Chapter 3

The role of mergers and acquisitions in employment dynamics in Belgium

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This chapter considers data on mergers and acquisitions (M&As) involving Belgian companies to investigate the role of M&As in employment dynamics. Given the low number of Belgian firms that are involved in M&A deals, conclusions from analyses on job creation are very robust for Belgium. Estimations suggest that concerns about the negative employment effects of foreign acquisitions are not warranted for Belgium. Whereas domestic acquisitions and intra-industry acquisitions are found to have negative effects on employment in target firms, which are partially offset by job creation in Belgian acquiring firms, acquisition of a Belgian target by a foreign acquiring firm appears to have a positive impact on employment in the Belgian target, if the foreign acquirer does not belong to the same industry as the Belgian target firm.

Introduction

The number and value of mergers and acquisitions (M&As) are known to rise and fall dramatically in consecutive waves. According to financial software company Dealogic, the total value of global M&A deals increased for the third consecutive year in 2015 to a record USD 5.03 trillion, up 37% from 2014 whereas Thomson Reuters reports a slightly lower record value of USD 4.7 trillion and a 42% increase from 2014. Zephyr (Bureau Van Dijk, 2016b) puts the value of global M&As in 2015 at a record high of USD 6.1 trillion although the number of deals dropped to 89 440 from 89 773 in 2014.[1]

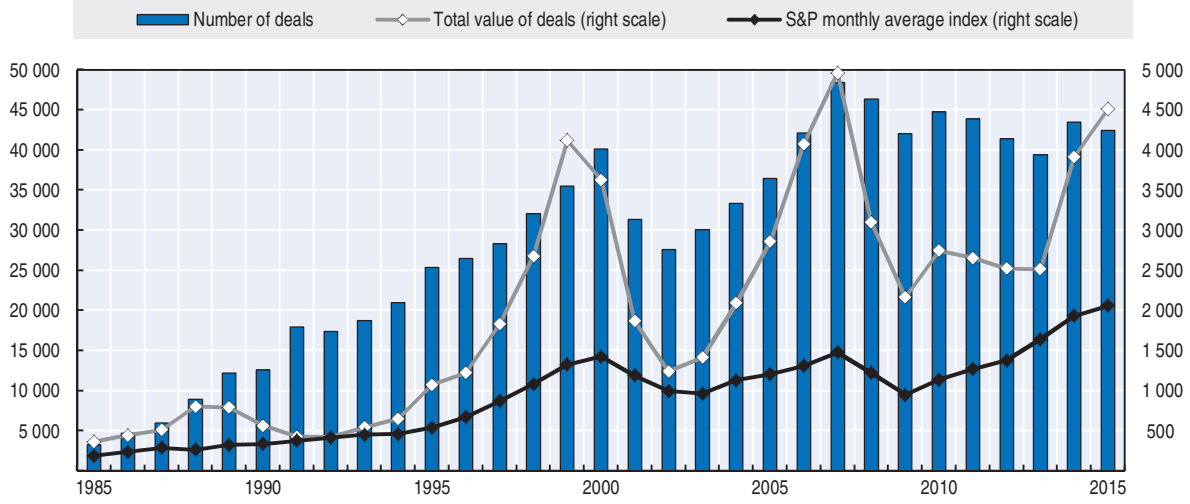
A vast literature assesses the motives and the performance of M&As from the perspective of target and/or acquiring firms. Gugler et al. (2012) point to the strong correlation between the evolution in M&A deals and financial market valuation and conclude, from an analysis of global M&As over the period 1985-2008, that "aggressive" managers take advantage of optimism in financial markets to pursue M&A deals that often turn out to be unprofitable. This view is supported by the returns of M&As to acquiring firms that are negatively correlated with the degree of optimism in financial markets at the time of the deal. Kim, Haleblian and Finkelstein (2011) argue that as financial markets reward high-growth firms, managers may be pressured by shareholders and financial analysts to pursue growth through M&A deals, especially if the potential of internal (organic) growth is limited.

The wave pattern of M&A deals as well as the strong correlation with stock market valuation can be seen in Figure 3.1, which shows the number and the total value of M&A deals worldwide for the period 1985-2015[2] and the Standard and Poor's (S&P) 500 stock market index. The correlation between the number – as well as the USD value of worldwide deals – and the S&P index is 0.90.

Although assessing the performance of M&As is obviously complicated, most studies suggest a low success rate, especially for acquiring firms (e.g. King et al., 2004; Puranam and Srikanth, 2007; Bauer and Matzler, 2014; Warter and Warter, 2014). Even M&As that are successful – from the point of view of the employees and shareholders of companies – may be problematic from a general welfare perspective if the advantage for the stakeholders results from an increase in market power and rents. An analysis of M&As in OECD countries by Doytch and Cakan (2011) suggests that M&As have a negative impact on aggregate economic growth, especially due to negative effects in primary and manufacturing industries. Furman and Orszag (2015) posit that consolidation in American industries contributed to rising inequality by increasing the share of firms that earn super-normal returns on capital. The increase in cross-border M&As triggered policy concerns over the potential negative impact of foreign acquisitions on domestic employment in host countries (Bandick and Görg, 2010; Chilton, Milner and Tingley, 2015).

This chapter aims at assessing the role of M&As in employment dynamics in Belgium and at investigating whether the distinction between internal growth and growth through M&As matters for analyses of job creation. Compared to other countries, the number of Belgian firms that are involved in M&A deals, as targets or acquirers, is fairly low and

Figure 3.1. **Number and value of worldwide M&As and Standard and Poor's index**



Note: The number of M&A deals is depicted on the left scale; the value of M&A deals (USD million) and the S&P 500 index are on the right scale.
Sources: Institute for Mergers, Acquisitions and Alliances (2016), "Mergers & Acquisitions Statistics", *https://imaa-institute.org/mergers-and-acquisitions-statistics*; Yahoo Finance (2016), "S&P 500 historical data", *https://finance.yahoo.com/quote/%5EGSPC/history?p=%5EGSPC*.

– against the worldwide trend – even shows a decline from 2005 onwards. Given the low number of firms in M&A deals in each given year, conclusions from analyses on job creation are very robust for Belgium. Estimations suggest that concerns about the negative employment effects of foreign acquisitions are not warranted for Belgium. Whereas domestic acquisitions and intra-industry acquisitions are found to have negative effects on employment in target firms, which are partially offset by job creation in Belgian acquiring firms, acquisition of a Belgian target by a foreign acquiring firm actually appears to have a positive impact on employment in the Belgian target, if the foreign acquirer does not belong to the same industry as the Belgian target firm (inter-industry acquisitions).

This chapter is organised as follows. In the second section the data that are used for the analysis of M&A deals involving Belgian companies are discussed. The third section compares a number of results of an analysis of employment dynamics without information on M&As to an analysis in which information on M&As for Belgium is used to distinguish between internal (organic) employment growth and external growth through M&As. The fourth section investigates the evolution of employment growth in target and acquiring firms over a period of three years before and up to three years after the completion of a deal. The fifth section looks at potential firm-level and industry-level determinants of the probability that a firm is involved in an M&A deal. Conclusions are provided in the final section.

Data section

The two main sources of firm-level data on M&As used in empirical studies are Thomson Reuters M&A and Zephyr, an online commercial database provided by Bureau van Dijk. Zephyr does not consider a minimum value for M&A deals whereas Thomson Reuters M&A currently uses a USD 1 million minimum threshold. Stiebale and Trax (2011) compare Zephyr with data from Thomson Reuters for M&A deals above USD 10 million – the previous minimum deal value of Thomson Reuters – and find that the coverage of transactions is very similar. Given its larger coverage, the analysis in this chapter is based on Zephyr (Bureau van Dijk, 2016b),[3] which contains data on worldwide M&As, initial public offerings, private equity

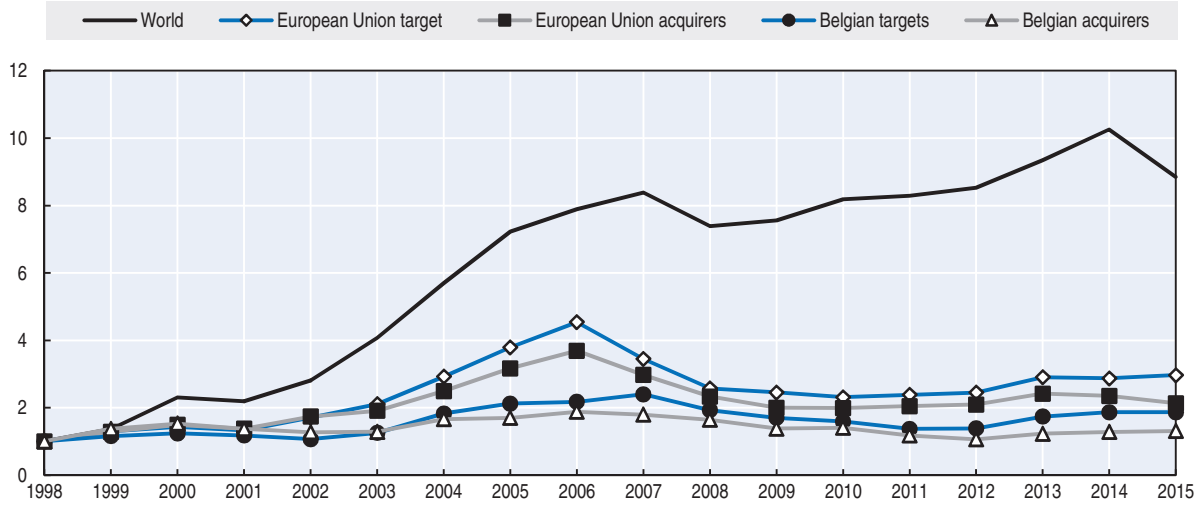
and venture capital deals from 1997 onwards. The information in Zephyr comes from annual reports of companies; private correspondence (letters and phone calls); company websites and media coverage. As mentioned before, there is no limitation on the deals taken into consideration in Zephyr except that all companies involved in a deal need to be identified. By January 2016 the Zephyr database contained information on some 1.4 million deals and rumours.[4] Company information is available for the target, acquirer and possible vendor firm before, during and after the deal. The database provides the value-added tax (VAT) number, if available, for the companies involved in a deal, which is used to link to other firm-level data for Belgian companies, from the National Social Security Office (Belgian employment data) and from Belfirst (Bureau van Dijk, 2016a), with annual account data of all companies with an obligation to deposit their annual accounts in Belgium.[5] Only non-financial companies (excluding non-profit organisations) are considered for the analysis which on average account for 98.5% of the total number of employees in the sector of non-financial corporations[6] over the period 2001-14.

