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Start-ups as drivers of market mobility:

An analysis at the region-sector level for the Netherlands

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Abstract

We investigate the impact of start-up rates on a measure of competition among incumbent firms called market mobility. While recent literature suggests that competition among incumbent firms is caused by (lagged) start-up rates, this relation has not yet been tested using a direct measure of competition among these firms. In the present paper we estimate a regression model, at the region-sector level for the Netherlands, where the mobility rate is explained by (lagged) start-up rates and control variables. Using data for 40 regions and five sectors over the period 1993-2006 we find that the impact of start-ups on market mobility varies by sector. We find a strong positive relation between start-up rates and mobility rates for industry sectors (manufacturing and construction) but an insignificant relation for services sectors. These results suggest there are differences in the types of entry between sectors and in the roles start-ups play in different sectors.

Keywords: new-firm start-ups, incumbent firms, competition, market mobility

JEL: O18, L16, M13

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INTRODUCTION

We investigate the impact of start-up rates on a measure of competition among incumbent firms called market mobility. Interactions between new and incumbent firms play an important role in the process of economic growth, and more knowledge on these interactions is required. Our paper fits in a recent strand of empirical research at the regional level (see FRITSCH, 2008, for a survey) which suggests that competition among incumbent firms is caused by (lagged) start-up rates. Contrary to earlier research in this field the present paper employs a direct measure of the level of competition among incumbents, which is called (market) mobility (CANTNER and KRÜGER, 2004; FOLKERINGA et al., 2008). The mobility rate measures to what extent the relative performance of firms (in terms of market shares of individual firms) changes over time. Based on Joseph Schumpeter's theory of creative destruction we hypothesize that the mobility rate is positively influenced by start-up rates. New firms challenge existing firms by introducing new products and services and market selection will cause the best firms to survive and grow and the least competitive firms to downsize or exit. This should be reflected in a higher value of the market mobility rate.

In the present paper we test our hypothesis by estimating a regression model, at the region-sector level for the Netherlands, where the market mobility rate is explained by (lagged) start-up rates and control variables. Using data for 40 regions and five sectors over the period 1993-2006 we find that the impact of start-ups on mobility varies by sector. In particular, we find a strong positive relation for industry sectors (manufacturing and construction) but an insignificant relation for services sectors. These results suggest there are differences in the types of entry between sectors and in the roles start-ups play in these sectors.

Our analysis contributes to existing literature in at least three ways. *First*, we estimate the extent to which competition among incumbent firms is related to the number of new-firm start-ups while using a direct measure of competition among incumbents. Earlier studies estimate the impact of new-firm start-up rates on regional economic performance, and decompose the total impact of the new firms in direct and indirect effects. The indirect effects are then *assumed* to be the result of increased levels of competition among incumbent firms but these levels are not actually measured (see e.g. FRITSCH, 2008; FRITSCH and MUELLER, 2004; VAN STEL and SUDDLE, 2008). Given the high importance for regional growth ascribed to these indirect effects (FRITSCH AND NOSELEIT, 2008), it is crucial to start using direct measures of competition when investigating interactions between start-ups and incumbents.

Second, when using a direct measure of competition, we use a measure that acknowledges the increased importance of small and medium-sized firms in modern economies (AUDRETSCH AND THURIK, 2001, 2004). While concentration measures like the C4 index or the Herfindahl index strongly emphasise the importance of the leading (biggest) firms in a market, our market mobility index uses information on relative performance of *all* firms in a market. In this paper we employ a unique data base where we can follow hundreds of thousands of firms over time. This way we are able to capture competition dynamics in all parts of the size distribution, not only the upper tail. Moreover, while the C4 and Herfindahl measures are static in nature, the mobility index captures changes over time. It may be argued this reflects the intensity of competition in a market more accurately (BALDWIN and GORECKI, 1994).

Third, combining various data sources we are able to perform our analysis at the level of industries and regions. Our scope of analysis is unprecedented. Previous studies focused mainly on mobility patterns within manufacturing industries and/or within the subset of large or leading firms (see e.g. STONEBRAKER, 1979; BALDWIN and GORECKI, 1994; DEUTSCH and SILBER, 1995; KAMINARIDES and FARAHBOD, 1995; KATO and HONJO, 2006; for a survey see CAVES, 1998). The database employed for the present paper covers the whole Dutch private sector including all non-agricultural industries. Moreover, as mentioned earlier, for each sector it uses data for all firms, not only the large firms.

