Paolo Fornaro
Henri Luomaranta

JOB CREATION AND THE ROLE OF DEPENDENCIES

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Paolo Fornaro*, Henri Luomaranta**

*Research Institute of the Finnish Economy

**Statistics Finland and University Of Toulouse 1

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Abstract

We contribute to the extensive literature on the relationship between firm size and job creation, by examining the effects of dependencies between enterprises. Using Finnish monthly data encompassing the population of Finnish private businesses, we calculate the gross job creation and destruction, together with the net job creation, for different size classes and industries. Importantly, we divide firms into a dependent (i.e. owned, at least partially, by a large company) and independent category. Due to the quality of the data, we are able to isolate the 'organic' growth of firms, disregarding the effects of mergers, split-offs and other legal restructuring. We find that independent companies have shown a considerably higher net job creation, regardless of their size class. However, dependent firms do not show particularly different behaviors with respect to the sensitivity to aggregate conditions, compared to their independent counterparts. Once we control for age, we find that independent firms generate more (net) jobs during the early years of their existence but destroy more jobs once they become older.

1   Introduction

The relationship between employment generation and firm's size has been the focus of extensive research. Since the seminal article of Birch (1981), there has been a lot of discussion about whether small firms are the main force underlying employment growth. This view has been the center of political debate, where public support to small businesses has been advocated in the light of their large growth enhancing capabilities. However, the original insights by Birch have been contested in multiple empirical works, which have pointed out issues underlying the data and the methodology adopted. For example, Davis, Haltiwanger, and Schuh (1996) argue that the procedure that Birch (1981) uses to classify a firm as small or large (i.e. using the base year on which the

growth rate is computed) leads to an overestimation of the job creation stemmed from smaller businesses. Subsequent works studying the effects of firms' size and job creation are, among many others, Davis et al. (1996) and Neumark, Wall, and Zhang (2011). In these papers it has been found that, after adjusting for the statistical biases of Birch (1981), small firms do not create more net jobs compared to large ones, or at least not in such a dramatic way as found in Birch's work. For the Finnish economy, there has been a number of studies where the relation between firm sizes and net job flows is examined. Some examples of these analyses comprise Hohti (2000), Ilmakunnas and Maliranta (2003) and, more recently, Wit and Kok (2014) and Anyadike-Danes, Bjuggren, Gottschalk, Holzl, Johansson, Maliranta, and Myrann (2014).

The enterprise size has not been the only firm's characteristic analyzed in regards to employment creation. Another important feature that has been considered as a contributing factor to net job growth is firm's age. A key study in this respect is Haltiwanger, Jarmin, and Miranda (2013), where the authors show that once we control for firm's age, small and large firms do not show discrepancies in net job creation. Other studies which are interested in the effect of the firms' age on job creation are Criscuolo, Gal, and Menon (2014), Distante, Petrella, and Santoro (2014) and Anyadike-Danes et al. (2014). The common finding of these studies is that young firms are the main drivers of job creation, with start-ups being especially important.

In this paper, we investigate another possible source of heterogeneity among firms which might affect job growth, i.e. external ownership and dependence. In particular, we look at how firms belonging to an enterprise group contribute to the employment generation (both gross and net), within different size classes. Large corporations are a key player in modern economies, accounting for a large share of aggregate output and potentially have substantial effects on the business cycle (see, e.g., Gabaix, 2011). However, as pointed out in the previous literature, large firms are usually associated with lower job creation compared to small enterprises. The fact that previous analyses do not separate dependent and independent enterprises might be a decisive factor behind this results. In a recent Eurostat report (Airaksinen, Luomaranta, Alajääskö, and Roodhuijzen, 2015), the share of dependent firms' employment within the small and medium enterprises (SME) category is documented to be substantial in several European countries, including Finland. This result casts doubt on many previous conclusions in the small versus large literature, where the SME status is systematically

defined by the number of employees only, regardless of the ownership structure. For example, the statistical result that small firms tend to create more jobs, on average, could stem from large firms investing through affiliates. Even in the case of looser control, it is arguable the employment generation of small dependent enterprises could be impacted by the decisions of the mother company. If dependent, small firms are behind the large job creation rates of SMEs, then the narrative of small businesses being the driver of employment generation should actually be interpreted in the light of large corporations creating jobs through subsidiaries.

The contribution to job creation by dependent and independent enterprises has not been studied extensively in the literature. A notable exception is Boccara (1997), where the author examines the job growth stemmed from small and medium firms belonging to enterprise groups in France during the 1984-1992 period, finding that the small firms belonging to large business groups exhibit higher job creation. Another work which touches the issue of dependencies and employment growth is the OECD report Schreyer (2000), in which the author discusses possible economic channels behind the relationship. Small firms might have multiple benefits from belonging to a large corporation. Subsidiaries owned (even partly) by a large company might have a better access to financing (both internal and external), together with more informal advantages such as access to a wider human capital and information related to market conditions and technology. However, there are possible channels leading to a negative impact of dependencies onto job creation. Large firms could consider their small subsidiaries as a small part of the production chain, which must perform a well defined and limited amount of tasks, without the need to grow in size.

