Small and medium-sized enterprises and Income inequality in Danish regions:
Technological change, job quality and innovation

Sigrid Jessen
Aalborg University
Business and Management
sije@business.aau.dk

Abstract
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Sigrid Jessen
DRUID/IKE, Aalborg University
Email-address: sije@business.aau.dk
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Abstract:
In light of past years’ rapid growth of income inequality, increasing attention is paid to the dynamics behind inequality. Within Economic Geography (EG) the emphasis has traditionally been on large firms or industries’ (e.g. Lee & Rodríguez-Pose, 2016) impact on income inequality with little focus on the role of the Small and Medium-sized Enterprises (SMEs), however, SMEs are increasingly becoming the "economic backbone" of Europe (Neagu, 2015). The UN has identified businesses as a crucial actor necessary for achieving the 17 Sustainable Development Goals (SDG), however, SMEs are radically different from larger firms in terms of their resources, technological accessibility, organizational structure, network and workforce characteristics (OECD, 2017). In addition, little is known on how regional differences affect the development of inequality regionally (e.g. lammarino et al., 2019). Therefore, this PhD-project will result in four journal papers, where SMEs’ impact on income inequality regionally in Denmark will be investigated. The topics of the four papers will be as follows:

1) SMEs in a regional knowledge network
To which extent do regions with more related capabilities among the SMEs affect the development of regional income inequality differently than the regions with more unrelated capabilities?

2) SMEs and technological advances
Which role do the use of technology in SMEs play in the development of income inequality regionally?

3) Labor quality and organization in SMEs in Denmark
Which role does organization of play in the possibility to create better jobs in SMEs in different geographical contexts in Denmark?

4) Clusters and labor quality in SMEs abroad
Which role does the structural context play in the possibility to create better jobs in SMEs in different geographical contexts abroad?
Mixed methods are suggested as main methods. Regression analyses on register data and survey data on one hand for paper 1 and paper 2 and case studies, on the other hand, for paper 3 and paper 4. With this, the PhD-project will achieve its goal of developing 1) concrete policy framework for policymakers and 2) guidelines for SMEs to participate in reducing the income inequality regionally in Denmark.

References:


ABSTRACT
In light of past years’ rapid growth of income inequality, increasing attention is paid to the dynamics behind inequality. Economic Geography (EG) has traditionally emphasized large firms and industries when investigating income inequality. Small- and Medium-sized Enterprises (SMEs) has received little attention even though these firms are often recognized as the “economic backbone” of many economies. The UN has identified businesses as a crucial actor necessary for achieving the 17 Sustainable Development Goals (SDG), however, SMEs are radically different from larger firms in terms of their resources, technological accessibility, organizational structure, network and workforce characteristics. In addition, little is known on how regional differences affect the development of inequality regionally. Therefore, this proposal is proposing an article-based PhD-project at the Innovation, Knowledge and Economic Dynamics (IKE) Group at Aalborg University resulting in four journal papers over three years, where SMEs’ impact on income inequality regionally in Denmark will be investigated. Mixed methods with regression analyses on one hand and case studies, on the other hand, are suggested as main methods. With this, this PhD-project will achieve its goal of developing 1) concrete policy framework for policymakers and 2) guidelines for SMEs to participate in reducing the income inequality regionally in Denmark.

KEYWORDS
SMEs; Tech. change; Job polarization; UNs 17 SDG; Inter/intra regional inequality
1 | INTRODUCTION

1.1 | Issues, aims and research questions

The past 40 years have shown a dramatic development in within-country income inequality (Piketty, 2014). Subsequently, the topic of income inequality and the drivers behind income inequality have in recent years received considerable critical attention both within the academic sphere, but also in the public discourse resulting in among other thing the UN to dedicate two of the 17 Sustainable Development Goals (SDG) to reducing inequality and creating better jobs (Milanovic, 2016). The UN has acknowledged businesses as one of the main actors in achieving the UN Development Goals (UN, 2017). SMEs are increasingly dominating economic activities in Europe. In Denmark, 99.7 percent of the nearly 300.000 Danish companies fall within the category of small and medium-sized enterprises (SMEs) with less than 50 employees. This percentage corresponds to half of the total employment in Denmark. SMEs are experiencing rapid growth of full-time employees, with a large part falling within the high-knowledge sector. At the same time, mega-firms with more than 500 employees experience declines. (DST, 2018) SMEs are, therefore, a crucial part of Denmark’s economic activities. As of yet, literature connecting economic activities to inequality almost solely focus on larger firms and industries (e.g. Lee & Rodríguez-Pose, 2016), however, the growing economic importance of SMEs make them critical for untangling the drivers behind income inequality. Four main factors in which SMEs differs from larger firms in their effect on income inequality can be identified; 1) the resources available, 2) the organization/network, 3) the knowledge-intensity and adaptation of technology and 4) the workforce characteristics. Furthermore, no studies have investigated how SMEs’ impact on income inequality are differentiating in different geographical contexts, although previous studies have found that geographical characteristics such as population density (Gleaser et al., 2009; Baum-Snow and Pavan, 2013), proximity to institutions such as universities (Iammarino et al., 2018) and the export pattern of the industries (Sbardella et al., 2016) affect the overall development of income inequality in regions. In order to close these gaps, a three-year PhD-project at the Innovation, Knowledge and Economic Dynamics (IKE) Group at Aalborg University, is now proposed, with the aim at answering one two-part research question, with four belonging sub-questions;