The organisation of the paper is as follows. We start with a short review of the literature concerning the relation between start-ups and the degree of competition between incumbent firms, which in turn should lead to (regional) economic development. As one important contribution of the paper is the use of a direct measure of the outcome of this competition process, viz. the market mobility index, the next section discusses how this index is derived and elaborates on its specific characteristics. Next, we describe our database and empirical model. In the next sections descriptive statistics and estimation results are presented and interpreted. The final section concludes.

THE RELATION BETWEEN START-UPS, MARKET MOBILITY AND GROWTH

Both researchers and policy makers view business dynamics as one of the driving forces of economic growth. Various terms have been used by various authors to indicate business dynamics. In this paper we follow Caves' terminology on the three different components of business dynamics[1] (see CAVES, 1998): the births and deaths of business units ('entry and exit'), variations in sizes and market shares of continuing units ('mobility') and shifts between enterprises in the control of continuing business units ('changes in control'). We focus on the roles that the first two types of business dynamics play in competition processes. As the term 'mobility' is used for different purposes in economic literature, we refer to 'market mobility' to indicate variations in sizes of incumbent firms.

Economies experiencing a high level of business dynamics (in terms of entry, exit and market mobility) are characterized by many start-up and high-growth firms, but also by many exits and contracting firms. These characteristics reflect a process of fierce competition where new firms enter the market with new products and services and challenge incumbent firms to improve their performance. If not, they might be forced to downsize or even exit the market. This challenge is felt by the incumbent firms, and as a result of new-firm entry, competition among incumbent firms increases. The most competitive entrants and incumbents survive and these businesses grow while the least competitive firms exit the market or are forced to downsize. The result of such a creative destruction process is an ever changing composition of the firm population in an economy where the average quality of the firms is also continuously increasing (as the high quality firms survive and grow and the low quality firms decline or exit). This continuing process should result in long-term growth and higher productivity levels. Therefore, business dynamics may be seen as an indicator of competitiveness of an economy (or industry) and hence economies with higher levels of business dynamics are expected to achieve higher levels of economic performance (BOSMA et al., 2006; VAN STEL and STOREY, 2004).

The theory described above is confirmed by several empirical analyses using micro level data. A standard result in empirical studies on the effect of entries and exits on productivity is that a considerable part of the productivity improvement can be attributed to the entry of new business units with above-average productivity and the exit of units with below-average productivity (FRITSCH and MUELLER, 2004). Using employment as performance measure, other studies show that mobility of incumbent firms results in a net increase in total employment at the industry level. For instance, BALDWIN (1995) divides Canadian manufacturing firms that survived from 1970 to 1982 into those gaining and those losing employment. The average 'gainer' grew by 7.8 percent annually while the average 'loser' shrank by 6.3 percent. For the German case of continuing firms in the non-agricultural sectors during

[1] Instead of our label ‘business dynamics’ Caves uses ‘turnover’ as a general term for the three processes.

1977-1990, BOERI and CRAMER (1992) find that employment increased by 6.2 percent annually for expanding incumbents, while the employment of contracting ones shrank 5.8 percent annually.

Following the studies at the micro level, a growing literature at the aggregate (typically, regional) level pays attention to the role of business dynamics in achieving high rates of economic growth. In particular, special issues of *Regional Studies* in 2004 (volume 38, issue 8) and *Small Business Economics* in 2008 (volume 30, issue 1) have been influential in this field. See ACS and STOREY (2004) and FRITSCH (2008) for surveys of these special issues. Recent empirical studies in this field typically tend to use several lags of the start-up rate as determinants of (regional) economic growth and decompose the total effect of start-ups on growth into direct and indirect effects using the Almon lag method (see e.g. FRITSCH and MUELLER, 2004; VAN STEL and SUDDLE, 2008). In this type of studies, the indirect effect relates to the effect of increased competition between incumbent firms, induced by the new-firm start-ups. However, a limitation of these studies is that the intensity of competition among the incumbents is not actually measured. As a result, the relation between start-ups and competition among incumbents is not statistically robust. Since the Almon lag studies suggest that the indirect effects may be considerably large, it is of vital importance to measure the extent of competition among the incumbent firm population, and to measure directly the relation between start-ups and competition among incumbents in a regression model. As discussed before, the current paper attempts to fill these two gaps.