We use monthly employment data of Finnish firms to study how the dependence to large companies affect the job creation (both gross and net) of enterprises, controlling for size and age. The data, extracted from the Statistics Finland database, allows us to verify if an enterprise belongs to a business group and how large is the share of the firm owned by the mother company, giving us the possibility to disentangle control from more informal dependencies and networks. The employment figures are adjusted to represent the "organic" growth of the firms, disregarding the effects of merger, split-offs and other legal restructuring. In addition, we examine the possible heterogeneity between the different industries of the economy (e.g. manufacturing and services), which might have an impact on how belonging to an enterprise group affects the job creation of a

company. For example, it is likely that in the service industry, where human capital plays a larger role, firms benefits more from dependencies and connections than in, e.g., constructions. Finally, we analyze how dependent and independent enterprises respond to different aggregate economic conditions. In particular, we examine the job flows of firms with different ownership structures during periods of economic expansion (which we identify as periods in which monthly output is above trend) and economic downturns (output below trend).

We find that small, medium and micro independent firms have experienced consistently higher growth rates compared to their dependent counterparts, regardless of the size classification methodology and size class considered. Once we control for age, we find that young independent firms have generated more jobs compared to their dependent counterparts, but this relationship is reversed for older companies. This pattern can be explained by the fact that young independent firms are more uncertain about their productivity potential, causing them to create more jobs during the early stages of their life and subsequently destroy more jobs when they get older. We also find that the effect of dependencies is not unique across industries. In particular, while dependent firms exhibit lower job creation rates inside the trade, services and construction industries, the negative effect of dependencies disappears or reverts in the manufacturing and financial sectors. Finally, we do not find a clear effect of dependencies onto the sensitivity to the business cycle for small and medium firms.

The remainder of the paper is structured as follows: In Section 2 we introduce the main methodological issues underlying the analysis, in Section 3 we briefly describe the data and in Section 4 we present the results. Section 5 concludes.

2   Methodological issues

The analysis of job creation and its relation with the firm size is highly sensitive to the data source and the methodology adopted. For example, the criterion to determine if a given enterprise should be included in the small or large size class is not uniform over the literature and using different selection procedures can yield very different results. In the work of Birch (1981), firms are included in the small class if the number of employees during the base year of the job growth calculation is below a threshold. This criterion, as argued by Davis et al. (1996) among others, can lead to a serious overestimation of the job creation stemmed from smaller businesses. In particular, using the base year

to classify a firm will cause the inclusion of many enterprises affected by temporary negative shocks in the small class (this phenomenon is addressed in the literature as the regression to the mean bias). Neumark et al. (2011) find that, using the base year classification of Birch (1981), small firms are generating a substantially larger share of employment compared to big enterprises. However, when they use the firms' average size to classify them, the gap between the job creation of small and large businesses shrinks substantially.

In this analysis, we use two size classification methodologies. The first one is the *dynamic size classification* method: enterprises are classified each year, using the average size between the two years on which the growth is computed. The number of full time equivalents (FTE) obtained is then compared to the cutoff points used by Statistics Finland to determine the size class of a company. As discussed in papers such as Davis et al. (1996) and Haltiwanger et al. (2013), this type of classification is robust to the regression to the mean bias. However, allowing companies to change size class over time tends to exacerbate the sensitivity of small enterprises to the business cycle. As discussed in Moscarini and Postel-Vinay (2012), during times of economic hardship we can expect firms to move to the small category and vice versa during expansions.

The second size classification criterion we use is called *average size classification* and it is based on the average number of employees (full time equivalents in our case) computed over the existence of the firm. As in the case of the *dynamic classification*, this methodology is robust to the regression to the mean bias. However, contrary to the *dynamic classification*, this methodology does not suffer from procyclicality issues. One problem with the *average size classification* is that it relies on the assumption that firms reach a long-term scale of operations during their lifespan, implying that the process underlying a firm's size is stationary.

The key measures of the analysis reported in Section 4 are the gross job creation, gross job destruction and net job growth. The gross job creation is defined as the sum of positive changes in the number of FTEs within a certain firm category, i.e. we have $jc_t = \sum_i^N dE_{it}^+$ where dE_{it}^+ are the positive changes in employment between time t and $t-12$ and which are then summed over the N firms belonging to a certain class. Job destruction is defined as $jd_t = \sum_i^N |dE_{it}^-|$, with dE_{it}^- being the negative change in the number of FTEs for company i. Importantly, we use the adjusted values for the FTEs in the base year, to control for mergers and acquisitions (details on the methodology

are provided in the Appendix) and to obtain a measure of the organic growth of a firm. The net job creation is defined as the difference between gross job creation and job destruction. Finally, we compute two measures of net job creation rate. The first one is used to compute the contribution to the overall creation of jobs in the economy due to a category of companies. Denoting the net job creation at time t for category C as $NJC_{t,C}$, we compute

$$NJCR^1_{t,C} = \frac{NJC_{t,C}}{(1/2E_t + 1/2E_{t-1})}, \tag{1}$$

where E_t is total employment. The denominator in (1) is suggested throughout the literature (e.g. Moscarini and Postel-Vinay, 2012) because it is more robust the regression to the mean bias. Another interesting measure is

$$NJCR^2_{t,C} = \frac{NJC_{t,C}}{(1/2E_{t,C} + 1/2E_{t-1,C})}, \tag{2}$$

where $E_{t,C}$ indicates the total number of employees in category C, making (2) an indicator of how a certain category is growing over time.

A final issue worth discussing in this section is the role firms' age. As pointed out in Haltiwanger et al. (2013), the age of a company is a key determinant in explaining its job creation. In particular they show that, after controlling for age, there is no clear difference in the net job creation rate of small and larger companies. To make sure that our results are not driven by the longevity of the firms we examine, we consider a subset of companies which are present throughout our sample period. Moreover, we analyze the impact of dependencies onto job creation while separating SMEs into different age categories.