Belfirst contains information on a relatively large number of mergers by acquisition that are not covered by Zephyr. The vast majority of the target firms in these deals are dissolved after acquisition. Over the period 2001-14 these acquisitions involve 0.12% up to 0.25% of the firms but their combined share in total employment only ranges from 0.15% up to 0.22%. Apart from being acquisitions that generally involve small target firms, most deals appear to be part of within-group consolidation. For 26 out of the 28 acquisitions that are reported in Belfirst but not in Zephyr and involve more than 150 employees, the target and acquiring firm can immediately be identified as belonging to the same group. Moreover, for the acquisitions reported in Belfirst but not in Zephyr, neither the identity of the acquiring firm nor any additional information regarding the deal is available. For these reasons the acquisitions that are only reported in Belfirst are not considered for estimation in the fourth and fifth sections of this chapter.[7] In the next section the data are considered to test the robustness of the analysis of net job creation.

Figure 3.2 compares the evolution, over the period 1998-2015, of completed acquisitions involving a Belgian target or acquirer to completed acquisitions involving a European target firm and acquisitions worldwide.[8] The number of acquisitions in each year is related to the 1998 level. From the figure it is abundantly clear that acquisitions involving a Belgian target firm or acquirer did not follow the surge in deals worldwide, which more than tripled between 1998 and 2015.[9] Since the height of 2007, the number of acquisitions with a Belgian target has been dropping almost continuously despite a slight increase in recent years. The number of deals involving a Belgian acquirer started to decrease from 2006 onwards to a level only 31% above the 1998 level.[10] Although acquisitions involving a European target or a European acquirer did not follow the strong worldwide rise either, the number increased more substantially.

A possible explanation for the relatively low number of M&A deals involving Belgian companies is provided by Huyghebaert and Luypaert (2010). Compared to Anglo-Saxon countries, Belgium has a lower share of publicly listed companies. As firms that are not listed face more constraints in financing M&A deals, they probably focus more on internal growth than on growth through acquisitions. Ownership also appears to be more concentrated, on average, in Belgium than in the United States. As a consequence, empire building and managerial hubris, which are found to explain some M&A deals, may occur less frequently in Belgium (Huyghebaert and Luypaert 2010, p. 393).

Figure 3.2. **Number of completed acquisitions involving Belgian firms, European firms and worldwide**



Note: The figure shows the number of completed acquisitions involving a Belgian firm (target or acquirer), European firm (target or acquirer) and the total number of acquisitions worldwide. The number of completed acquisitions in all years is related to the 1998 level.
Source: Authors' calculations based on Bureau van Dijk (2016b), *Belfirst* (database), *www.bvdinfo.com/en-be/our-products/company-information/national-products/bel-first/*.

The ten industries (NACE two-digit Rev. 2) with the highest share of firms involved in an M&A deal over the period 2001-14 are listed in Table 3.1, for respectively deals involving a Belgian target firm and a Belgian acquiring firm.[11] The manufacture of coke and refined petroleum products and the manufacture of basic pharmaceutical products and pharmaceutical preparations are among the industries with the highest relative involvement in M&As, both for deals with a Belgian target or a Belgian acquiring firm.

Table 3.2 shows the share of Belgian firms involved in acquisitions (2001-14) in the total number of firms as well as their share in total employment.[12] For each given year, a very small number of firms is involved in an acquisition. The share of these firms in total employment is relatively larger, especially for Belgian firms that acquire another firm.

For example, Belgian firms that acquired another firm in 2005 accounted for 6.59% of total employment. As Table 3.2 clearly indicates, the number of employees in firms involved in M&As is substantially above average. Over the period 2001-14, target firms had 3 to 13 times more employees than the average; acquiring firms had from 20 up to 80 times as many employees as the average.

Table 3.3 shows the age distribution of Belgian target and acquiring firms in M&A deals that were completed in the period 1997-2015.[13] In domestic M&A deals, of the Belgian target start-ups (up to two years), 12% were acquired by another Belgian start-up, 20% by a young firm (three to five years), 17% by firms between six and ten years old and 51% by firms older than ten years. For all domestic deals as well as cross-border deals, acquiring firms are predominantly older than ten years, especially in acquisitions of a foreign firm by a Belgian firm. Foreign start-ups and young firms appear to be more active in acquiring Belgian start-ups and young firms than the other way round. This could indicate that Belgian start-ups are less prone to seize foreign acquisition opportunities although it could also be explained by credit constraints that hamper foreign acquisitions by young Belgian firms. This seems in line with the low level and growth in M&A deals involving a Belgian firm, be it as a target or as an acquirer, as shown in Figure 3.2.

Table 3.1. **Top ten industries with the highest share of firms involved in a deal, 2001-14**

Belgian target firms	
Industry	Share of firms (in %)
Manufacture of coke and refined petroleum products	2.59
Remediation activities and other waste management services	1.96
Electricity, gas, steam and air conditioning supply	1.10
Manufacture of basic pharmaceutical products and pharmaceutical preparations	0.80
Manufacture of tobacco products	0.61
Programming and broadcasting activities	0.59
Manufacture of computer, electronic and optical products	0.54
Manufacture of beverages	0.52
Computer programming, consultancy and related activities	0.50
Telecommunications	0.46
Belgian acquiring firms	
Industry	Share of firms (in %)
Manufacture of basic pharmaceutical products and pharmaceutical preparations	1.38
Manufacture of coke and refined petroleum products	1.04
Telecommunications	0.98
Manufacture of beverages	0.97
Manufacture of chemicals and chemical products	0.83
Financial service activities, except insurance and pension funding	0.79
Manufacture of basic metals	0.74
Air transport	0.67
Publishing activities	0.64
Manufacture of computer, electronic and optical products	0.60

Note: Firms classified by primary two-digit NACE Rev.2 code.
Source: Authors' calculations based on Bureau van Dijk (2016b) for acquisitions involving Belgian firms (target or acquirer).

Table 3.2. **Share (% of total number of firms/employment) of target and acquiring firms, 2001-14**

	Belgian targets		Belgian acquirers	
	Share # firms	Share employment	Share # firms	Share employment
2001	0.04	0.33	0.06	3.08
2002	0.06	0.66	0.06	2.15
2003	0.07	0.53	0.09	4.25
2004	0.08	0.34	0.09	3.39
2005	0.09	1.19	0.09	6.59
2006	0.10	1.20	0.11	4.40
2007	0.08	0.39	0.08	3.87
2008	0.08	0.29	0.09	4.08
2009	0.07	0.34	0.07	1.44
2010	0.08	0.33	0.09	3.65
2011	0.07	0.29	0.07	5.80
2012	0.06	0.31	0.07	2.45
2013	0.07	0.25	0.08	2.84
2014	0.08	0.24	0.09	3.06
Average	**0.07**	**0.48**	**0.08**	**3.65**

Source: Authors' calculations based on Bureau van Dijk (2016b) for acquisitions involving Belgian firms (target or acquirer) and National Social Security Office (2016).

Table 3.3. **Age distribution of target and acquirer in M&A deals involving Belgian firms in percentage, 1997-2015**

Domestic M&As (target and acquirer are Belgian firm), # identified deals: 928					
	Age group acquiring firm (Belgian)				
Age group target firm (Belgian)	0-2 years	3-5 years	6-10 years	> 10 years	Total
0-2 years	12	20	17	51	100
3-5 years	6	19	24	51	100
6-10 years	6	12	19	63	100
> 10 years	3	3	10	84	100
Cross-border M&As (target is Belgian firm, acquirer is foreign firm), # identified deals: 430					
	Age group acquiring firm (foreign)				
Age group target firm (Belgian)	0-2 years	3-5 years	6-10 years	> 10 years	Total
0-2 years	7	4	19	70	100
3-5 years	13	14	10	63	100
6-10 years	8	11	15	66	100
> 10 years	7	4	10	79	100
Cross-border M&As (target is foreign firm, acquirer is Belgian firms), # identified deals: 571					
	Age group acquiring firm (Belgian)				
Age group target firm (foreign)	0-2 years	3-5 years	6-10 years	> 10 years	Total
0-2 years	0	4	19	78	100
3-5 years	2	10	24	63	100
6-10 years	6	10	15	68	100
> 10 years	5	6	6	83	100

Note: The table shows for each age group the share (in %) of target firms acquired by which age group of acquirer in M&A deals over the period 1997-2015 (most recent deals) in which the target and/or acquirer is a Belgian firm. Some 60% of these deals are domestic (both the target and acquirer are a Belgian firm) and 40% cross-border.
Source: Authors' calculations.