THE CONCEPT OF MARKET MOBILITY AND ITS MEASUREMENT

Market mobility indicators measure to what extent a ranking of a population of firms (in terms of economic performance) changes over time. If the ranking is stable (i.e. the same firms are at the high and low ends of the ranking in two years of comparison), then market mobility is low. If there is a lot of change in the ranking, then market mobility is high. High market mobility rates are assumed to reflect high intensities of competition. As BALDWIN and GORECKI (1994) put it: "Mobility indices measure the outcome of the competitive process in terms of transfer of market shares from losers to winners. Much of what happens during the competitive process will be manifested by changes in relative firm position" (p. 95).

Although market mobility rates are clearly valid measures of competition, they are rarely used in empirical work. In part this is due to the large requirements - both in terms of data and in terms of methodology - of measuring mobility. Instead, economists often use concentration measures like the C4 index or the Herfindahl index. However, such measures are indirect measures of competition as they only measure market structure at one point in time (BALDWIN and GORECKI, 1994; DEUTSCH and SILBER, 1995). A possible reason for the widely used concentration measures is that they are easy to calculate and widely available. BALDWIN and GORECKI (1994) argue however that mobility statistics are more direct measures of the intensity of competition as they "reflect the process that takes place within an industry" (p. 93).

Hence, a first advantage of mobility rates over concentration measures is that they capture *changes* in market structure, not just a snapshot at a given point in time. A second advantage is that changes in relative firm positions of *all* firms are used. Concentration measures focus solely on market shares of the leading firms and therefore on monopolistic behaviour. As a result, these measures ignore business dynamics among the bigger part of the firm population. Mobility rates capture changes in market structure considering competition dynamics among all firms in the firm distribution.[2] This is appropriate, considering the increased importance of small firms in modern economies (AUDRETSCH AND THURIK, 2001, 2004).

In the current paper we use market mobility indices at the region-sector level for Dutch regions over the period 2000-2006. The indices are computed using the Markov-chain based methodology developed by SHORROCKS (1978) and GEWEKE et al. (1986) and recently applied by CANTNER and KRÜGER (2004). To compute the market mobility indices we use a unique database in which we can follow several hundreds of thousands of individual firms over time on an annual basis. Based on changes over time in the rankings (in terms of employment size) of the individual firms we are able to measure competition processes across sectors and regions. The next subsection describes how the market mobility rates are constructed in practice.

Measuring market mobility

The central issue in measuring market mobility is to capture changes over time in relative firm positions, in terms of economic performance (in our case, relative firm size). This boils down to defining different states, which reflect different levels of relative economic performance of individual firms in a certain market. Thus, all firms in each period are distributed over a number of classes ranging from relatively weak to relatively strong economic performance. A high value of the mobility index reflects high differential changes in this distribution for the market concerned. A sophisticated method to measure mobility indices makes use of an estimated transition matrix of a Markov chain. In such a chain, firms are defined to be in different states, e.g. in terms of size. The transition matrix then provides an overview of the transition probabilities of leaving a particular state (i.e. size-class) and entering a different one

[2] KATO and HONJO (2006) use an indicator which does use changes in market structure, but which capture only the dynamics of the leading firms.

in a certain time period. The matrix also provides probabilities of staying in the same state between two consecutive moments in time. Theoretical work of GEWEKE et al. (1986) and SHORROCKS (1978) shows how mobility indices can be constructed from the elements (transition probabilities) of the transition matrix.

In this paper we use the mobility measure $M_U(\mathbf{P}) = n\sum_{i\in I}\pi_i(1-p_{ii})/(n-1)$, as described by CANTNER and KRÜGER (2004), where ***P*** is the transition matrix, *i* is an index for the relative size-class, *p* is a transition probability, *n* is the number of relative size-classes (four, in our case), and $\boldsymbol{\pi}$ is the vector of so-called stationary probabilities.[3] A detailed description of this index would require going into the specifics of Markov chain methodology, which would require too much space. We will briefly describe the intuition though. In simple terms, a population of firms in a given market is ranked in four quartiles at two points in time, based on their relative employment size. Transition probabilities from size-class *i* to size-classes 1 to 4 are estimated by counting the proportion of firms moving from size-class *i* to size-classes 1 to 4, respectively. The diagonal elements of the transition matrix then provide the probabilities that firms remain in the same (relative) size-class. The mobility measure is constructed in such a way that markets with high values for the diagonal elements (i.e. small probabilities of moving to another size-class), have low market mobility values, and vice versa.

