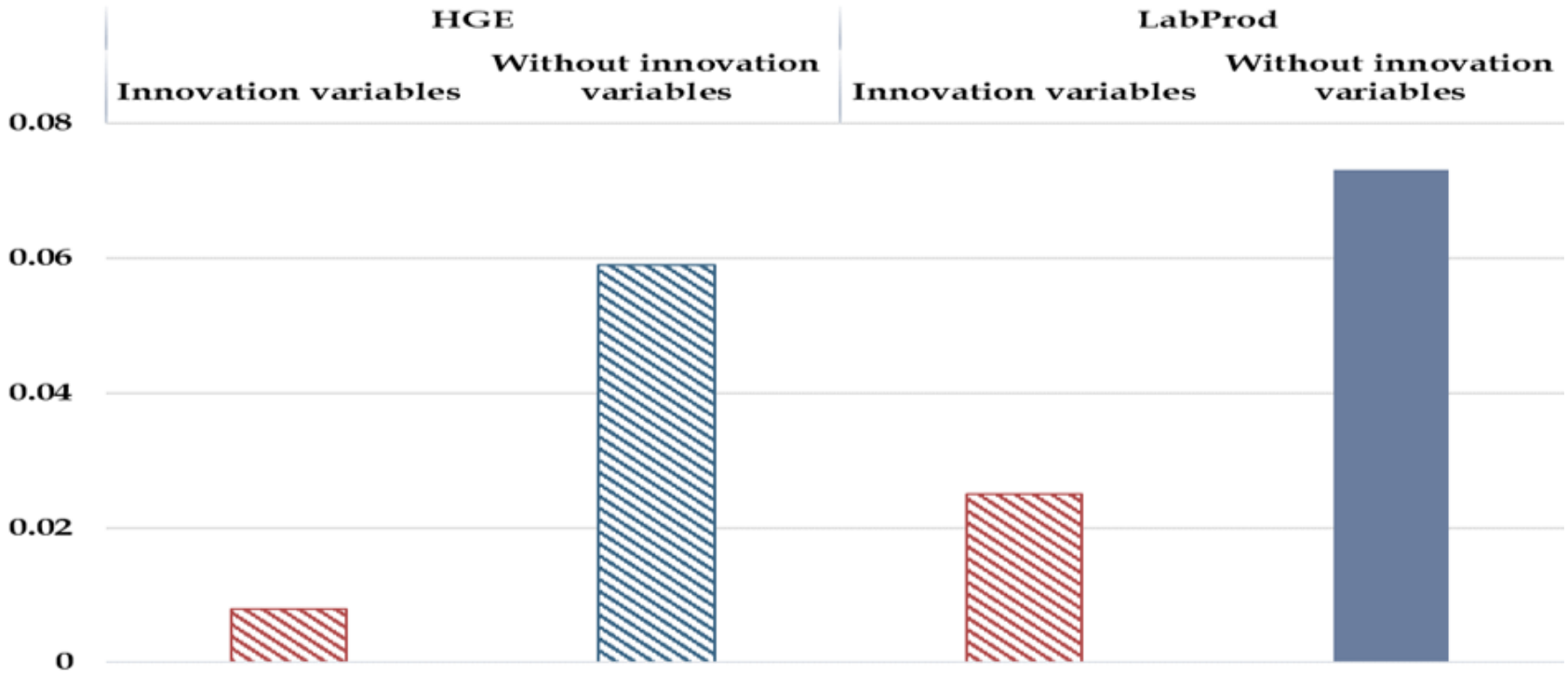
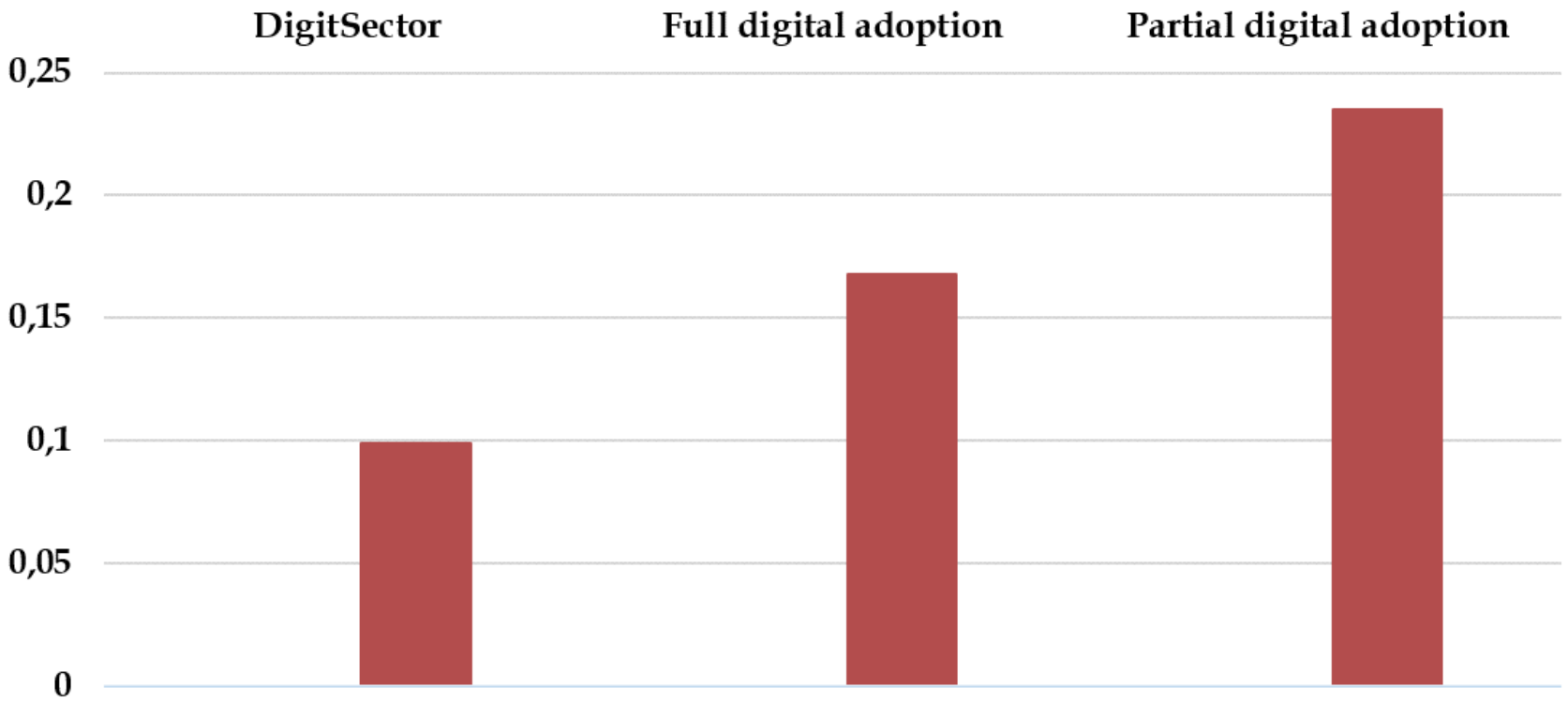