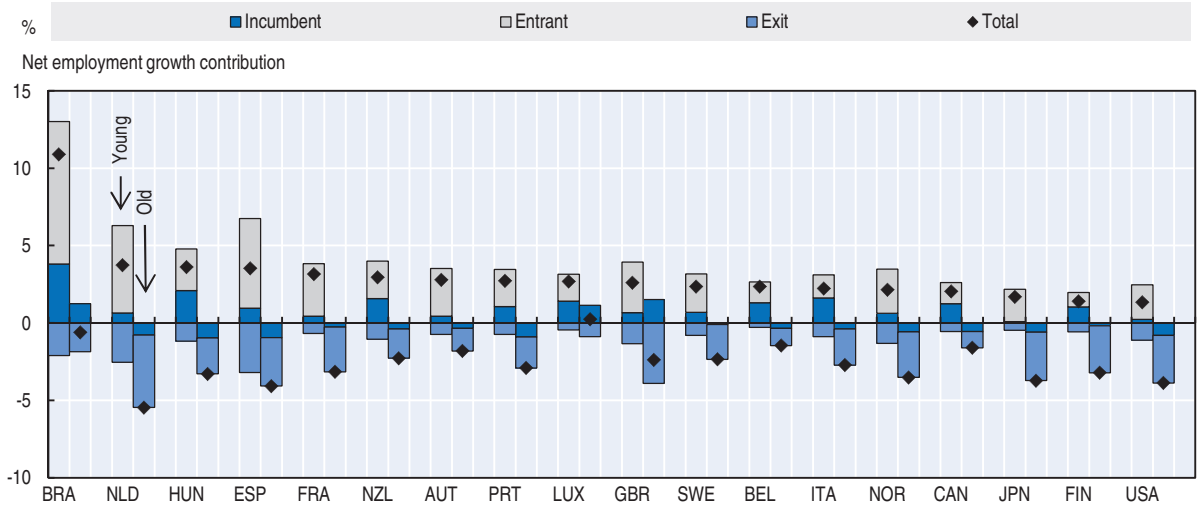
Organic growth versus growth through acquisition

The DynEmp project led by the OECD Directorate for Science, Technology and Innovation clearly demonstrates the importance of young firms – entrants and start-ups – as the main contributors of net job creation in all countries. The crucial role of young firms was reinforced during the crisis. Although less considerable than in the early years of the period studied (2001-11), the net job creation of young incumbents remained positive after 2008 whereas old incumbents contributed to net job destruction over the period 2008-09, especially by shedding jobs through downsizing (Calvino, Criscuolo and Menon, 2015). The important role of young firms in net job creation is confirmed for Belgium, although the extent is more limited than in other countries such as Brazil, the Netherlands, Hungary or Spain, as illustrated by Figure 3.3. The lower contribution of young firms to job creation in Belgium relative to other countries is predominantly explained by a low start-up rate (Criscuolo, Gal and Menon, 2014; Calvino, Criscuolo and Menon, 2015).

As firm-level information on M&A deals is not available for most countries, the cross-country analyses in DynEmp do not distinguish between internal (organic) growth and growth through M&As.

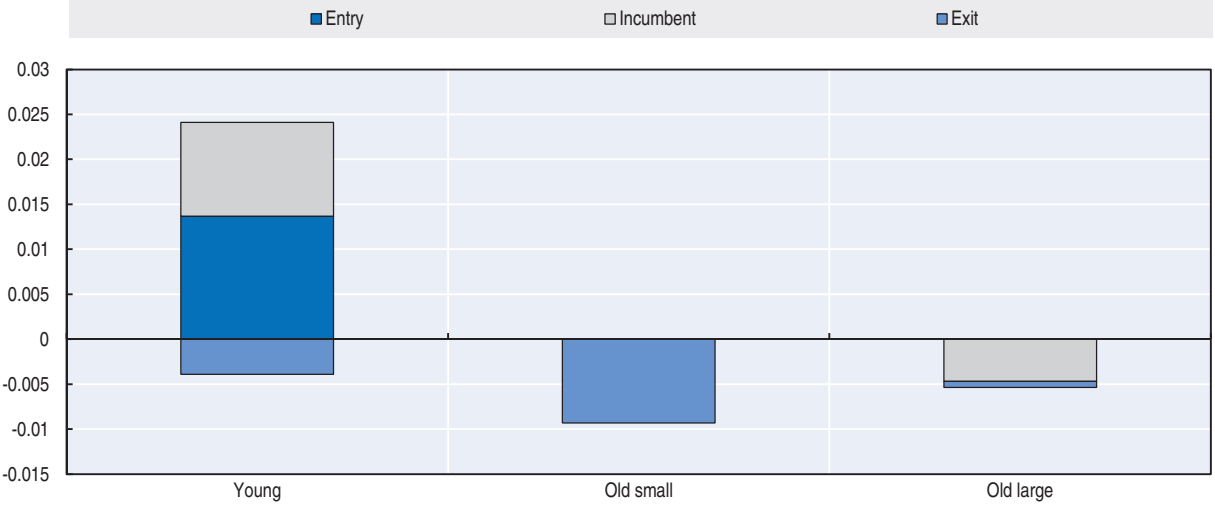
This section uses the additional information on M&As involving Belgian companies to assess to what extent the distinction between internal and external growth affects the results of the DynEmp analysis for Belgium.

Figure 3.3. **Net job creation by firm age group in 18 countries, 2001-11**



Note: The figure shows the net employment growth contribution by firm age group, as a percentage of aggregate non-financial business sector employment.
Source: Criscuolo, Gal and Menon (2014), "The Dynamics of Employment Growth: New Evidence from 18 Countries", *http://dx.doi.org/10.1787/5jz417hj6hg6-en*.

Figure 3.4. **Net job creation by age group of Belgian firms not involved in M&As by percentage, 2002-13**



Notes: The figure shows the net employment growth contribution by firm age-size group, as a percentage of aggregate non-financial business sector employment for firms that were not involved in any M&A deal over the period 2002-13. Young = less than five years old); old = five years old or more); small = less than 250 employees; large = 250 or more employees.
Source: Authors' calculations using data from Bureau van Dijk (2016a), *Belfirst* (database), *www.bvdinfo.com/en-be/our-products/company-information/national-products/bel-first/*, and Bureau van Dijk (2016b), *Zephyr* (database), *https://zephyr.bvdinfo.com/*and National Social Security Office (2016), "National employment data".

Figure 3.4 shows the breakdown by age group of Belgian firms that were not involved in any M&A deal over the period 2002-13. Old firms (five years old or more) are further broken down by size (small firms: less than 250 employees). The latter breakdown confirms the main conclusions of the DynEmp project: young – mostly small – firms strongly contribute to net job creation, through entry and post-entry growth of start-ups, whereas old small firms account for the largest part of net job destruction.[14] Given the low number of Belgian firms

involved in M&A deals in any given year, the net job creation by firms involved in M&As is marginal. There is a very small positive net job creation component of entrants that were involved in an M&A deal over the period 2002-13, most likely as a target, and a small negative job creation component for old large firms that were involved in an M&A deal.

If the information on mergers by acquisition provided by Belfirst, but not by Zephyr, is taken into account, the components depicted in Figure 3.4 change slightly. The entry component is smaller and the two components for old small firms are somewhat less negative. The latter is explained by the fact that many of the targets of the mergers by acquisition in Belfirst are small old firms which are considered as exits whereas they are actually absorbed, as pointed out in the data section, often as part of a within-group consolidation deal.