We refer to NORRIS (1998) for a general overview of Markov chains. For an overview of various mobility measures using Markov chain methodology, we refer to CANTNER and KRÜGER (2004). For an application of several of these measures to our Dutch database, we refer to FOLKERINGA et al. (2008). This last study also shows that the correlations between the various variants of the mobility measure are very high (around 0.9). Therefore, in the

[3] As we use relative size-classes (i.e. fractile classes), and four classes in total, the stationary probabilities are 0.25

present paper we will use only one measure which is the $M_U(P)$ measure described above.

Market mobility rates used in the present paper

FOLKERINGA et al. (2008) discuss a number of empirical choices which have to be made when computing mobility indices. The mobility rates used in the present paper have the following starting points. *First*, because the relevant market at which mobility indices are to be computed is often a region instead of a nationwide market, we use data at the establishment level instead of the firm level. *Second*, as we view the mobility index as a measure of competition between incumbent firms (establishments), we exclude the business dynamics that take place in the left tail of the firm size distribution. We only include establishments with five or more workers within the period studied. Firm entries and exits are also excluded from our measures of market mobility, so that we truly obtain a measure of competition among incumbent firms.[4] *Third*, the mobility rates are not annually computed, but refer to a longer term period. When new firms challenge incumbent firms to perform better, in theory they initiate a creative destruction process, where competitive entrants and incumbents survive and grow and inefficient firms exit or decline. However, this process does not materialise in one year but rather takes a considerably longer period.[5] Accordingly, the associated changes in firm rankings expressed by the mobility rate also do not materialize from one year to the next year. Therefore we compute mobility indices over a longer period of time, in this case six years. Specifically, firm rankings in a given market (a region-sector unit, in our case) are compared between January 1st, 2000 and January 1st, 2006 (for firms existing on both dates). *Fourth*,

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for each size-class.

[4] There is also a practical reason. The number of firms with four or less workers forms the vast majority of firms in any economy. Because we use fractile classes to classify the firms in terms of size, there would be too many firms with the same size to distribute the firms over the fractile classes (which by definition are equally large).

[5] According to VERHOEVEN (2004) it takes 7 to 8 years before the productivity level of a new-firm start-up in the Netherlands equals that of an average incumbent.

when computing mobility rates we rank the firms in four quartiles, based on employment size.[6] Hence, a firm moves from one state to another when it moves from one quartile (e.g. the highest 25% of firms in terms of employment) to another. The size-based ranking in quartiles is computed at the regional and sector level, i.e. for each sector in each region we construct a transition matrix based on all firms (>4 workers) within that sector and region.

DATA AND MODEL

In this paper we explain market mobility rates from start-up rates and control variables, at the region-sector level. For the regional dimension we use the NUTS-III spatial aggregation level, also known as COROP classification. This implies there are 40 regions. Regarding sectors, our data allow us to calculate variables according to a five-sector classification (cf. VAN STEL and SUDDLE, 2008): manufacturing (International Standard Industrial Classification code D), construction (ISIC code F), trade (ISIC codes GH), transport & communication (ISIC code I), and services (ISIC codes JKNO). We estimate a model at the region-sector level specified above. The following variables play a role in our empirical analysis (descriptive statistics and/or regression analysis).

- Mobility rate 2000-2006.

This will be the dependent variable in our regression analysis. As described above, mobility rates are computed using data for those establishments which have five or more workers both in 2000 and in 2006. Firm entries and exits are excluded from this measure. Data on individual firms are taken from the data base REACH (REview and Analysis of Companies in Holland), which is operated by a private firm called Bureau van Dijk. The original source of these data is the so-called 'Handelsregister' (Trade record) maintained by the Dutch Chambers of

[6] We also experimented with ten fractile classes, but given that we compute mobility rates at a rather low aggregation level (i.e. per region-sector unit), the number of observations per cell would become too small.

Commerce. Initially, for each region mobility rates are computed at the sector level distinguishing 16 industries (cf. FOLKERINGA et al, 2008). Next, the mobility rates are aggregated towards the five-sector level described above using a sectoral weighting scheme.[7]

- Average start-up rate 1999-2005.