3 Data Description

The data is extracted and anonymized at the premises of Statistics Finland, the Finnish national statistics agency. The data contains monthly observations of persons employed (as full time equivalents, FTEs) for the entire business sector, excluding public sector and primary producers. Thus, we analyze the employment generation patterns of enterprises that are active in the business economy. The analyzed enterprises are classified by Statistics Finland into broad activity categories based on the classification of economic activities system in the EU (NACE Rev. 2). In order to control for heterogeneities arising from the different activity categories, we group the enterprises in manufacturing,

construction, trade, services and finance industries.

The Finnish Business register contains information on ownership links between the enterprises that belong to a group. Furthermore, the register holds information on the nationality of the enterprise group, and thus the Statistics agency is able to distinguish between foreign and domestically owned enterprise groups. By linking these data sources at micro-level, we are able to pinpoint whether at any given time an enterprise is "independent" (no enterprise group links), "dependent" (the enterprise is at least partly owned by a mother company, or the enterprise is a mother company itself), "controlled" (the mother company owns over 50% of the enterprise), or "foreign controlled" (the enterprise group head is foreign, and its ownership exceeds 50%). After applying these classifications to the enterprises, we use two sets of data. The first sample includes monthly observations of employment destruction and creation for all the enterprises that are active at any given month between January 1998 and September 2014, and the second sample includes employment creation and destruction of only those enterprises that are present for the full sample period, thus excluding entries and exits. Net job creation computation are based on adjusted FTEs, where the effects of mergers and split-offs are eliminated by the methodology of Statistics Finland. For the foreign controlled enterprises, the data is available only from January 2007 onward and hence is analyzed in a separated subsection.

The sample including entries and exits contains 253,685 enterprises in September 2014 and 234,257 enterprises in January 1998. The sample where only long lasting enterprises are included contains 70,356 enterprises. The following tables provide the number of enterprises in each of the analyzed categories by industry (Table 1) and size category (Table 2) in 07/2014 for both samples, in order to characterize the data and the Finnish business economy.

	Manufacturing	Construction	Trade	Services	Finance
Full sample					
Independent	20,716	37,565	41,813	124,439	2,021
Dependent	2,541	804	2,543	6,216	631
Controlled	2,340	758	2,438	5,532	597
Foreign controlled	543	87	1,023	937	141
Long lasting enterprises					
Independent	7,952	8,104	12,902	29,910	338
Dependent	1,307	339	1,299	2,035	195
Controlled	1,230	320	1,270	1,855	186
Foreign controlled	246	22	505	307	42

Table 1: Number of enterprises on September 2014, divided by industry and dependency status.

	Micro	Small	Medium	Large
Full sample				
Independent	216,093	9,634	775	52
Dependent	6,643	3,816	1,727	549
Controlled	5,840	3,611	1,672	542
Foreign controlled	1,110	918	500	203
Long lasting enterprises				
Independent	54,041	4,728	400	37
Dependent	2,163	1,862	855	287
Controlled	1,963	1,783	832	283
Foreign controlled	313	448	261	100

Table 2: Number of enterprises on September 2014, divided by class size and dependency status.

While the figures reported in Table 1 point toward dependent firms being a small share of the overall population of enterprises, Table 2 provides key information to motivate this analysis. The number of dependent medium-sized and small enterprises represents a large share of the total, highlighting the fact that disregarding the possible links between larger companies and subsidiaries might bias the results for two important size class of firms such as the small and medium enterprises.

4 Results

We start our empirical analysis by studying the relationship between firm size and the measures of interest reported in Section 2. In this fashion, we can compare the Finnish setting with the findings obtained in studies as, e.g. Davis et al. (1996) and Haltiwanger et al. (2013).

In particular, in Table 3, we report the total number of employees, the gross job creation and destruction, together with net job creation, for large and SMEs (i.e. the category encompassing small, medium and micro firms) companies. Moreover, we compare enterprises with different dependencies status, even though we do not separate firms of different size class within the same dependency class. We report results for both dynamic and average size classification and the results are expressed in terms of FTEs.

	Total Number of Employees	Gross Creation	Destruction	Net Job Creation
Average Size Classification				
Large	495,383	28,465	43,924	−15,458
Medium	235,594	21,627	26,558	−4,930
Small	256,658	34,670	33,554	1,115
Micro	317,340	74,912	69,480	5,431
Dependent	695,932	50,470	60,589	−10,119
Control	678,087	48,344	58,826	−10,482
Independent	609,046	109,205	112,929	−3,723
Dynamic Size Classification				
Large	513,171	29,137	42,663	−13,526
Medium	230,965	21,051	27,377	−6,325
Small	254,768	33,466	33,596	−130
Micro	306,072	76,020	69,881	6,139
Dependent	695,932	50,470	60,589	−10,119
Control	678,087	48,344	58,826	−10,482
Independent	609,046	109,205	112,929	−3,723

Table 3: Average number of total number of employees, gross creation, destruction and net job creation. Enterprises are divided by size class and dependency status. All values reported are FTEs.

The figures reported in Table 3 are somewhat similar to what has been found in the literature. Firms of smaller size exhibit large gross job creation and destruction, especially the enterprises in the micro category. Independently from the size classification methodology, large firms are the most important employer of the Finnish economy, considering the average number of FTEs between 1998 and 2014. At the same time, they have experienced the lowest net job creation, shredding on average more than 10,000 jobs on a year-on-year basis. Micro enterprises, on the other hand, seem to be the ones contributing the most to net job growth. This result holds regardless of the size classification method, even though the net job creation of these enterprises is slightly smaller if we use the average classification methodology. Interestingly, by using the dynamic size classification, micro firms are the only ones generating positive net job creation.