Table 3.4. **Net job creation (absolute values and as share of total employment) of Belgian firms by age and M&A status, 2002-14**

	Young: no M&A	Old: no M&A	Young target	Old target
2002	12 330 (0.63)	-27 421 (-1.40)	-222 (-0.01)	-760 (-0.04)
2003	21 969 (1.11)	-3 047 (-0.15)	-397 (-0.02)	-777 (-0.04)
2004	19 648 (0.98)	5 298 (0.27)	-111 (-0.01)	-2 217 (-0.11)
2005	23 987 (1.18)	12 508 (0.62)	-28 (-0.00)	-736 (-0.04)
2006	25 987 (1.25)	17 366 (0.84)	-148 (-0.01)	-3 806 (-0.18)
2007	30 153 (1.41)	30 027 (1.41)	204 (0.01)	-495 (-0.02)
2008	28 753 (1.32)	17 537 (0.80)	190 (0.01)	371 (0.02)
2009	20 195 (0.95)	-60 302 (-2.83)	19 (0.00)	-2 412 (-0.11)
2010	28 805 (1.34)	-12 166 (-0.57)	77 (0.00)	-1 726 (-0.08)
2011	30 111 (1.38)	15 255 (0.70)	103 (0.00)	-167 (-0.01)
2012	6 246 (0.26)	-112 118 (-4.63)	26 (0.00)	-977 (-0.04)
2013	5 676 (0.24)	-1 484 (-0.06)	-181 (-0.01)	-347 (-0.01)
2014	5 827 (0.25)	15 654 (0.68)	-81 (-0.00)	-404 (-0.02)
Average (%)	**0.95**	**-0.33**	**0.00**	**-0.05**
	Young acquirer	Old acquirer	Exit young target	Exit old target
2002	-26 (-0.00)	641 (0.03)	-17 (-0.00)	-561 (-0.03)
2003	47 (0.00)	2 956 (0.15)		-26 (-0.00)
2004	381 (0.02)	2 177 (0.11)	-9 (-0.00)	-1 (-0.00)
2005	24 (0.00)	380 (0.02)		-453 (-0.02)
2006	86 (0.00)	-3 824 (-0.18)	-3 (-0.00)	-74 (-0.00)
2007	340 (0.02)	-3 139 (-0.15)	-5 (-0.00)	-713 (-0.03)
2008	-108 (-0.00)	-3 679 (-0.17)	-3 (-0.00)	-185 (-0.01)
2009	-73 (-0.00)	-6 410 (-0.30)		-304 (-0.01)
2010	73 (0.00)	3 411 (0.16)	-43 (-0.00)	-15 (-0.00)
2011	213 (0.01)	-507 (-0.02)	-2 (-0.00)	-116 (-0.01)
2012	210 (0.01)	-6 582 (-0.27)	-19 (-0.00)	-1 488 (-0.06)
2013	73 (0.00)	-1 142 (-0.05)		-89 (-0.00)
2014	211 (0.01)	1 130 (0.05)	-5 (-0.00)	-71 (-0.00)
Average (%)	**0.01**	**-0.05**	**-0.00**	**-0.01**

Notes: The table shows the net job creation in absolute numbers and – in brackets – relative to total employment (%), of different groups of firms with a breakdown by age (young is five years at most and old more than five years) and a breakdown by M&A status (no M&A means that the firm was not a target or acquirer in the three previous years; target means that the firm was a target of an acquisition in the last three years but was not dissolved and acquirer means that the firm acquired another firm in the last three years). Exit young (old) target shows the number of jobs of young (old) firms – prior to exit – that were the target of an acquisition and were dissolved.
Source: Authors' calculations.

Table 3.4 shows a breakdown, over the period 2002-14, of net job creation (in absolute numbers and relative to total employment) with a breakdown by age (young: less than five

years old; and old: five years old or more) and the M&A status of firms (four categories: firms not involved in any M&A deal over the last three years; firms that have been the target of an acquisition over the last three years but that have not been dissolved; firms that have acquired another firm over the last three years; and firms that were acquired and dissolved in the previous year). The results confirm that the positive net job creation of young firms exceeds the job destruction of old incumbents.

Net job creation by young firms involved in M&As, either as a target (not dissolved) or an acquirer is negligible. For old target and acquiring firms, the net contribution is more substantial but in line with old incumbents not involved in acquisitions, and net job creation was on average negative. Net job creation may blur potential differences in the impact of different types of acquisitions (e.g. domestic versus cross-border or intra-industry versus inter-industry deals). These effects are considered in the next section.

Table 3.5 shows for each year over the period 2002-14, the share of Belgian high-growth firms in that year that were involved in an acquisition in one of the three previous years.

Table 3.5. **Belgian firms involved in acquisitions as a share of high-growth Belgian firms in percentage**

	Young target	Old target	Young acquirer	Old acquirer	Total M&A firms
2004	0.55	1.21	0.11	2.20	4.07
2005	0.10	1.36	0.42	2.20	4.08
2006	0.00	2.23	0.51	2.02	4.76
2007	0.18	1.91	0.00	2.19	4.28
2008	0.40	2.42	0.08	2.50	5.39
2009	0.27	2.17	0.36	3.53	6.34
2010	0.40	1.41	0.40	2.42	4.64
2011	0.45	2.27	0.23	2.72	5.68
2012	0.00	1.63	0.00	2.44	4.07
2013	0.00	1.33	0.12	2.65	4.10
2014	0.13	1.33	0.53	2.52	4.51
Average	**0.23**	**1.75**	**0.25**	**2.49**	**4.72**

Notes: The table shows the number of Belgian young (less than five years) and old (more than five years) target and acquiring firms with high growth as a share of all high-growth firms in that year. Target and acquiring firms are considered based on the fact that they were involved in an acquisition in the last three years. High-growth firms are defined as firms with more than ten employees at the beginning of a three-year period with an annual average growth in employment of 20% over that period.
Source: Authors' calculations.

Following Anyadike-Danes, Bonner and Hard (2013), high-growth firms are defined as firms with more than ten employees at the beginning of a three-year period with an annual average growth in employment of 20%. For example, the second column on the first line in Table 5 shows that 0.55% of high-growth firms in 2004 were young firms that were the target of an acquisition in the period 2001-03. Over the period considered, about 1.75 % of high-growth firms in Belgium were old firms that were acquired and about 2.49% were old firms that acquired another firm. For young firms involved in acquisitions, the shares are smaller. The four groups of firms involved in acquisitions have an average combined share of high-growth firms of 4.72%. This corroborates the relatively small contribution to overall employment growth. However, firms involved in acquisitions account for a disproportionate share of high-growth firms. Compared to their share in the total number of firms with an initial employment of more than ten employees, the share in the total

number of high-growth firms is 1.57 times higher for young targets, 1.29 for old targets, 1.82 for young acquiring firms and 1.75 for old acquiring firms. These results indicate that a fairly small number of firms achieve strong growth in employment through acquisition.

Employment effects of M&As

Review of the literature

Theoretical models of the employment effects of M&As generally rely on two countervailing arguments. M&As may reduce employment due to increased efficiency or economies of scale but if the efficiency gains are passed through in lower prices, firms may increase their market share and consequently their employment level (Oberhofer, 2013). Furlan, Oberhofer and Winner (2015) point out the mixed results of empirical studies on the employment effects of M&As, which may be explained by differences across countries in corporate governance regulation (e.g. the position of minority shareholders). The authors argue that most studies consider a discrete variable (0/1) for M&As although the share of ownership is continuous (bounded).[15] For a sample of European M&As from the Zephyr database, covering the period 2003-10, they find that employment growth after an M&A varies considerably over the distribution of the acquired ownership share. For small acquired shares, M&As appear to have a negative impact on employment. Above the 25% of ownership threshold the effect is statistically significant and positive. The effect remains positive above this threshold but the effect decreases above 50%.

Conyon et al. (2002) report that mergers involving United Kingdom firms in the period 1967-96 appear to have had a negative impact on employment. The negative effect is stronger for intra-industry mergers than for inter-industry mergers. Gugler and Yurtoglu (2004) also find that intra-industry mergers reduce demand more than inter-industry mergers in the United Kingdom, but for deals involving firms from continental Europe, the opposite effect is found. Bandick and Görg (2010) find indications of a positive impact on employment of vertical acquisitions of Swedish firms.

Lehto and Böckerman (2008) argue that whereas M&As are generally considered as positive due to their impact on the restructuring of industries, cross-border M&As are viewed less favourably given the perceived negative effects for domestic employment. Data on M&A deals involving Finnish firms suggest that domestic acquisitions have a negative impact on employment in all industries, whereas foreign acquisitions of Finnish target firms only appear to negatively affect employment in manufacturing industries. Gugler and Yurtoglu find that domestic mergers in the United Kingdom reduce employment by more than cross-border deals made by acquiring United Kingdom firms.

Most analyses of the employment effects of M&As focus on target firms. Stiebale and Trax (2011) are of the few that consider the impact of M&As on acquiring firms. Using data on cross-border M&As involving firms from France and the United Kingdom over the period 2000-07, they find a positive impact on domestic employment and provide indications of a connection between the motives and effects of cross-border deals.

The job destruction due to M&As may be overestimated by simply looking at the post-M&A evolution in employment. Lougui and Broström (2015) find indications that, for Swedish firms over the period 2000-09, M&As result in spin-outs which are explained by the deterioration in working conditions after an M&A but even more so by a mismatch between individual aspirations and management strategy, which leaves opportunities for start-ups in market segments and niches that are abandoned by the acquiring firm. The

spin-outs appear only in domestic deals and after some years. Margolis (2006) finds that employees that leave after an M&A deal is completed tend to be young, female and white-collar with low tenure who generally have a good labour market position (high probability of finding another job). Siegel and Simons (2010) find that M&As enhance plant productivity but also result in the downsizing of establishments and firms.

The impact of M&As on the creation of new firms (spin-outs), on working conditions or workforce compositions, on productivity and other measures of firm performance is beyond the scope of this chapter.