Following the labour market approach we define the start-up rate as the number of new-firm start-ups divided by employment. The data on the number of start-ups are taken from the Dutch Chambers of Commerce. The number of start-ups is defined to include all independent new-firm registrations. It includes both new firms with employees and new firms without employees. Mergers, new subsidiary companies, new branches and relocations to other regions are not counted as a start-up. Data on employment are taken from Statistics Netherlands and the employment figures relate to employee jobs expressed in full-time equivalents (labour years).[8]

- Average start-up rate 1993-1999.

As explained earlier, the impact of start-ups on mobility may be lagged. Therefore we also include lagged start-up rates in our regressions.

- Population density.

In more dense regions local competition may be stronger and this might positively affect mobility rates. Data for population density are taken from Statistics Netherlands.

- Average firm size 2000-2006.

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[7] We aggregate towards the five-sector classification because the start-up rate variable is not available at lower sectoral aggregation levels.

[8] Because of a change in the employment data at Statistics Netherlands, data for 2006 are not comparable to 2005. Therefore, we use the average of 1999-2005 instead of 2000-2006, the period for which we measure mobility.

In markets with larger firms (i.e. higher average firm size) firm movements between fractile classes may occur less often because it requires bigger investments to overtake other firms in the ranking. Stated otherwise, in scale-based industries market structure is generally less volatile. Average firm size is computed as employment (employee jobs expressed in full-time equivalents) divided by the number of firms. Data sources are Statistics Netherlands and the Dutch Chambers of Commerce, respectively.

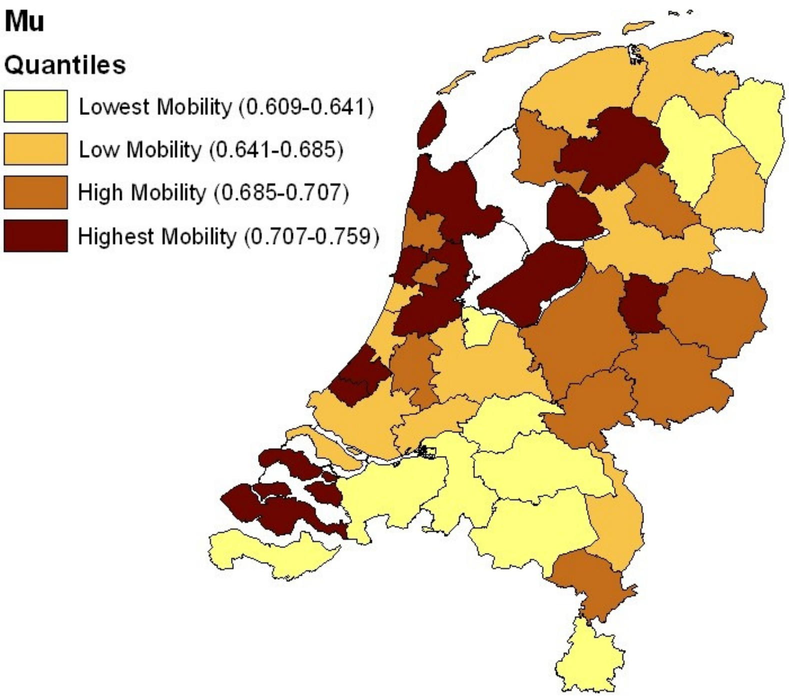
DESCRIPTIVE STATISTICS

In this section we present some descriptive statistics. In particular, we present mobility rates by region, and correlations between regional start-up rates and regional mobility rates, by sector.

Regional differences in mobility rates

Figure 1 illustrates market mobility rates by Corop-region. In the map, the regions have been classified in quartiles of 10 regions. It seems that mobility is particularly high in the regions around Amsterdam / The Hague and the area to the North of Amsterdam (i.e. large parts of the province 'Noord-Holland'). Mobility is also high in Flevoland and parts of Zeeland in the South-west. Mobility is low in the North of the country (with Zuidoost Friesland as a notable exception, perhaps a result of the policy to focus growth around the A7-corridor – with Heerenveen as focus point - which runs through this region) and in Brabant and Limburg in the South. In interpreting Figure 1, one should bear in mind that the regional patterns are to some extent influenced by different sector structures across regions.[9] As we will see in the next subsection, mobility rates vary across sectors.