1. To what extent are SMEs contributing to the rising income inequality regionally in Denmark and to what extent can SMEs affect the development of income inequality?
   • Which role do characteristics and organization of the regional knowledge network play for the development of income inequality regionally?
   • Which role does the role of new technology play for the development of income inequality regionally?
   • How can the organization of labor in SMEs create better jobs in Danish SMEs?
   • To which extent is regional differences affecting SMEs effect on regional income inequality?

The questions are answered through on one hand regression analyses with register data from Denmark’s Statistics and Survey data from the project, “Technologies and Skills in Denmark” and on the other hand case studies with SMEs and policymakers in a Danish and an international context.

The contribution of the PhD-project will be twofold: 1. A policy-framework for policymakers to make informed decisions in leading SMEs and thus the region to greater social sustainability and 2. a guideline for SMEs enabling suggestions and inspirations for social transitions and helping contribute to UN’s 17 SDGs.

The remainder of this description will be as follows; Section two will provide the current state of affair in the literature. Section three introduces the methodological approach. Section four describes the budget and time-frame.
THEORETICAL FRAMEWORK

2.1 Small firms with big effects – The difference between SMEs and large firms’ impact on income inequality

Whereas larger firms and industries often have been the primary objects of investigation when economic activities are being linked to the development of income inequality (e.g. Lee & Rodríguez-Pose, 2016), little effort has been put in investigating the effect of SMEs of income inequality (UN, 2017). This is despite often being referred to as the “economic backbone” of Europe (Neagu, 2016) due to their growing economic importance. However, why are SMEs interesting to investigate compared to the traditionally used larger firms and industries? There are at least four factors in which SMEs differs from larger firms in a way that could play a role in the development of income inequality;

First, generally, SMEs have fewer financial resources compared to the larger firms (OECD, 2017). This lack of resources has the direct impact that SMEs struggle to a higher degree to provide continued education for their low- and medium-skilled employees compared to the larger firms (UN, 2017). The reason is that the risks of the project taken on will limit the size of the potential project, and thereby economic gains are of a greater magnitude for the larger firms than for the SMEs (BarNir & Smith, 2002).

Second, how SMEs structurally organize themselves and engage in networks are radically different than for the larger firms. In general, SMEs are due to their size more flexible and can more easily transform themselves, whereas the larger firms are more rigid and a transformation of the organizational structure can, therefore, be more costly (Carrier, 1994). In terms of how the ways SMEs engage with the external surroundings, SMEs are more likely to engage in local knowledge networks or "coopetation" which is due to the higher degree of necessity for sharing knowledge and resources for the SMEs compared to the larger firms (Gnyawali & Park, 2009).

Third, both SMEs and larger firms are experiencing the impact of technological change where there is a growth of firms within high-knowledge intensive firms (Autor & Dorn, 2013). In Denmark, the majority of the new jobs created by SMEs are falling within the high-knowledge intensive sectors, with 80% of these being within the high-tech manufacturing sectors (DST, 2018). One of the most considerable differences between the SMEs and the larger firms is also one of the most considerable factors within the inequality; The role of new technologies, although its effect is dividing scholars (e.g. Frey & Osborne 2017; Autor, 2015). Interestingly, SMEs face numerous challenges in adopting new technologies, due to rising RD costs, the high risk connected to technological development, as well as a lack of resources to pursue large-scale innovation projects (BarNir & Smith, 2002). These difficulties for SMEs to adopt new technologies could, however, play a role in the development of income inequality since medium-skilled jobs would be more difficult to be replaced in the SMEs compared to the larger firms (Hane-Weijman, Eriksson & Henning, 2017) and the stratified labor-structure would not be as strongly enforced.