From this very simple analysis, we can already draw some interesting conclusions regarding the dependency effect on job creation. On average, dependent firms represent the majority of the population, employing almost 100,000 employees more than the independent enterprises (but this is most likely due to the presence of large mother companies). Moreover, the vast majority of employees within the dependent firms class work in controlled enterprises. In other words, most dependent enterprises are tightly controlled by their mother company (in terms of ownership). Independent firms, on the other hand, have a much higher gross creation and destruction, together with the highest net job growth. However, in Table 1 we are not separating the size effect and the dependency effect. For example, it might be that very low net job creation of dependent firms is due to the fact that larger companies are more likely to belong to this category and hence distort their actual contribution to job creation. Below, we report similar figures for SMEs and considering different type of dependency.

	Total Number of Employees	Gross Creation	Destruction	Net Job Creation
Average Size Classification				
Medium Dependent	161, 656	13, 288	16, 513	−3, 224
Small Dependent	72, 757	8,665	9, 608	−942
Micro Dependent	16, 137	3,341	3, 378	−36
SMEs Dependent	250, 551	25,296	29, 500	−4, 203
Medium Controlled	155, 015	12, 594	15, 953	−3, 359
Small Controlled	67, 371	7, 937	9, 028	−1, 090
Micro Controlled	14, 223	2, 945	3, 028	−82
SMEs Controlled	236, 609	23, 477	28, 010	−4, 533
Medium Independent	73, 938	8, 339	10, 045	−1, 706
Small Independent	183, 901	26, 004	23, 946	2, 058
Micro Independent	301, 202	71, 570	66, 102	5, 468
SMEs Independent	559, 042	105, 913	100, 093	5, 819
Dynamic Size Classification				
Medium Dependent	152, 675	12, 970	16, 278	−3, 307
Small Dependent	67, 119	8, 308	9, 299	−991
Micro Dependent	14, 736	3, 253	3, 562	−309
SMEs Dependent	234, 531	24, 532	2, 9141	−4, 608
Medium Control	146, 267	12, 332	15, 746	−3, 414
Small Control	61, 856	7, 585	8, 749	−1, 164
Micro Control	12, 883	2, 816	3, 218	−401
SMEs Control	221, 007	22, 735	27, 715	−4, 979
Medium Independent	78, 289	8, 080	11, 098	−3, 017
Small Independent	187, 649	25, 158	24, 297	861
Micro Independent	291, 335	72, 767	66, 318	6, 449
SMEs Independent	557, 274	106, 006	101, 714	4, 292

Table 4: Average number of total number of employees, gross creation, destruction and net job creation for small, medium and micro enterprises, divided by dependency status.

The results reported in Table 4 underline some substantial differences between dependent and independent firms, with respect to employment creation and destruction. Within the small and medium enterprises, independent firms represent the largest category, with more than the double the FTEs of dependent companies. Moreover, independent firms have experienced a much larger gross job creation and destruction, during our sample. Finally, companies which belong to the independent category seem to be the main source of the positive net job creation observed for small and micro enterprises.

The channels underlying the effect of dependency on firms' job creation does not have a clear *a priori* positive or negative impact. On the one hand, we expect that small firms belonging to a corporation benefits to the access of a large stock of human capital and knowledge which is likely to be available to the mother company. Moreover, the subsidiary can benefit from participation to the formal and informal networks of a large corporation, e.g. the ability to reach new clients and suppliers. These benefits can lead to a better performance of the small company, which in turn can lead to an increase in its size and hence to a larger job creation. On the other hand, a mother company can consider its subsidiaries as small parts of its production process, which are highly specialized. For example, a large mother company might be in charge of the administrative side of multiple subsidiaries, which would not require separate staff to handle managerial duties. In this way, the small enterprises belonging to a large corporation would be organized in a way to achieve maximum productivity and hence they might actually reduce the number of employees, leading to a lower job creation of dependent companies.

The findings outlined in this subsection point toward a negative impact of dependency onto job growth, with small companies belonging to a corporation showing negative job creation. Small dependent firms seem to be restricted to a specialized task and do not increase in size. The fact that they have been shredding jobs can be interpreted as an attempt of their mother companies to achieve high levels of productivity. Another possible explanation is that small dependent enterprises have been dragged down by the poor performance of their large mother companies, which have been declining in terms of job creation.

4.1 Dependencies and the role of age

Even though the results of Table 4 are extremely interesting in the light of showing the dependency effect against the size effect in job creation, we should examine another factor that has been regarded in the literature (see, e.g., Haltiwanger et al., 2013) as key in explaining the net job creation of different types of enterprises, i.e. firm age. To address this issue, we use two different datasets containing dependent and independent SMEs. The first dataset is the same adopted to obtain the results in Table 3 and 4 and considers entries and exits of firms, while the second one includes only continuous firms, i.e. present throughout our sample. In this way, we compare companies which have been long lasting, at least toward the end of the sample, and hence the effect of age should be milder. For example, Haltiwanger et al. (2013) show that the effect of age on the job creation of firms of different size is especially strong on start-up companies, while it reduces substantially for older enterprises.

In Table 5, we report the net job creation rates for dependent and independent medium, small and micro firms, computed using (1) and (2). To keep the analysis contained, we consider the results for the average size classification methodology only.