Fig. 1. Market mobility indices across regions (in quartiles)



Correlations between start-up rates and mobility rates

Table 1 shows the correlations between start-up rates and mobility rates, by sector. In theory a higher start-up rate fuels a creative destruction process which should be reflected in higher mobility rates. Hence we expect correlations to be positive. The results show important differences across industries: manufacturing and construction show relatively large positive correlations (although only significant for manufacturing), while for trade, transport and services the relationship is weak (correlation below or around 0.10). The table suggests that the relationship between start-ups and mobility varies by sector. We will take this into account in our regression analysis.

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[9] The sectoral mobility rates were weighted by sector employment to arrive at an aggregate regional mobility rate.

Table 1. Correlations between start-up rates and mobility rates

Correlation	Manufac-turing	Construc-tion	Trade	Transport	Services
Start-up rate – Mobility rate	0.54***	0.22	0.10	0.02	0.12
Lagged start-up rate – Mobility rate	0.49***	0.25	-0.01	-0.11	0.07
Sample averages					
Average firm size 2000-2006	13.86	4.20	4.37	8.36	6.57
Mobility rate 2000-2006 (x100)	55.71	68.88	71.50	64.52	71.00

Note: Start-up rate relates to period 1999-2005, lagged start-up rate relates to period 1993-1999, mobility relates to period 2000-2006. Each correlation is based on 40 observations (regions).
***: p<0.01; **: p<0.05; *: p<0.10

REGRESSION ANALYSIS

In our regression analysis, we assess the impact of start-up rates on market mobility while controlling for other explanatory factors. From our theoretical framework, we expect that new firms challenge incumbent firms, which should lead to increased competition, reflected by higher mobility rates. This suggests a positive relationship between start-up rates and mobility. As the lag with which this may occur is not known beforehand, we run model variants using current and lagged start-up rates. In the models, population density is included as a catch-all variable that is strongly correlated to aspects such as educational attainment, income levels and market access. Its expected impact is positive. Furthermore, we control for sector. Mobility rates are structurally different across sectors (see Table 1, and also FOLKERINGA et al., 2008). We control for this by including a set of sector dummies. Among other things, the sector dummies correct for the impact of different scales of operation across different sectors, possibly influencing market mobility (see also Table 1).

As we have seen from the correlation table, the relation between start-ups and mobility appears to vary by sector. Therefore we would like to estimate the model separately for each sector. However, as this would result in quite small samples (40 observations per sector) we choose to cluster manufacturing and construction (which may be labeled 'industry') on the one hand and the other three sectors (which may be labeled 'services' in a broad sense on the other hand. This results in estimation samples of 80 and 120 observations, respectively. As mentioned, when estimating these models we do include sector dummies at the five-sector level though.

Table 2 presents regression results for all five industries together, while Tables 3 and 4 deal with the separate results for Industry and Services, respectively. Each table has four model variants. The first variant includes the start-up rate as well as the control variable population density. The second variant adds sector dummies to the model. Variants three and four repeat variants one and two, the difference being that lagged start-up rates are used instead of current start-up rates. In all model variants, outlier observations are excluded from the estimations (seven in total).

We start by analyzing Table 2 (results for all industries). Our control variable population density is consistently positive but insignificant except for the fourth model variant. Apparently, population density only weakly affects regional variations in market mobility. Comparing models 1 to 2 on the one hand, and models 3 to 4 on the other hand, we see that the loglikelihood value increases considerably. Indeed, likelihood ratio tests confirm that the model fit increases significantly by including the sector dummies. Hence, for further interpretation of our results we focus on models 2 and 4. We see that the impact of the current start-up rate is significantly positive (model variant 2). However, the impact of the lagged start-up rate is not significantly different from zero, suggesting the positive impact emerges relatively fast. The effects vary by sector though, as we will discuss below.

In Table 3 we see that for manufacturing and construction, the impact of start-ups on market mobility is positive and highly significant in all variants, suggesting fierce competition between new and incumbent firms. Likelihood ratio values do not increase much as a result of including the sector dummy and according to statistical tests, model 2 does not outperform model 1. On the other hand, model 4 does outperform model 3. As models 1 and 4 are thus the preferred models, we conclude the coefficient for the start-up rate is about 0.35. The similar magnitude for the current and lagged start-up rates suggests that the actual lag is somewhere in between one and seven years. It takes some time before new firms actually challenge incumbent firms.