Fourth, the characteristics of the workforce differ significantly between SMEs and larger firms, both in terms of wages, the security of jobs and skill-level. Studies have previously shown that the wages in SMEs are substantially lower compared to those in the larger firms (Neagu, 2016). In the same vein, SMEs are to a higher extent influenced by "precarious jobs", where the contracts offered in SMEs generally are of a temporary nature and to lower wages (Buitelaar et al., 2016), due to less union organization in SMEs (Andersson & Thörnqvist, 2007) and the lack of financial resources of SMEs (UN, 2017). This also affects the general skill-level of the SMEs’ workforce, since larger firms in the process of “employee sorting” are more likely to attract high-skilled labor, due to the more favorable conditions, compared to the smaller firms. Moreover, as previously mentioned, the larger firms are more sensitive for automation, which generally affects the medium-skilled jobs (Autor & Dorn, 2013). Interestingly, the redundant low-skilled workers of the larger firms will often be absorbed by SMEs, resulting again in SMEs having stronger bases of medium- and
low-skilled labor (Hane-Weijman et al., 2017) that will not receive additional training due to the lacking resources for the SMEs.

Summing up, the vast majority of studies linking economic activities with income inequality are either focusing on industries or large firms. This is despite that there are considerable differences between SMEs and larger firms in their ways in which they impact income inequality and that SMEs are increasingly becoming a substantive part of the economies of many OECD countries. Despite this, it remains unclear which exact impact SMEs may have on income inequality. Four main factors in which SMEs are affecting income inequality differently from larger firms have been identified: 1) the resources available to, e.g. provide continued education, 2) the organization/network of the SMEs in terms of collaboration with other firms, 3) the adaptation of technology and 4) the workforce employed in SMEs.

2.2 SMEs in the region – The difference between rural and urban regions

Another gap this project takes on, is the impact different geographical contexts have on SMEs effect on the development of income inequality. As of yet, very few attempts have been made to investigate the development of income inequality on a regional level (Iammerino et al., 2019) and none have looked into how the regional context is affecting SMEs impact on regional income inequality. Four main differences between urban and rural regions have also been identified here: Resources, (Knowledge) Network, Knowledge intensity, Workforce.

First, roughly speaking urban regions are having more financial resources and rural regions and would thereby to a greater extent be able to support SMEs in initiatives to, e.g. provide knowledge sharing or continued education (Cataldo & Rodríguez-Pose, 2016).

Second, urban areas are having a higher agglomeration of firms and are therefore, also having more dense knowledge networks of more similar nodes in the network (Steijn et al., 2018). The relatedness/unrelatedness between firms in the same region might impact increasing income inequality. Although relatedness is one of the most prominent ideas in EG to describe the development of economic activities today, little effort has been made to connect these structures to the structures of inequality. Relatedness between firms are likely to enable knowledge spillovers (Neffke et al., 2017) and can result in reductions of resources of firms (Wixie & Andersson, 2017). If there is higher relatedness among SMEs it is, furthermore, more likely that if a crisis strikes the region that the worker will be less affected, due to their increased possibilities to find new employment within the region, as long as the firms are not connected in terms of input-output relations (Boschma, 2015). It can, therefore, be expected that regions with higher levels of relatedness among the SMEs might have lower levels of income inequality. However, further investigation is necessary.

Third, in terms of the knowledge intensity, it has long been investigated that the economic activity of firms follows particular geography, in which more innovative regions generally have the most innovative firms (Boschma, 2018). In general, urban regions are more technologically advanced and urban regions generally contain more high-knowledge intensive SMEs than the rural regions (DST, 2018).

Fourth, in Denmark is the workforce in urban regions are generally higher-skilled, although with greater difference within the population, and are generally receiving higher wages. This is due to among other things that the competition in urban regions is higher, which therefore pushes both the required skill-level and subsequently, the wages (Gleaser et al., 2009).

In summary, there are apparent differences in which the regional context might mediate the effect of SMEs on income inequality, in terms of Resources, (Knowledge) Network, Knowledge intensity and workforce. Urban regions are expected to have more resources to support the SMEs from an institutional level, enable stronger knowledge networks which could be used for knowledge/resource sharing, generally, are more knowledge-intensive and are having higher-skilled labor on one hand which could enable SMEs to lower income inequality regionally. Urban regions could,
therefore, have a positive impact on SMEs impact on income inequality; however, it remains inconclusive.