	$NJCR^1\%$	$NJCR^2\%$	$NJCR^1\%$ Continuous	$NJCR^2\%$ Continuous
Medium Dependent	-0.23	-1.71	-0.03	0.04
Small Dependent	-0.07	-1.04	-0.006	0.11
Micro Dependent	-0.002	-0.45	-0.007	-0.74
SMEs Dependent	-0.31	-1.39	-0.04	0.07
Medium Controlled	-0.25	-1.85	-0.04	-0.05
Small Controlled	-0.08	-1.52	-0.01	-0.12
Micro Controlled	-0.006	-0.92	-0.006	-0.21
SMEs Controlled	-0.33	-1.62	-0.06	-0.05
Medium Independent	-0.12	-3.21	0.15	0.80
Small Independent	0.17	0.87	0.28	0.79
Micro Independent	0.43	2.07	0.19	0.46
SMEs Independent	0.47	0.97	0.63	0.64

Table 5: Net job growth rates for micro, small and medium sized enterprises, divided by dependency status. Both the dataset with entries and exits and the one with long-lasting firms only are considered and results are obtained using the average size classification.

The results included in Table 5 confirm the strong effect of dependencies on the net job creation and the rate of growth of firms of different size class. Enterprises which depend or are controlled by a mother company have lower job creation rates and seem to grow less. The effect is especially pronounced for small and micro enterprises, while medium independent enterprises seem to have a lower growth rate, with respect to their initial

size (i.e. looking at $NJCR^2$), compared to their dependent counterparts. However, they have a larger net job creation with respect the overall number of employees.

These considerations are not affected by shifting our focus to continuous enterprises. When we consider more stable companies, the net job creation rates and the growth rates of dependent firms become less negative or even turn positive. However, independent firms are still the ones that have contributed the most to employment generation.

As additional robustness check, we look at the effect of dependencies on the net job creation rate of SMEs of different age groups. We divide firms in "new" (0-1 year), "young" (2-5 years)," middle-age" (6-10 years) and "old" (10 or more years) and compute their net job creation rates using both formula (1) and (2). Notice that category "new" includes the very important entrant group, for which net job creation corresponds to their gross job creation.

The age of a firm is based on the procedure adopted by Statistics Finland, i.e. by looking at the age of the legal unit. This method is not flawless because a legal unit can be considered new if it is the result of legal restructuring. As pointed out in Hyytinen and Maliranta (2013), using the administrative age tends to make the firms look younger. Notice that we are interested in comparing dependent and independent enterprises, so the problem is centered on how the administrative age of dependent and independent firms is sensitive to this issue. It is arguable that young subsidiaries tend to include older enterprises which are formed after restructuring. However, if there is no new legal unit formed after the dependency status change, the age of the enterprise does not change (in other words, the age of the firm does not reset after becoming dependent or independent).

There are however some adjustments that milden this issue: first of all we are not considering large firms, which are the most sensible to this problem. Moreover, in case a firm is considered new because of a restructuring, we have access to its adjusted previous year value. In case that value is present for a given entrant, we omit that firm because it is not a real new entrant (greenfield entry). Finally, we want to stress that we are looking at organic changes of FTEs, so we are already filtering out the effects of mergers and split-offs when calculating the net job creation of the different groups. To see the effect of this adjustment, we also report the results where we consider all new firms based on the age of the legal unit (i.e. without making a greenfield entry adjustment). Results are reported in Table 6.

	$NJCR^1\%$	$NJCR^2\%$
Greenfield Dependent	0.13	
New Dependent	0.14	36.50
Young Dependent	−0.014	−0.28
Middle-age Dependent	−0.06	−2.14
Old Dependent	−0.40	−2.91
Greenfield Controlled	0.11	
New Controlled	0.12	34.46
Young Controlled	−0.02	−0.79
Middle Age Controlled	−0.06	−2.46
Old Controlled	−0.40	−3.09
Greenfield Independent	1.13	
New Independent	1.16	95.36
Young Independent	0.35	4.75
Middle-age Independent	−0.10	−2.19
Older Independent	−1.01	−3.75

Table 6: Net job growth rates for SMEs, divided by dependency status and age. Results are reported in percentage points.

First of all a word on the difference between greenfield entries and entrants based on their administrative age. As it can be seen, for all categories, the job creation of greenfield entrants is very similar to the net job creation of formal entrants. We have checked the average number of firms that are not real entrants and find that the proportion of non-greenfield entrants in the dependent category is 37% while it is 22% for independent firms. Moreover, looking at the results, it seems that most of the net job creation of new firms is due to greenfield entrants. Finally, and most importantly, using greenfield entrants does not remove the effect of dependencies, with the job creation of new independent firms 1% higher than the one of dependent firms. Notice that we do not report $NJCR^2$ for the greenfield entrants because the number of workers in that group corresponds to the job creation for that group.

Looking at the rest of the results in Table 6, we see that after we control for different age groups, we find an interesting pattern in the effect of dependency status. In particular, it seems that there is an inverse relationship between the effect of dependency on net job creation and the age of the enterprise. For new and young firms, we clearly see that being dependent has a negative effect on the net job creation, especially for new firms. The employment generated by new enterprises which are independent is almost 10 times higher than their dependent counterparts, while for young firms we find that dependent firms have a negative job creation rate against the positive one of independent companies. These considerations are even more clear when we look at the

$NJCR^2$, i.e. how the group we are examining grew. We find that independent young firms have experienced an average yearly growth of 4.75% while dependent firms have a mildly negative job creation. Moreover, we can see that the group of independent new firms has experienced a growth rate which is almost three times the one of dependent new companies (notice that the very large values for $NJCR^2$ can be explained by the strong effect of entrants).