In Table 4 results for Services sectors (trade, transport, and business services) are presented. We note that in models 1 and 3 the effect of the start-up rate is positive and highly significant. However, these results are driven by sector differences between trade, transport, and business services, and merely reflect differences in mobility rates across these sectors. When we control for sector dummies the effect disappears. Hence we do not find evidence for a relation between start-ups and mobility for services sectors.

The insignificant effect for Services is contrary to our expectations, but the combined picture with the estimated large effects for Industry appears to be consistent with earlier findings. We pose three possible explanations for our estimation results. First, VAN STEL and SUDDLE (2008) find that, compared to other sectors, the impact of new firm formation on regional economic development is by far the largest for start-ups in manufacturing. The authors argue that differences in innovation characteristics between manufacturing industries and services industries are an important discriminating factor. Innovations in services industries are often non-technological and mostly involve small and incremental changes in processes and procedures, while innovations in manufacturing may have greater impact as they tend to require more R&D and are often more radical in nature. New firms performing innovative activities may therefore be more of a threat to incumbent firms in manufacturing industries compared to services industries. Hence, in manufacturing, incumbent firms are actually challenged by (innovative) newcomers so that they are forced to perform better as well. This increases competition among incumbent firms, which is reflected by higher market mobility levels (and hence a significant relation between start-ups and mobility).

A second argument is that entry barriers may cause a selection effect among potential entrants. It is well-known that entry barriers in manufacturing sectors are more apparent than in services sectors. Entry may be deterred by forcing the entrant to come in at large scale and high risk, or to come in at small scale at a cost disadvantage (economies of scale). Entry may also be deterred by the fact that established firms have brand identification and consumer loyalties (product differentiation) and the need to invest large amounts of capital in order to compete, particularly if the capital is required for risky or unrecoverable up-front advertising or R&D (capital requirements). These entry barriers are related to the uncertainty of entrants' investments and have consequences for the number of entrants and the commitments they choose (CAVES, 1998). The large investment requirements for setting up a business in Industry sectors (particularly manufacturing) and the uncertain rewards impose a relatively high barrier. Therefore, gross entry tends to be lower for Industry sectors than for Services. However, as a result the average quality of entry might be higher for Industry sectors, given that a potential entrant thinks twice about entering a market with such high entry barriers. YIP (1982) argues that 'gateways to entry' might exist through the unique set of skills, resources, and networks possessed by potential entrants. For markets with relatively high entry barriers it is more likely that entrants actually possess these qualities, while those who think they do not possess these qualities will not enter, due to the greater risks involved. To the contrary, in large parts of the Services sector, start-up costs are relatively low and therefore the potential loss of investment costs is much lower, enabling many potential entrants (even low quality entrants) to 'try their luck'. As a result of the high quality entry in Industry sectors, incumbent firms are more heavily challenged by the entrants, which increases competition and drives mobility rates upwards.

Third, in the Netherlands there is a trend that many solo self-employed (entrepreneurs owning businesses without employees) enter the labour market. These individuals start businesses not because they intend to grow their business but because they prefer the freedom of working autonomously, instead of working as an employee where they have to answer to managers. Typically, these entrepreneurs enter in services sectors where entry barriers are low. In recent decades, an increased differentiation of consumer services, declining transaction costs and increasing network economies related to information technology, have made it possible for these entrepreneurs to maintain viable firms at a very small scale (WENNEKERS et al., 2008). However, as these entrepreneurs do not have the intention to grow their business, they are also not really challenging incumbent firms, consistent with a lack of significant relation between start-ups and mobility rates in services. The phenomenon of the solo self-employed is almost non-existent in manufacturing as working without employees implies operating far below the minimum efficient scale.

Table 2. Estimation results all industries (total sample)

Variable	**I**	**II**	**III**	**IV**
Constant	61.36 (1.12)***	62.56 (1.20)***	58.27 (1.24)***	62.48 (1.35)***
Population density	0.10 (0.09)	0.10 (0.07)	0.14 (0.09)	0.12 (0.07)*
Start-up rate (99-05)	0.29 (0.07)***	0.21 (0.11)**		
lagged Start-up rate (93-99)			0.59 (0.09)***	0.16 (0.11)
Dummy Manufacturing (D)		-8.19 (1.33)***		-8.16 (1.38)***
Dummy Construction (F)		-3.68 (2.35)		-1.02 (1.52)
Dummy Trade (GH)		5.60 (1.43)***		5.82 (1.46)***
Dummy Transport (I)		--		--
Dummy Bus. Services (JKNO)		5.05 (1.45)***		5.98 (1.32)***
R-squared	0.10	0.53	0.20	0.52
adjusted R-squared	0.09	0.51	0.19	0.51
loglikelihood	-664.01	-602.01	-653.29	-602.82
N	193	193	193	193

Note: Pooled OLS regressions for all industries (outliers excluded), standard errors in parentheses.
Dependent variable: Mobility rate.
***: $p<0.01$; **: $p<0.05$; *: $p<0.10$.