Graph 4. Estimated coefficients of belonging to a digitalised sector *(DigitSector)*, and the full and partial digitalisation level before the pandemic *(Full digital adoption and Partial digital adoption)*. Dependent variable probability of digitalising due to COVID-19 pandemic. *Note: Independent variables refer to year 2019 while impact refers to long-term after 2020.*



The COVID-19 pandemic has caused an economic disruption => need for sustainable economic recovery including digital and green transition.

Our results show:

- **Short term:**
  - We confirm a within adjustment at firm level since **low productive firms** decreased the number of employees as a reaction of the crisis.
- **Long term:**
  - **More productive firms** are less likely to expect to reduce their employment.
  - **HGEs** have a lower probability of reducing their employment in the long term. The innovative nature of HGEs is one of the main characteristics associated with this.
  - Our results indicate a widening gap in terms of the **degree of digitalisation** across firms and emphasises the importance of generating a core of internal abilities at firm level.

- POLICY MESSAGES:
  - Productivity enhancing reallocation played a role as a response to the crisis => An addition question is to assess if less productive firms decreased their employment more due to the COVID-19 crisis, thus contributing positively to aggregate productivity growth (Bloom et al., 2021; Andrews et al., 2021a).
  - Need to support innovation and firm-level productivity => ensures competitiveness and provides some resilience against major crises.
  - The persistence in digitalisation during the COVID-19 crisis justify the need to support firms in their initial investments in digitalisation => avoid digital neo-dualism (Dosi et al., 2017). The implementation of the national Recovery and Resilience Plans will provide important support to the digitalisation efforts of European economies.