Things become radically different when we look at older enterprises. For middle-age firms (6 to 10 years old), we find that the dependency status does not have a large effect, especially when looking at the $NJCR^2$. However, when looking at older firms, we find that independent companies have had a substantially lower net job creation rate, both with respect to the overall economy (i.e. $NJCR^1$) and to their own size (even though to a smaller extent).

This interaction between firm age and the dependency status can be explain by the *experimentation* process (see Brynjolfsson, McAfee, Sorell, and Zhu, 2007, Hyytinen and Maliranta, 2013, and Gabler and Poschke, 2013) that new firms face when entering the market. It is plausible that a newly formed or young dependent enterprise has a better idea of its productivity potential (for example because it needs to perform a specific task for its mother company), compared to an independent one. This can be reflected in young independent firms creating more employment because they are too optimistic of their production possibilities. In time, when they achieve their long-run level of productivity, independent companies need to shred excessive jobs which they have created during the learning phase. On the other hand, a dependent or controlled company hires less during the initial stage of its life and hence does not need to decrease its labor input as much as its independent counterpart, when it gets older.

To sum up the results of this subsection, we find that controlling for age does not render the dependency status uninfluential in explaining the heterogeneity in the net job creation of Finnish enterprises. However, we find that the impact of dependencies changes as firms get older.

4.2 Cyclical Analysis

The results discussed in the previous subsections evidence the strong impact of ownership structure onto the average gross and net job creation. It is also interesting to analyze how dependency from a mother company affects the sensitivity of a firm to the business

cycle. To do this we compute the euclidean distance between the mean net job creation of a certain category of firms during periods of low and high economic growth. A contractionary period is defined as month in which the indicator of real economic activity[1] is below its trend and vice versa for an expansionary period.

In other words, our measure of sensitivity to aggregate economic conditions is given by:

$$\Gamma_C = \frac{\sqrt{\overline{NJC^2_{Rec,C}} + \overline{NJC^2_{Exp,C}}}}{\overline{E}_C}, \tag{3}$$

where $\overline{NJC}_{Rec,C}$ is the average net job creation for category C during periods of slow economic growth and $\overline{NJC}_{Exp,C}$ is the same measure taken during period of good aggregate economic conditions. Finally, $\overline{E}_C$ is the average number of FTEs for category of firms C, which is used to make the figure comparable across companies of different class sizes and dependency status. Intuitively, a low value of Γ_C indicates that the employment generation of a certain type of enterprises does not vary substantially during different macroeconomic conditions. On the other hand, a large value of this indicator points toward a remarkable sensitivity of certain classes of firms to the business cycle.

We report, in Table 7, this measure of sensitivity to the business cycle for SMEs of various ownership structure, considering both the dataset which includes entry and exit and the one with only continuous companies.

	$\Gamma_C\%$	Γ_C % Continuous
Medium Dependent	3.70	2.32
Small Dependent	3.10	2.10
Micro Dependent	1.86	1.82
SMEs Dependent	3.37	2.22
Medium Control	3.89	2.37
Small Control	3.45	2.20
Micro Control	2.10	1.94
SMEs Control	3.63	2.29
Medium Independent	4.25	3.37
Small Independent	2.86	2.95
Micro Independent	2.89	1.60
SMEs Independent	2.36	2.04

Table 7: Sensitivity of micro, small and medium sized enterprises to aggregate economic conditions. Higher numbers indicate more sensitivity to the business cycle. Both the dataset with entries and exits and the one with long-lasting firms only are considered.

Looking at Table 6, we see that the sensitivity to business cycles varies widely across

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[1]We use the Trend Indicator of Output (TIO), produced by Statistics Finland, as monthly measure of real economic activity.

different types of firms. First of all, it seems that micro firms tend to be more stable with respect to different aggregate economic conditions. While this can be surprising in the light of works such as Gertler and Gilchrist (1994), where smaller enterprises are seen as especially sensitive to economic downturn, it resembles the conclusions obtained in Moscarini and Postel-Vinay (2012). In their analysis, the authors found that larger firms employment behavior exhibits stronger correlation to the business cycle.

Firms' age also plays an influential role in terms of the sensitivity to the macroeconomic cycle. This comes as no surprise, given that we expect older firms to fluctuate less and because we omit entries and exits, which are heavily affected by different economic conditions. The dependency status, however, does not seem to have a clear effect on the cyclicality of job creation. For example, independent medium and micro enterprises seem to be more sensitive to the aggregate economic environment compared to their dependent counterpart, while the opposite holds for small firms and SME category as a whole.

Overall, while dependencies have a strong effect on the average job creation, it does not seem to have a substantial impact on their cyclical behavior.

4.3 Sectoral Analysis

So far, we have analyzed firm-level data without distinguishing the industry to which a certain enterprise belongs to. We can expect the effect of dependencies to vary across different industries. For example, the sharing of know-how between the mother company and its subsidiaries might be more relevant in firms working in the service sector compared to the ones working in the construction or manufacturing sector.

In Table 7, we examine the net job creation rate defined following (1), where we use the total number of employees belonging to an industry as the denominator. We do this for dependent and independent SMEs belonging to various industries. For the sake of brevity, we limit our analysis to the dataset including entries and exits, and to the average size classification method.