Estimation framework

If a target firm is fully absorbed by the acquirer, it can no longer be identified and observed as a separate firm. Without information on M&As, such absorptions may erroneously be reported as firm exit and the number of employees of absorbed firms as jobs lost due to exit. However, as Table 3.6 shows, only 14% of Belgian firms that were the target of an M&A deal in the period 1997-2015 appear to have been absorbed through acquisition (dissolved through merger or takeover).[16]

Table 3.6. **Status of Belgian target firms, 1997-2015**

Status	Number	Percentage
Active	1 324	62
Dissolved (merger or takeover)	306	14
Dissolved	155	7
Dissolved (bankruptcy)	141	7
Dissolved (liquidation)	111	5
In liquidation	33	2
Inactive (no precision)	18	1
Active (insolvency proceedings)	14	1
Other (e.g. bankruptcy)	17	1

Note: The table shows the current status of Belgian firms that were the target of an M&A deal over the period 1997-2015.
Source: Authors' calculations based on Bureau van Dijk (2016b), *Zephyr* (database), *https://zephyr.bvdinfo.com/*.

A majority of 62% are still active and can be identified as a separate unit. As the table shows the current legal situation in 2015, firms that have been acquired in the past may have been dissolved or may have stopped their activities in the years following acquisition. In that case they are not considered to have been dissolved as a result of the acquisition.

To assess the employment growth of Belgian firms involved in M&As a specification similar to Siegel and Simons (2010) is used:

$$\Delta L_{i,t} = \alpha_0 + \sum_{n=-3}^{+3} \beta_n D_{i,t+n} + \alpha_1 Ln L_{i,t-1} + \alpha_2 Ln Age_{i,t} + \alpha_3 \left(Ln Age_{i,t}\right)^2 + \alpha_4 Ln L_{i,t-1} * Ln Age_{i,t} + \varepsilon_{i,t}. \quad (1)$$

$\Delta L_{i,t}$, employment growth, is the log difference between employment of firm i in year t and employment in the previous year. $D_{i,t+n}$ are dummy variables that equal 1 in year $t+n$, if firm i was the target of an M&A deal in year t and 0 otherwise. The coefficients β_n show the extent to which employment growth in $t+n$, of firms that have been the target of a merger or acquisition, differs from employment growth in firms that have not been the target of an acquisition. Following Oberhofer (2013), the log of lagged employment ($Ln\ L_{i,t-1}$),

a linear and squared term of the log of firm age ($Ln\ Age_{i,t}$) and an interaction of firm size and age is included. The inclusion of firm size links the specification to the numerous studies that test the hypothesis of Gibrat (1931) who stated that firm growth is independent of firm size. Empirical studies tend to reject the hypothesis in favour of a negative correlation between initial firm size and employment growth. Firm age also appears to be negatively linked to growth but in a non-linear way. Theories on firm growth generally suggest a specification in which the annual growth rate of firms is linked to the log of initial firm size and the log of firm age (Oberhofer 2013, p. 347). Oberhofer (2013) includes an interaction between firm size and age to account for previous studies in which it is found that differences in firm size increase with age. He finds a statistically significant negative coefficient for the log of firm size and firm age and a statistically significant positive coefficient for the squared term of the log of firm age as well as for the interaction between firm size and firm age. Specification (1) is estimated for Belgian target firms and Belgian acquiring firms separately. Year dummies are included in all estimations to account for business cycle effects and other year-specific factors. Time-independent firm heterogeneity is captured through firm-level fixed effects. In most estimations, the coefficients of the lagged employment level and the firm size and age variables are highly statistically significant and have the same sign as in Oberhofer (2013), corroborating his finding that small and young firms grow faster but that this effect decreases as firms mature and differs across different age cohorts (as indicated by the interaction between employment and age).

Estimation results

Target firms

Table 3.7 shows the results for Belgian firms that were the target in M&A deals over the period 2001-14,[17] distinguishing between target firms that were dissolved through merger or acquisition (see Table 3.6) and target firms that were not fully absorbed after acquisition. By definition, only for the latter the evolution of employment after acquisition can be observed. The results clearly suggest that Belgian target firms witnessed employment growth well above average before acquisition, especially when the target firms were dissolved. Acquisition negatively affects employment in target firms that are not dissolved through acquisition in the year of acquisition or some years after acquisition, although only the coefficient in the year of acquisition is statistically significant.

Previous studies pointed out the differential impact of acquisitions depending on the characteristics of the deal. To account for these possible differences, this analysis distinguishes between domestic and cross-border deals and intra-industry and inter-industry deals.[18] Table 3.8 shows the results for Belgian firms that were acquired over the period 2001-14, for those target firms that were not fully absorbed after acquisition.[19]

The upper half of the table shows the results for domestic, foreign, intra-industry[20] and inter-industry acquisitions and the lower half the results for respectively domestic intra-industry, domestic inter-industry, foreign intra-industry and foreign inter-industry acquisitions.

In the year of completion of an acquisition the coefficient for target firms is negative in all configurations, except for acquisitions by a foreign company. For foreign inter-industry acquisitions, the coefficient is actually statistically significant positive (10%). This finding is in tune with the results reported for Sweden by Bandick and Görg (2010). The coefficients of the dummy variables in the years after completion indicate that domestic

Table 3.7. **Employment growth of Belgian target firms, 2001-14**

	Target firm dissolved	Target firm not dissolved
t-3	0.18 (9.11)***	0.05 (4.17)***
t-2	0.17 (8.62)***	0.05 (4.31)***
t-1	0.14 (6.16)***	0.01 (4.87)***
t	-	-0.06 (-4.14)***
t+1	-	-0.01 (-0.41)
t+2	-	0.01 (0.93)
t+3	-	-0.01 (-0.85)
$Ln\ L_{t-1}$	-0.54 (-254.12)***	
$Ln\ Age_t$	-0.37 (-103.88)***	
$(Ln\ Age_t)^2$	0.11 (61.81)***	
$Ln\ L_{t-1} * Ln\ Age_t$	0.07 (82.33)***	
# observations	1 648 429	
# firms	231 210	
R^2	0.31	

Notes: The table shows the results of a panel estimation with firm-level fixed effects of the employment growth of Belgian target firms, over the period 2001-14, three years prior to acquisition and up to three years after acquisition for target firms that are not dissolved as a result of acquisition. The specification contains year dummies. The z values are reported in brackets; *, ** and *** indicate that the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. Standard errors are heteroscedasticity consistent (VCE(robust) in Stata).
Source: Authors' calculations.

Table 3.8. **Employment growth of Belgian target firms (not dissolved) by type of deal, 2001-14**

	Domestic	Foreign	Intra-industry	Inter-industry
t-3	0.06 (3.82)***	0.03 (2.06)**	0.06 (2.27)**	0.05 (3.82)***
t-2	0.05 (2.89)***	0.06 (3.10)***	0.04 (1.34)	0.07 (4.30)***
t-1	0.06 (3.67)***	0.05 (3.18)***	0.05 (1.48)	0.07 (4.90)***
t	-0.12 (-5.62)***	0.01 (0.33)	-0.15 (-3.53)***	-0.04 (-2.28)**
t+1	-0.04 (-1.87)*	0.03 (1.66)*	-0.05 (-1.17)	0.02 (0.84)
t+2	-0.03 (-1.25)	0.05 (2.65)***	-0.11 (-2.21)**	0.05 (2.63)***
t+3	-0.06 (-2.73)***	0.03 (2.06)**	-0.09 (-2.10)**	0.02 (1.01)

	Domestic		Foreign	
	Intra-industry (13%)	Inter-industry (42%)	Intra-industry (8%)	Inter-industry (37%)
t-3	0.06 (1.66)*	0.06 (3.26)***	0.06 (1.57)	0.04 (2.09)**
t-2	0.01 (0.20)	0.07 (3.11)***	0.10 (1.97)**	0.06 (2.82)***
t-1	0.03 (0.90)	0.07 (3.17)***	0.07 (1.26)	0.07 (3.75)***
t	-0.20 (-3.47)***	-0.11 (-4.20)***	-0.08 (-1.20)	0.04 (1.77)*
t+1	-0.13 (-2.03)**	-0.04 (-1.22)	0.05 (1.03)	0.07 (2.83)***
t+2	-0.12 (-1.98)**	0.01 (0.28)	-0.09 (-1.14)	0.08 (3.61)***
t+3	-0.17 (-2.69)***	-0.03 (-1.12)	0.01 (0.16)	0.06 (3.20)***

Notes: The table shows the results of an estimation with firm-level fixed effects of the employment growth of Belgian target firms that were acquired, but not dissolved, over the period 2001-14, from three years prior to acquisition up to three years after acquisition. The specification contains year dummies. The z values are reported in brackets; *, ** and *** indicate that the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. Standard errors are heteroscedasticity consistent (VCE(robust) in Stata). The coefficients of all control variables, number of observations and R^2 are equal to the ones reported in Table 3.7.
Source: Authors' calculations.

and intra-industry acquisitions have a more negative impact on employment in Belgian target firms than foreign and inter-industry acquisitions. For foreign inter-industry acquisitions – which account for 37% of acquisitions in the period under consideration – all

coefficients are positive and statistically significant. These results lend support to the finding by Lehto and Böckerman (2008) that the general concern that foreign acquisitions destroy more jobs than domestic acquisitions, is not warranted although the evolution of employment in acquiring firms also needs to be considered to assess the net effect on domestic employment.[21]

Table 3.9 shows the employment growth in Belgian target firms (not dissolved), grouped by firm age (in the year of acquisition), for all categories of acquisitions combined. The results indicate differences across age groups for the year of completion and the three years thereafter. The impact of acquisition on employment in Belgian target firms appears to become more negative the older the target firm although only for mature target firms a statistically significant positive employment effect of acquisition is found, namely after two years. For old firms, the impact in the year of completion of an acquisition is statistically significant negative. To some extent the differences across age groups appear to be explained by differences in the type of acquisition, reported on the four last rows in Table 3.9. Of the four age categories, mature target firms have the highest share of foreign inter-industry acquisitions, for which, as Table 3.8 indicates, employment growth after acquisition is (statistically significant) positive in all three years after acquisition. The negative impact in the year of acquisition for old target firms seems in line with its highest share of domestic intra-industry deals.