CAVEATS:

- EIBIS questionnaire was developed in 2020 => caution with interpretation of the impact.
- Variables may indicate associations instead of causality (but we apply some technical controls!)

FUTURE RESEARCH LINES:

- Analysis of final impact of COVID-19 on employment and productivity (between-productivity effect or within-productivity effect?).
- Start-ups analysis promoting productivity.
- Potential technological gap: Drivers? Effects on productivity?

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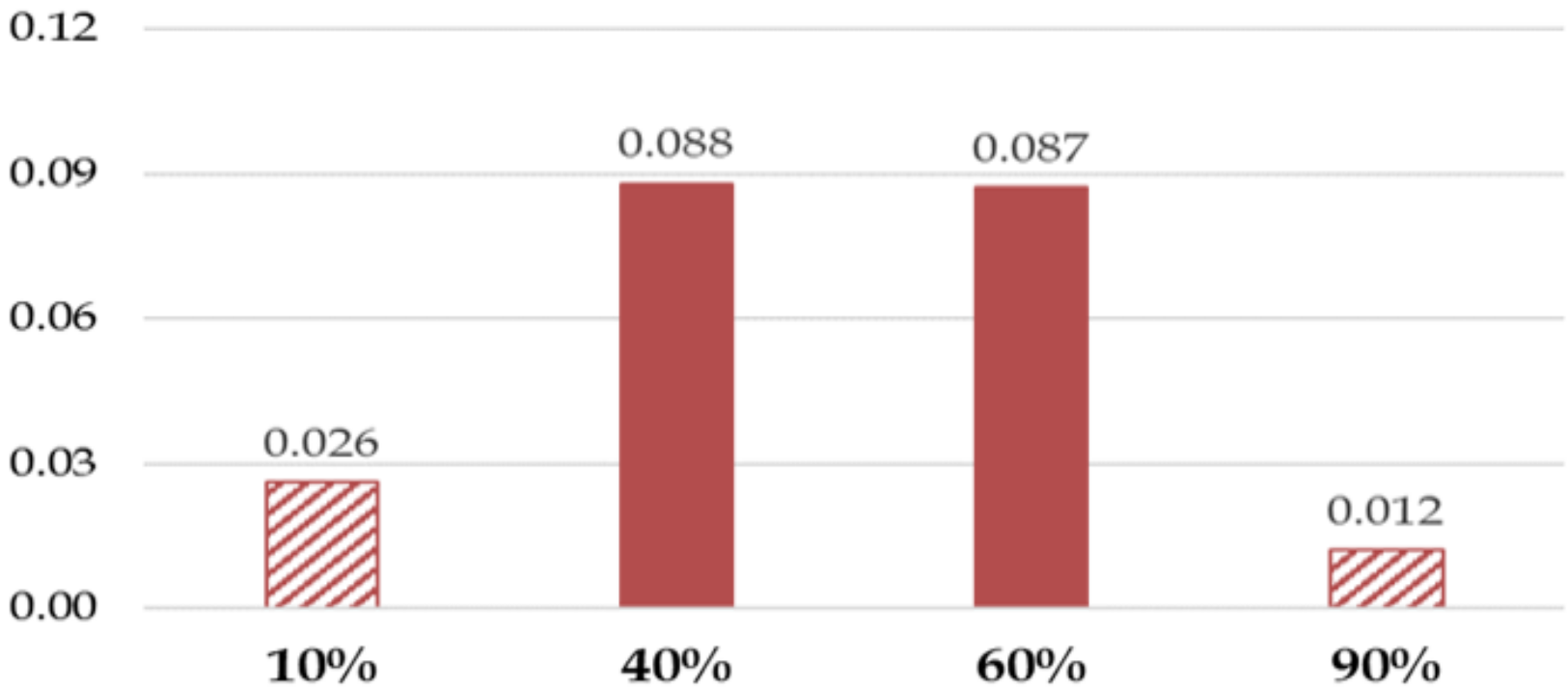
Graph 1. Estimated coefficients of being a HGE on the labour productivity (in logs). Bootstrapped quantile regression at 10%, 40%, 60 and 90% (100 replications). *Note: Independent variables refer to year 2018 while productivity refers to year 2019. Diagonal bars represent non-significant coefficients.*



Graph 2. Estimated coefficients of being a HGE (HGE) on the probability of being in the first productivity relative index in comparison with an adjunct group. *Note: Independent variables refer to year 2018 while productivity refers to year 2019. Diagonal bars represent non-significant coefficients.*