2.3 | SMEs and regional income inequality

In conclusion, together, these studies provide valuable insights on SMEs’ impact on income inequality regionally. Little attention paid to the SMEs despite their growing economic importance in many developed countries and that they differ significantly from larger firms in their potential effect on income inequality. Furthermore, there has been identified a clear difference between the rural and the urban regions. Altogether, this call for further investigation and this proposal, therefore, suggest a three-year study in which these gaps will be addressed. This proposal suggests one twofold research question with sub-belonging four questions which touches on all four factors: 1) Resources, 2) (Knowledge) Network, 3) Knowledge intensity and 4) Workforce:

1. To what extent are SMEs contributing to the rising income inequality regionally in Denmark and to what extent can SMEs affect the development of income inequality?
   • Which role do characteristics and organization of the regional knowledge network play for the development of income inequality regionally?
   • Which role does the role of new technology play for the development of income inequality regionally?
   • How can the organization of labor in SMEs create better jobs in Danish SMEs?
   • To which extent is regional differences affecting SMEs effect on regional income inequality?

3 | METHODOLOGICAL APPROACH

3.1 | Study area

The main geographical scale used as study area for the proposed project is the Danish regions. However, a comparative aspect is also proposed, where a stay at a foreign research department will be incorporated. This aspect will be described in further detail under research activity three. In order to obtain an understanding of the impact, SMEs have on income inequality, and how the geographical contexts influence this impact, it is proposed to follow the same methodological approach for determining the regional scale in Denmark as Eriksson et al. (2017), and thereby get 29 Danish regions. Due to the apparent variation between urban and in rural regions, this study divides the regions following the DORS (2015) distinction into either urban or rural giving a total of 19 rural regions and ten urban regions.

3.2 | Research activities and data

In order to answer the research questions set out for this project, three main research activities with minor studies integrated will be conducted. The fourth research sub-question on the impact of different geographical/regional contexts will be incorporated into each of the three research activities.

1. The questions on which role characteristics of the regional knowledge network plays for the development of income inequality regionally are expected to be answered through two research activities. First, it is vital to understand quantitatively how SMEs in a network impact the development of income inequality. Here, the theories on relatedness will be beneficiary and the study will, therefore, adopt the skill-relatedness index by Neffke &
Henning (2013)\textsuperscript{1} and data from The Integrated Database for Labour Market Research (IDA) (Timmerman, 2010). This approach will allow an understanding of whether regions with more related capabilities among the SMEs affect the development of income inequality regionally differently than the regions with more unrelated capabilities. Similar to other inequality studies this study aims at using panel regressions as the main research method (E.g. Lee, 2011, Lee Rodríguez- Pose, 2013; Breau et al., 2014).

2. The second question on the role the use of technology plays in the development of income inequality regionally will be answered by conducting quantitative analyses on the use of technologies in the development of income inequality regionally. The approach will be inspired by Lee & Rodríguez-Pose (2016), which investigates the role high-tech industries impact on income inequality and poverty in American cities by using panel regression. However, in this study, the emphasis will be on SMEs and the regional scale, rather than industries and cities. Data from the “Technologies and Skills in Denmark” project conducted in spring 2019 will be used here.

3. The question on the organization in the SMEs concerning better jobs is, on the other hand, expected to be answered qualitatively in both a Danish and an international context. Interviews will, therefore, be conducted both with Danish SMEs and policymakers and vice versa in an international context. This data will include primarily information on work organization, however, information on innovation efforts and use of technology will also be included. For data collection in international SMEs, a stay in a foreign research environment for approximately six months will be incorporated in the PhD-project. This data will be used to add an international comparative perspective to the research, and to create opportunities for collaboration with local researchers in the foreign environment. The chosen foreign research environment must, therefore, not only be of high quality and professionally relevant; it should also allow for interviews in SMEs that function in a context that is comparable to Danish SMEs’ context in terms of institutional conditions, technological development and internationalization.

4 | PLANNING AND PERSONNEL

The PhD-project is funded by the Spar Nord Foundation. Budget is attached.

The expected time-frame for the project is described in Figure 1. The PhD-project will be article-based, resulting in a minimum of four journal papers over the span of three years. The choice of an article-based thesis enables research activities to occur simultaneously.

5 | EXPECTED OUTPUT AND SOCIETAL IMPACT

The consequences of increasing income inequality are of high societal impact. Income inequality is seen as being attenuating to economic growth and have strong social consequences. It is of utmost importance to create an understanding to which the inequality develops and especially with SMEs becoming degree becoming the “economic backbone” of Europe and Denmark. The goal for the project is, therefore, to develop on the one hand a policy framework to help policymakers to make informed decisions and on the other hand guidelines for SMEs in order for them to support a social sustainable transformation. This goal will not only, in the long run, create better terms for economic growth for the regions, but potentially also create better lives for the Danish population.

\textsuperscript{1}This is an index, which frequently has been adopted by several other studies, e.g. Holm et al. 2017 and Xiao et al. 2016
6 | REFERENCES