Table 3.9. **Employment growth of Belgian target firms before and after acquisition by age group**

	Start-ups (0-2 years)	Young (3-5 years)	Mature (6-10 years)	Old (> 10 years)
t-3	-	0.13 (1.41)	0.07 (2.12)**	0.04 (3.61)***
t-2	-	0.16 (1.75)*	0.11 (3.29)***	0.03 (2.66)***
t-1	0.12 (0.57)	0.18 (2.19)**	0.09 (2.89)***	0.04 (3.42)***
t	0.08 (0.80)	0.06 (0.76)	-0.01 (-0.31)	-0.08 (-5.21)***
t+1	-0.02 (-0.14)	0.10 (1.57)	-0.03 (-0.64)	-0.01 (-0.65)
t+2	0.02 (0.21)	0.01 (0.19)	0.08 (2.06)**	0.00 (0.29)
t+3	-0.02 (-0.16)	0.02 (0.32)	-0.00 (-0.07)	-0.01 (-0.74)
$Ln\ L_{t-1}$	-0.54 (-254.44)***			
$Ln\ Age_t$	-0.37 (-103.90)***			
$(Ln\ Age_t)^2$	0.11 (61.86)***			
$Ln\ L_{t-1} * Ln\ Age_t$	0.07 (82.47)***			
# observations	1 648 429			
# firms	231 210			
R^2	0.31			
Domestic intra (%)	11	12	12	14
Domestic inter (%)	53	38	39	42
Foreign intra (%)	11	11	7	8
Foreign inter (%)	25	39	41	35

Notes: The table shows the results of an estimation with firm-level fixed effects of the employment growth of Belgian target firms that were acquired, but not dissolved, over the period 2001-14, from three years prior to acquisition up to three years after acquisition. Target firms are grouped by firm age (defined in the year of acquisition). The specification contains year dummies. For start-ups, active for up to two years, the coefficient for t-3 and t-2 cannot be estimated due to lack of cases. The z values are reported in brackets; *, ** and *** indicate that the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. Standard errors are heteroscedasticity consistent (VCE(robust) in Stata).
Source: Authors' calculations.

Table 3.10 shows the employment growth in Belgian target firms (not dissolved), with firms grouped by Pavitt industry category. Pavitt (1984) classified industries based on the origin and the main sources of technological knowledge and the market structure of industries.

Bogliacino and Pianta (2015) proposed an update of the Pavitt categories by NACE industries (Revision 2, 2008), including a classification for new industries and services. The four Pavitt categories are:

- Science-based: sectors in which innovation is based on advances in science and research and development (R&D).
- Specialised suppliers: sectors producing machinery and equipment that is used in new processes for other industries.
- Scale-intensive: sectors in which scale economies are relevant and a certain rigidity of production processes exists; technological change is usually incremental.
- Supplier-dominated: traditional sectors in which small firms are prevalent and technological change is introduced through the inputs and machinery provided by suppliers from other industries.

Table 3.10. **Employment growth of Belgian target firms before and after acquisition by Pavitt category**

	Science-based (17%)	Specialised suppliers (22%)	Scale-intensive (12%)	Supplier-dominated (49%)
t-3	0.03 (0.96)	0.07 (2.73)***	0.07 (2.80)***	0.03 (2.08)**
t-2	0.06 (2.24)**	0.07 (2.18)**	0.02 (0.48)	0.04 (2.37)**
t-1	0.06 (1.99)**	0.05 (1.65)*	0.04 (1.51)	0.05 (3.07)***
t	-0.07 (-2.09)**	-0.03 (-0.85)	-0.09 (-2.16)**	-0.08 (-3.60)***
t+1	0.01 (0.26)	-0.02(-0.56)	-0.05 (-1.47)	-0.02 (-0.77)
t+2	0.01 (0.41)	0.04 (1.02)	-0.06 (-1.39)	0.01 (0.46)
t+3	-0.04 (-0.90)	0.05 (1.59)	-0.04 (-1.12)	-0.02 (-1.02)
$Ln\ L_{t-1}$	-0.45 (-47.88)***	-0.56 (-100.67)***	-0.48 (-40.00)***	-0.54 (-195.52)***
$Ln\ Age_t$	-0.45 (-21.58)***	-0.29 (-33.70)***	-0.41 (-19.05)***	-0.40 (-86.21)***
$(Ln\ Age_t)^2$	0.12 (12.25)***	0.10 (19.58)***	0.11 (12.09)***	0.12 (49.04)***
$Ln\ L_{t-1} * Ln\ Age_t$	0.05 (15.59)***	0.07 (29.99)***	0.07 (16.88)***	0.07 (65.33)***
# observations	49 580	271 932	65 698	989 567
# firms	7 893	39 972	8 223	136 730
R^2	0.33	0.32	0.25	0.30
Domestic intra (%)	8	11	15	16
Domestic inter (%)	43	43	45	38
Foreign intra (%)	8	10	8	8
Foreign inter (%)	41	36	33	37

Notes: The table shows the results of an estimation, separately by Pavitt category, with firm-level fixed effects of the employment growth of Belgian target firms that were acquired, but not dissolved, over the period 2001-14, from three years prior to acquisition up to three years after acquisition. The specification contains year dummies. The z values are reported in brackets; *, ** and *** indicate the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. Standard errors are heteroscedasticity consistent (VCE(robust) in Stata).
Source: Authors' calculations.

The effects of acquisitions on employment in target firms differs across the four categories of industries with larger negative effects in the year that a deal is completed in scale-intensive and supplier-dominated industries, which happen to be the type of industries for which the share of domestic intra-industry acquisitions is above average.

A number of robustness tests confirm the main conclusions. Using the share of ownership that is transferred through acquisition as the variable rather than the dummy variable (acquired or not) used in specification (1) – as in Furlan, Oberhofer and Winner (2015) – provides similar but generally less precise results, in effect larger standard errors and worse results for the specification tests.[22] Including a squared term for the year of completion of a deal does not support the finding by Furlan, Oberhofer and Winner (2015)

of non-linear employment effects of M&As. Including a variable of the number of deals a firm is involved in, in a given year, does not provide any evidence of a statistically significant effect of the number of deals.[23] The number of different firms involved in an acquisition has a statistically significant positive impact on employment growth in the target firm for domestic and foreign acquisitions but a statistically significant negative impact for intra-industry deals.[24]

Acquiring firms

Table 3.11 shows the results of an estimation of specification (1) considering employment growth in Belgian acquiring firms, distinguishing between firms that acquire firms that are not dissolved and acquiring firms that dissolve the target firm. The table provides results for respectively domestic, foreign, intra-industry and inter-industry acquisitions. Irrespective of the type of acquisition, firms that acquire another firm without absorbing the target witness employment growth above average in the years prior to acquisition. Firms that acquire another firm that is not dissolved continue to have employment growth above average in the year of acquisition and the following years. For acquiring firms that dissolve the target, the coefficient of employment growth is positive but not always statistically significant in the year of acquisition. This seems to suggest that a substantial number of jobs that disappear in the target firms that are dissolved are lost without contributing much to employment in acquiring firms. In the years after acquisition, employment growth in firms that acquired another firm that is dissolved through acquisition is above average. This is especially true for foreign acquisitions and to a lesser extent also for inter-industry acquisitions.

Apparently, some firms with below-average employment growth succeed in increasing their growth by diversifying through the acquisition and absorption of firms in other markets (foreign or another industry).

An alternative explanation could be that firms intending to grow through acquisition do not increase or even reduce internal employment prior to acquisition.

Table 3.12 shows the results of the evolution of employment growth for firms that acquire another firm without dissolving the target, with a further breakdown by type of acquisition.[25]

The negative impact on employment of domestic intra-industry acquisitions in target firms (see Table 3.8) is counterbalanced by positive employment effects in domestic acquiring firms. Acquisition of a domestic firm in another industry has a positive impact on employment in the acquiring firm. Foreign intra-industry acquisitions have no statistically significant employment effects in acquiring firms, similar to the absence of effects in target firms (see Table 3.8). Foreign inter-industry acquisitions have a substantial positive impact on employment in acquiring firms. The latter type of acquisition also appears to have a positive impact on employment in target firms. This could indicate that these acquisitions reflect strategies to exploit complementarities between the target and acquirer that are mutually beneficial for employment growth. Estimations by Pavitt category[26] for the evolution of employment growth of acquiring firms show that coefficients are positive before acquisition as well as in the year of acquisition and the three following years in all industries. The coefficients are mostly statistically significant in science-based and supplier-dominated industries.