Table 3. Estimation results Industry (manufacturing + construction)

Variable	**I**	**II**	**III**	**IV**
Constant	54.76 (1.13)***	59.15 (3.15)***	53.81 (1.21)***	58.64 (2.61)***
Population density	0.01 (0.10)	0.06 (0.11)	0.03 (0.10)	0.07 (0.10)
Start-up rate (99-05)	0.38 (0.05)***	0.21 (0.13)*		
lagged Start-up rate (93-99)			0.63 (0.09)***	0.36 (0.16)**
Dummy Manufacturing		-4.53 (3.04)		-4.74 (2.28)**
Dummy Construction		--		--
R-squared	0.43	0.44	0.43	0.46
adjusted R-squared	0.41	0.42	0.41	0.44
loglikelihood	-242.49	-241.33	-242.31	-240.10
N	78	78	78	78

Note: Pooled OLS regressions for Industry sectors (outliers excluded), standard errors in parentheses.
Dependent variable: Mobility rate.
***: p<0.01; **: p<0.05; *: p<0.10.

Table 4. Estimation results Services (trade + transport + business services)

Variable	**I**	**II**	**III**	**IV**
Constant	59.64 (1.83)***	61.95 (1.98)***	63.67 (1.85)***	63.75 (1.80)***
Population density	0.21 (0.10)**	0.14 (0.10)	0.20 (0.11)*	0.11 (0.10)
Start-up rate (99-05)	0.76 (0.14)***	0.29 (0.23)		
lagged Start-up rate (93-99)			0.36 (0.13)***	0.02 (0.15)
Dummy Trade		5.10 (1.93)***		6.77 (1.65)***
Dummy Transport		--		--
Dummy Business Services		4.55 (1.97)**		6.34 (1.38)***
R-squared	0.21	0.26	0.08	0.25
adjusted R-squared	0.20	0.23	0.06	0.22
loglikelihood	-364.04	-360.42	-372.80	-361.24
N	115	115	115	115

Note: Pooled OLS regressions for Services sectors (outliers excluded), standard errors in parentheses.
Dependent variable: Mobility rate.
***: p<0.01; **: p<0.05; *: p<0.10.

CONCLUSIONS

We investigated the impact of start-up rates on a measure of competition between incumbent firms called market mobility. Based on Joseph Schumpeter's theory of creative destruction we hypothesised that the mobility rate is positively influenced by start-up rates. New firms challenge existing firms by introducing new products and services and market selection will cause the best firms to survive and grow and the least competitive firms to downsize or exit. This should be reflected in a higher mobility rate.

We tested our hypothesis by estimating a regression model, at the region-sector level for the Netherlands, where the mobility rate is explained by (lagged) startup rates and control variables. Using data for 40 regions and five sectors over the period 1993-2006 we found that the impact of start-ups on mobility varies by sector. In particular, we found a strong positive relation for manufacturing and construction. For the service sectors the relation is insignificant.

Our results suggest there are differences in the types of entry between sectors and in the roles start-ups play in these sectors. Possibly, manufacturing start-ups enter because of perceived business opportunities based on innovations and precise estimates of their resources and their probability of success. Entry barriers may cause a selection effect and result in a higher average quality of new-firm start-ups relative to other sectors. By competing on innovation, start-ups stimulate competition between incumbents resulting in higher mobility rates. In the services sector, by contrast, start-ups may be followers reacting to growing markets. Start-ups would then increase the scope of markets, but do not fuel competition as such. One may argue that a manifestation of this increased scope is the emergence of a large group of solo self-employed in the Netherlands.

Future research should focus on computing market mobility rates at lower sectoral aggregation levels so that the relation between start-up rates and mobility rates can be investigated for more narrowly defined markets.

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