	Dependent	Independent
Medium Construction	−0.003	0.03
Small Construction	−0.01	0.76
Micro Construction	−0.01	1.44
SMEs Construction	−0.036	2.23
Medium Finance	0.11	−0.16
Small Finance	0.023	0.07
Micro Finance	0.04	0.15
SMEs Finance	0.18	0.06
Medium Trade	−0.07	-0.04
Small Trade	−0.07	0.14
Micro Trade	−0.03	0.11
SMEs Trade	−0.17	0.21
Medium Services	−0.10	0.03
Small Services	−0.01	0.39
Micro Services	−0.01	0.83
SMEs Services	−0.12	1.25
Medium Manufacturing	−0.65	−0.40
Small Manufacturing	−0.17	−0.16
Micro Manufacturing	0.03	−0.06
SMEs Manufacturing	−0.80	−0.62

Table 8: Net job creation for micro, small and medium sized enterprises, divided by industry and dependency status. We consider only the average classification methodology and the dataset with entries and exits.

Table 8 highlights some interesting industry specific features to the relationship between dependency and job creation. Importantly, there is no a unique effect of dependency across industry. While we see that independent companies belonging to the service, trade and construction industries show substantially larger net job creation with respect to their dependent counterparts, the same cannot be said for the finance and manufacturing industries. In particular, the net job creation of enterprises in manufacturing do not seem to be affected greatly by the dependency status. Moreover, we find that independent firms in the finance industry have experienced lower growth compared to the dependent ones.

The results reported in this subsection shed some more light onto the possible interpretation of the general finding of the negative impact of dependency on job creation. One can argue that in the service and trade industries the mother company can intervene strongly in the administration side of its subsidiaries, which are then limited to some specialized tasks. On the other hand, in the manufacturing industry it is likely that the mother company cannot centralize some activities in the same fashion.

4.4   The Role of Foreign Ownership

As mentioned in Section 3, our data on foreign controlled enterprises start in January 2007. Given that this period is of particular importance, in the light of the Great Recession, and given the possible idiosyncrasies characterizing firms belonging to a foreign corporation, we decided to analyze them separately. In tables 9 and 10, we report both net job creation rate measures defined in Section 2 and the business cycle sensitivity indicator, respectively. We compare foreign controlled firms with the behavior of independent companies during the same sample period and consider both the data including entry and exit and the one with continuous firms only.

	$NJCR^1\%$	$NJCR^2\%$	$NJCR^1\%$ Continuous	$NJCR^2\%$ Continuous
Medium Foreign	-0.13	-1.61	-0.08	-1.89
Small Foreign	-0.03	-1.62	-0.01	-0.76
Micro Foreign	0.01	0.83	-0.0003	-0.07
SMEs Foreign	-0.15	-1.42	-0.10	-1.52
Medium Independent	-0.47	-5.40	-0.016	-0.35
Small Independent	-0.20	-0.73	-0.050	-0.35
Micro Independent	0.71	1.53	-0.08	-0.44
SMEs Independent	0.03	0.08	-0.14	-0.40

Table 9: Net job growth rates for micro, small and medium sized enterprises, divided by dependency status. Both the dataset with entries and exits and the one with long-lasting firms only are considered and results are obtained using the average size classification.

	$\Gamma_C\%$	$\Gamma_C\%$ Continuous
Medium Foreign	5.67	4.22
Small Foreign	4.67	3.21
Micro Foreign	4.73	1.75
SMEs Foreign	4.75	3.82
Medium Independent	3.27	2.07
Small Independent	3.34	2.34
Micro Independent	2.30	1.80
SMEs Independent	2.81	2.03

Table 10: Sensitivity of micro, small and medium sized enterprises to aggregate economic conditions. Higher numbers indicate more sensitivity to the business cycle. Both the dataset with entries and exits and the one with long-lasting firms only are considered.

Tables 9 and 10 highlight some surprising results which go in a different direction compared to what we have found so far. Medium and small foreign-controlled firms show a higher (albeit still negative) net job creation rate from 2007 to 2014, compared to their independent counterparts. On the other hand, micro independent enterprises had

a much better performance, in terms of job creation. Looking at the overall SMEs group, we find that both net job creation rate measures indicate a superiority of independent firms in generating employment. For long-lasting enterprises we find that the for all SMEs the dependence status has a positive effect on the net job creation rate, but they have grown less (as evidenced by lower $NJCR^2$).

The results contained in Table 10 evidence a clear characteristic of foreign-controlled firms, i.e. their high sensitivity to the business cycle. Enterprises that are controlled by a foreign corporation adjust better to different economic conditions and adjust their employment level accordingly. This holds true for both the data including entry and exits and the one with only continuous firms. An explanation for this result can be found in the fact that a foreign corporation can adjust production across different countries and reallocate resources based on the business cycles of the various economies in which it operates more easily.

4.5 A possible explanation: cross correlations of net job creations

So far, we have described the data agnostically, i.e. we did not seek a possible explanations to why dependent and independent SMEs show different patterns of employment behavior. In particular, we have found that independent firms have been more successful in creating new jobs, even though we have not determined a possible cause.

One of the most simple explanations is that dependent small enterprises are heavily affected by the performance of their mother company. This kind of relationship would be reflected in substantially higher correlations between the net job creation of large and dependent companies against the one between small independent enterprises and big firms. We report these correlations in Table 11, where we use the average size classification methodology and examine both data with entry and exit and continuous firms.