Table 3.11. **Employment growth of Belgian acquiring firms before and after acquisition, 2001-14**

Target firms not dissolved				
	Domestic (26%)	Foreign (74%)	Intra-industry (42%)	Inter-industry (58%)
t-3	0.05 (2.43)**	0.05 (3.86)***	0.06 (2.55)***	0.07 (3.36)***
t-2	0.07 (3.60)***	0.04 (2.79)***	0.09 (4.34)***	0.06 (2.80)***
t-1	0.08 (3.59)***	0.04 (3.21)***	0.08 (3.10)***	0.08 (3.57)***
t	0.10 (4.37)***	0.06 (5.26)***	0.10 (3.85)***	0.09 (4.41)***
t+1	0.11 (4.82)***	0.03 (2.98)***	0.07 (2.73)***	0.09 (4.41)***
t+2	0.06 (2.59)***	0.02 (1.60)*	0.03 (1.19)	0.05 (2.56)***
t+3	0.02 (0.73)	0.02 (1.66)*	0.03 (1.36)	0.02 (1.00)
Target firms dissolved				
	Domestic (60%)	Foreign (40%)	Intra-industry (40%)	Inter-industry (60%)
t-3	-0.03 (-0.94)	-0.01 (-0.35)	-0.02 (-0.52)	-0.03 (-0.66)
t-2	-0.01 (-0.26)	-0.00 (-0.04)	-0.05 (-1.10)	0.02 (0.48)
t-1	-0.00 (-0.05)	0.01 (0.33)	-0.05 (-0.95)	0.04 (1.04)
t	0.06 (1.89)*	0.06 (1.75)*	0.03 (0.62)	0.06 (1.38)
t+1	0.04 (1.06)	0.10 (2.31)**	-0.02 (-0.29)	0.09 (1.95)**
t+2	0.07 (2.05)**	0.09 (2.64)***	0.06 (1.20)	0.07 (1.60)*
t+3	0.07 (2.09)**	0.06 (1.68)*	0.08 (2.07)**	0.06 (1.34)
Ln L_{t-1}	-0.54 (-258.03)***			
Ln Age_t	-0.31 (-93.21)***			
$(Ln\ Age_t)^2$	0.06 (43.50)***			
Ln L_{t-1} ** Ln* Age_t	0.07 (86.42)***			
# observations	1 648 429			
# firms	231 210			
R^2	0.30			

Notes: The table shows the results of panel estimation with firm-level fixed effects of employment growth of Belgian firms acquiring another firm, over the period 2001-14, from three years prior to acquisition up to three years after acquisition. The specification contains year dummies. The z values are reported in brackets; *, ** and *** indicate the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. Standard errors are heteroscedasticity consistent (VCE(robust) in Stata).
Source: Authors' calculations.

Table 3.12. **Employment growth of Belgian acquiring firms before and after acquisition, 2001-14**

	Domestic		Foreign	
	Intra-industry (21%)	Inter-industry (32%)	Intra-industry (17%)	Inter-industry (30%)
t-3	0.04 (1.28)	0.07 (2.47)**	0.09 (2.61)***	0.09 (2.67)***
t-2	0.09 (3.48)***	0.06 (1.97)**	0.09 (2.55)**	0.06 (2.18)**
t-1	0.06 (1.81)*	0.10 (3.04)***	0.09 (3.12)***	0.06 (2.11)**
t	0.10 (2.71)***	0.10 (3.32)***	0.10 (3.18)***	0.09 (2.98)***
t+1	0.10 (2.93)***	0.12 (3.81)***	0.04 (0.86)	0.06 (2.32)**
t+2	0.06 (1.71)**	0.06 (2.01)**	0.00 (0.02)	0.04 (1.80)*
t+3	0.02 (0.77)	0.02 (0.52)	0.04 (1.24)	0.03 (1.17)

Notes: The table shows the results of a panel estimation with firm-level fixed effects of employment growth of Belgian firms acquiring another firm that is not dissolved, over the period 2001-14, from three years prior to acquisition up to three years after acquisition. The specification contains year dummies. The z values are reported in brackets; *, ** and *** indicate that the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. Standard errors are heteroscedasticity consistent (VCE(robust) in Stata). The coefficients of all control variables, number of observations and R^2 are equal to the ones reported in Table 3.11.
Source: Authors' calculations.

The probability of acquisition

Estimation framework

This section investigates which firm-level or industry-level characteristics affect the probability of a firm being involved in an acquisition, either as a target or an acquiring firm.

As a generalised linear model, this method uses as the random component the event of acquisition as a binary (binomially distributed) response variable, in combination with the inverse of the logistic function as the link function: $(\pi) = log\frac{\pi}{1-\pi}$, with π the probability that a firm is acquired (or acquires). The ratio $\frac{\pi}{1-\pi}$ is referred to as the odds and the logarithm of this ratio as the log odds. The maximum-likelihood estimated coefficient of an explanatory variable can be interpreted as the change in the log odds ratio of acquisition *versus* non-acquisition due to a unit change in the respective variable, ceteris paribus.[27]

The distinction domestic versus cross-border and intra-industry versus inter-industry acquisitions,[28] used in the previous section, is maintained as these dimensions are found to be important for the probability of acquisition in Belgium. For a sample of 484 M&As involving Belgian firms over the period 1997-2007 Huyghebaert and Luypaert (2010) find, for example, that industry concentration only matters for the probability of acquisition for domestic and intra-industry acquisitions.

The literature provides many possible explanations as to why a given firm may be more likely to acquire or be acquired by another firm (e.g. Palepu, 1986; Barnes, 1999; Schoenberg and Reeves, 1999; Huyghebaert and Luypaert, 2010; Gutsche, 2013). Overall, these fall into two broad categories: determinants relating to motivations for acquisitions and constraining factors. To become an acquirer, firm size would be an important constraint since smaller firms presumably have less access to financial resources. For the same reason, more liquidity and higher profitability could be facilitating factors, while a high leverage may have an inhibitory effect. The business cycle may also influence this channel, limiting access to credit during downturns. An important motivation for acquiring other firms could be a firm's growth strategy, where low growth in the past may predict a change from an internal towards an external growth strategy. A similar shift may be predicted by a mismatch between (available) funds and (lacking) internal investment opportunities, the so-called growth-resource mismatch, or even the age of a firm. Other possible motivations include strategic considerations related to industry concentration and market power, diversification of risks and the creation of synergies (facilitated by high levels of immaterial assets on the part of the acquirer). Huyghebaert and Luypaert (2010) find that intangible assets positively affect the M&A decision of Belgian firms.

On the other side, the attractiveness of an acquisition target would be determined by its own growth potential and financial health (past growth, profitability and liquidity, low leverage, age), and by industry and business cycle variables. In particular, a reverse resource mismatch (low funds but high growth potential) may be a facilitating factor (e.g. Palepu, 1986; Gutsche, 2013). Firm size could be both a facilitating and a prohibiting factor since taking over a large firm results in larger growth, yet at the same time requires more financial resources and handling of complexity.

The variables considered in this study's estimation result from the list of possible determinants found in previous studies and data availability.

Turnover and the number of employees are used to proxy firm size (both in logs and including a squared term to allow for non-monotonicity). Profitability and the growth

potential are captured by the growth rates of turnover, employment, profits (defined as earnings before interest and tax [EBIT]), intangible assets and debt (negatively). The EBIT rate, i.e. EBIT relative to total assets, is assumed to indicate internal cash flow generation capacity and hence liquidity. Leverage is represented by the debt rate (debt as a fraction of total assets). An interaction effect between the EBIT rate and the debt rate is included in the analysis to allow for a resource mismatch effect. The size of intangible assets (in logs) is used as a proxy for synergetic potential, whereas the growth in intangible assets is included in the analysis as a measure of (past) growth strategy for acquirers and an extra measure of attractiveness for acquired firms. The term spread and the yield spread should capture potential business cycle effects, and the specification also includes the Herfindahl-Hirschman (HH) index and its square to capture potential effects of concentration within the industry, which is allowed to be non-monotonous. Finally, firm age is included as a demographic factor. In the list above fractions of variables in terms of total assets were used primarily to avoid collinearity with the turnover variables. All variables are from Zephyr and Belfirst. As some of the financial and accounting information is only available from 2006 onwards, estimations cover the period 2006-14.

Inference for the model is based on the likelihood ratio (LR) test both for individual parameters and the model as a whole, which is warranted by the fact that logistic regression models yield estimates with large-sample normal distributions. Under the null assumption, the LR test converges to a chi-squared distribution where each parameter counts as a degree of freedom. It is preferred over the Wald Test since the latter uses less information and suffers from decreasing power with increasing effect size (Hauck and Donner, 1977).

The pseudo R^2 reported here is McFadden's version.[29] Although this goodness-of-fit measure has good statistical properties, and is ranged between 0 and 1 like the conventional coefficient of determination in ordinary least squares (OLS), the interpretation of intermediate values is not straightforward. For instance, simulations by Domencich and McFadden (1975) suggest that pseudo R^2 values of 0.2 and 0.4 correspond to R^2 values of around 0.4 and 0.8 respectively.

As a measure for the predictive power of the models, the area under the receiver operating characteristic (ROC) curve, known as the area under the curve (AUC) or the concordance index, is shown. The ROC curve gives the fraction of true positives (sensitivity) as a function of the fraction of false positives (one minus the specificity) predicted by the model, for different values of the probability cut-off point. Obviously, for a cut-off equal to 0, both fractions are 0, while both fractions are 1 for a cut-off equal to 1. If a model yields completely random probability predictions, both fractions equal the cut-off probability, resulting in a linear ROC and AUC = 0.5. However, if a model predicts well, increasing the cut-off will result in a large gain in terms of true positives at a small cost in terms of false positives. Consequently, the ROC will rise quickly, leading to an AUC closer to 1 (see e.g. Agresti [2002] for more information).