In Table 11, we can see that the net job creations of independent firms are substantially less correlated with the one of large firms, compared to the controlled and dependent enterprises. This can point out to a "dragging down" explanation for the lower net job growth of dependent companies. However, there is a caveat: the performance of large companies, especially in a small economy as the Finnish one, can be an indicator of aggregate economic conditions and a lower correlation to the net job creation of large companies can simply indicate a lower sensitivity to the business cycle

	Medium	Small	Micro
Dependent	0.773	0.740	0.275
Controlled	0.776	0.743	0.244
Foreign	0.398	0.429	−0.056
Independent	0.664	0.662	0.601
	Continuous	Firms	
Dependent	0.814	0.766	0.641
Controlled	0.813	0.743	0.634
Foreign	0.761	0.808	0.648
Independent	0.747	0.811	0.675

Table 11: Correlations of net job creation rates between SMEs and large firms.

of independent firms. We touched on this point in section 4.2, but we could not identify a clear relationship between dependence status and business cycle sensitivity. For the micro enterprises, however, it seems that independent firms are more correlated to large enterprises than the dependent ones. This result might be driven by the very small values of net job creation of micro dependent enterprises.

Another interesting fact is the low correlation between foreign controlled firms and big Finnish companies. We have found, in Section 4.4, that foreign controlled enterprises are especially sensitive to the aggregate conditions of the Finnish economy. In the light of these results, the low correlations of Table 11 can be explained by the effect of large Finnish companies performance and not by a business cycle explanation, giving support to a possible dragging down effect underlying the lower net job growth of dependent firms.

Finally, in the case of continuing firms, we see slightly higher correlations coefficients with the net job growth of large companies (especially for the foreign controlled SMEs). This can be explained by the intrinsically higher stability of this kind of enterprises which show a common correlation with the overall trend underlying the economy.

5 Conclusions

We contribute to literature on the relationship between firms' size and job creation by investigating an additional source of heterogeneity within the SMEs, i.e. their dependency status. In particular, we separate the small and medium enterprises population using different degrees of control and examine their gross job creation and destruction, together with their net job growth.

We find that independent SMEs have experienced, on average, higher net job creation

compared to firms which depend on a mother company. This result holds for all the size classes and different degrees of control. Moreover, we find that the negative effects of dependency onto job creation is present also when we examine only long-lasting enterprises. However, controlling for firm age introduces an inverse relationship between the effect of dependencies on job generation and the age of the company. In particular, young independent firms generate much more employment than their dependent counterparts, but older independent companies have slightly lower net job creation rates compared to subsidiaries. We also find that SMEs in different industries exhibit different patterns. Importantly, dependency status does not seem to play a large role in the job creation for the manufacturing industry, or at least not to the same extent as in the services and trade sector. Finally, we do not find a specific impact of dependencies onto the sensitivity of SMEs to the business cycle.

There are multiple channels that can explain the negative effect of being a subsidiary on the job creation of small firms. First of all, dependent enterprises are more than likely influenced by their mother company in their hiring decisions. If the mother company is shredding jobs, as it can be seen in the very negative net job creation of large companies in Table 3, it will probably impact its subsidiary, by blocking the creation of new jobs or even imposing job cuts to its small affiliates. This explanation is partially supported by the findings reported in Table 11, where dependent firms exhibit higher correlations with large companies. Another explanation can be found in the attempt to achieve higher productivity. It is possible for the mother company to centralize some tasks which were previously conducted within the subsidiary. In this view, the mother company sees the small subsidiary as a small part of the production process and does not have particular incentives in increasing the scale of its controlled firms. This reasoning can explain the results of Table 6, where dependent firms hire less during the early years but destroy fewer jobs once they get older.

The analysis conducted in this paper can be extended in multiple ways. First of all, we can examine different aspects of dependent and independent SMEs, other than employment. For example, we could look at labor productivity or the value added produced in different types of small enterprises, based on their dependency status. This productivity study could indicate if mother companies focus on keeping their subsidiaries small and efficient, explaining their lower job creation. Moreover, it could be interesting to analyze the share of firms contributing to the negative and positive job

creation inside a given category. In this way, we could see if the negative job creation is generated by the largest companies within a size class or if the contribution to the job creation is evenly distributed.

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6   Appendix A: Adjustment for entry and exit.

In this appendix, we discuss the details the procedure adopted by Statistics Finland to control for merger and split-offs in a set of enterprises. Assume that firm 1 is examined after an event (merger or split-off) where N firms are involved. Then the estimated employment of firm 1 one year ago is calculated by:

$$emp(firm_{1,t-12}) = \frac{emp(firm_{1,t}) * emp(firm_{1,t-12}, firm_{2,t-12}...firm_{N,t-12})}{emp(firm_{1,t}, firm_{2,t}...firm_{N,t})}$$

where t is the time periods in which the adjustment is computed, and N is the number of firms involved in a merger or split-off. The sum of the previous year employment levels in all the firms involved in the event is divided for each continuing firm weighted by their relative size at present time t. Let us go through some simple numerical examples to see how this works:

1. Assume a firm A with 2 employees in period t, that had 1 employee in t-12. Firm A acquires firm B with 1 employee at time t, m and 1 employee one year ago. Firm A, which continues existing, will be assigned a new estimated number of employees for the comparison year, in order to make the growth rates comparable year-on-year. The comparison values of firm A is estimated as $\frac{2(1+1)}{(2+1)} = 4/3$, and the rate of change for A becomes $(2 + 1)/(4/3) = 2.25$ (as opposed to 3 if no correction is done)

2. Consider the situation where firm A is split into smaller units, say B and C. A has 3 employees at time $t - 12$, B has 3 employees at t and C has 2 workers at t. B and C did not exist at $t - 12$, so their comparison values become: $(3/3)3 = 3$ and $(2/3)3 = 2$, resulting in the rate of change for B and C to be 3/3 and 2/2 (equal to 1 for both firms). The growth rate is forced to be the same among the continuing firms after a split-off.