Estimation results

The probability of being acquired

Table 3.13 gives the estimated coefficients and the relevant statistics for the four logit models predicting the probability of being acquired on the basis of firm characteristics. For all types of acquisition, high turnover and employment initially increase the odds of being subject to an acquisition, although the effect decreases and even becomes negative for very

Table 3.13. **Probability of a Belgian firm being acquired, 2006-14**

	Domestic	Foreign	Intra-industry	Inter-industry
Ln turnover	3.90 (5.98)***	3.25 (5.17)***	3.51 (3.28)***	3.72 (6.29)***
(Ln turnover)^2	-0.11 (-5.47)***	-0.09 (-4.61)***	-0.1 (-2.99)***	-0.1 (-5.67)***
Turnover growth	-0.06 (-0.34)	0.24 (2.00)**	0.36 (2.00)**	0.13 (1.04)
Ln employment	0.69 (4.15)***	1.02 (5.49)***	0.56 (2.14)**	0.81 (5.06)***
(Ln employment)^2	-0.06 (-2.50)**	-0.1 (-4.05)***	-0.04 (-1.05)	-0.08 (-3.6)***
Employment growth	0.12 (0.60)	-0.13 (-0.60)	-0.13 (-0.36)	0.10 (0.60)
EBIT rate	-0.89 (-1.81)*	0.53 (0.96)	-0.42 (-0.38)	0.22 (0.45)
EBIT growth	0.03 (1.37)	-0.02 (-0.75)	-0.03 (-0.64)	0.00 (0.11)
Debt rate	-0.29 (-1.47)	-0.44 (-2.10)**	-0.35 (-1.04)	-0.53 (-2.80)***
Debt growth	-0.24 (-1.65)*	0.22 (2.49)**	-0.43 (-1.61)	0.10 (1.03)
EBIT rate*debt rate	-0.45 (-1.96)**	-0.72 (-2.85)***	-0.18 (-0.22)	-0.82 (-4.17)***
Ln intangible assets	0.14 (5.77)***	0.16 (6.87)***	0.10 (2.36)**	0.16 (7.49)***
Intangible assets growth	0.03 (0.86)	-0.01 (-0.32)	0.06 (0.98)	-0.03 (-0.63)
Term spread	-0.13 (-1.68)*	-0.14 (-1.90)*	-0.02 (-0.17)	-0.18 (-2.64)***
Yield spread	0.17 (1.30)	0.36 (2.78)***	0.12 (0.54)	0.37 (3.10)***
Herfindahl-Hirschman	0.76 (0.79)	1.29 (1.21)	2.36 (1.62)	0.88 (0.92)
Herfindahl-Hirschman^2	0.51 (0.38)	-1.38 (-0.77)	-0.21 (-0.11)	-0.73 (-0.46)
Age	-0.02 (-2.28)**	-0.03 (-4.47)***	0.02 (0.73)	-0.03 (-4.27)***
Age^2	0.00 (1.91)*	0.00 (3.56)***	0.00 (-1.04)	0.00 (4.37)***
Constant	-40.99 (-8.13)***	-37.05 (-7.54)***	-39.01 (-4.73)***	-40.18 (-8.72)***
Number of observations	711 280			
LR chi2 (p value)	625.64 (0.00)	721.57 (0.00)	202.88 (0.00)	812.34 (0.00)
Pseudo R^2	0.11	0.13	0.09	0.13
Concordance index	0.85	0.88	0.84	0.87

Notes: The table shows the results of a logit estimation of the probability of acquisition on target firm characteristics. The data relate to the period 2006-14. Rendered values indicate the effect on log odds, not probabilities, and corresponding z values are reported in brackets. *, ** and *** indicate that the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. The Pseudo R^2 statistic is McFadden's. For the interpretation of the concordance index, see the fifth section of this chapter.
Source: Authors' calculations.

large firms through the significant coefficient of the squared logs for domestic, foreign and inter-industry acquisitions. Given this non-monotonicity, the level of employment that maximises the odds of being taken over can be derived. For foreign and inter-industry acquisitions, the optimal level amounts to 164 and 158 respectively, while the level is considerably higher for domestic acquisitions: 314 employees. For intra-industry acquisitions, a higher number of employees always increases the odds. The lower optimum for the foreign and inter-industry models may point to a difference in motivation underlying these types of acquisition, with perhaps a greater emphasis put on the investment value or growth potential of the target firm. The amount of intangible assets also has significant positive effects on all the odds.

The effect of growth variables is less straightforward. Turnover growth increases the odds of being taken over intra-industry or by a foreign firm. Growth of debt has a negative influence on the probability of domestic acquisition, yet influences the probability of acquisition by a foreign firm positively. Other growth variables and sector concentration do not seem to matter.

For inter-industry and foreign acquisitions, term spread and yield spread have significant effects (respectively negative and positive), adding evidence for a greater prominence of investment considerations in these types of acquisition. For the same types (and to a lesser extent also for domestic acquisitions), increasing firm age initially has a negative effect on the odds, although this effect reverses for very old firms.

The debt rate also has a negative effect for both types, and this effect becomes more pronounced for firms with a higher profit rate (interaction effect). The profit rate, on the other hand, has no significant effect on its own: although conditional on debt rate, it actually decreases the acquisition probability. This seems to contradict the resource mismatch hypothesis, which implies that buying firms are especially looking for targets with great opportunities in combination with low resources. Of course, given the absence of a positive effect from profits, the latter variable may be a bad proxy to measure opportunity (other specifications with employment growth and turnover growth did not provide a fundamentally different picture).

The probability of acquiring

Table 3.14 shows the estimated coefficients and the relevant statistics for the four estimated models using a logit regression, from the point of view of the acquiring firm. Hence, the second column contains the estimates for the probability that a firm, given its characteristics, will acquire a domestic firm, while the third column model estimated the probability of acquiring a foreign firm. The last two columns show the results for intra-industry and inter-industry acquisitions respectively.

Table 3.14. **Probability of a Belgian firm acquiring another firm, 2006-14**

	Domestic	Foreign	Intra-industry	Inter-industry
Ln turnover	2.41 (3.73)***	2.31 (7.20)***	2.95 (4.28)***	1.56 (2.76)***
(Ln turnover)^2	-0.06 (-3.29)***	-0.05 (-5.81)***	-0.07 (-3.71)***	-0.04 (-2.22)**
Turnover growth	0.25 (1.87)*	0.30 (3.38)***	0.29 (1.96)**	0.21 (1.46)
Ln employment	0.92 (4.42)***	0.36 (3.29)***	0.55 (2.46)**	0.78 (3.81)***
(Ln employment)^2	-0.06 (-2.72)***	-0.01 (-1.24)	-0.04 (-1.65)*	-0.06 (-2.69)***
Employment growth	0.46 (2.42)**	0.12 (0.79)	0.26 (1.04)	0.31 (1.40)
EBIT rate	-1.40 (-1.54)	-3.62 (-4.59)***	-2.04 (-1.87)*	-4.28 (-5.61)***
EBIT growth	0.05 (1.81)*	0.01 (0.59)	0.02 (0.54)	0.04 (1.19)
Debt rate	-0.27 (-1.04)	-1.65 (-9.54)***	-0.68 (-2.15)**	-1.25 (-4.51)***
Debt growth	0.01 (0.09)	0.19 (2.67)***	0.11 (0.79)	0.17 (1.50)
EBIT rate*debt rate	1.43 (1.89)*	2.36 (1.92)*	2.09 (1.96)**	3.02 (3.29)***
Ln intangible assets	0.19 (6.82)***	0.20 (12.35)***	0.22 (7.43)***	0.24 (8.25)***
Intangible assets growth	0.01 (0.27)	0.02 (0.55)	0.05 (1.06)	0.04 (0.85)
Term spread	0.06 (0.62)	-0.08 (-1.23)	0.15 (1.32)	-0.02 (-0.23)
Yield spread	0.31 (1.98)**	0.12 (1.16)	0.04 (0.21)	0.29 (1.70)*
Herfindahl-Hirschman	-1.62 (-1.38)	-1.74 (-2.43)**	3.29 (2.39)**	-2.99 (-2.32)**
Herfindahl-Hirschman^2	2.9 (2.06)**	2.52 (3.01)***	-4.39 (-1.90)*	4.52 (3.15)***
Age	-0.00 (-0.32)	-0.02 (-3.97)***	0.00 (0.10)	-0.02 (-2.60)***
Age^2	-0.00 (-0.22)	0.00 (5.6)***	-0.00 (-0.65)	0.00 (3.20)***
Constant	-32.42 (-6.26)***	-30.1 (-11.26)***	-37.86 (-6.69)***	-24.53 (-5.38)***
Number of observations	711 310			
LR chi2 (p value)	664.94 (0.00)	2457.71 (0.00)	617.65 (0.00)	679.26 (0.00)
Pseudo R^2	0.18	0.28	0.21	0.21
Concordance index	0.91	0.94	0.93	0.92

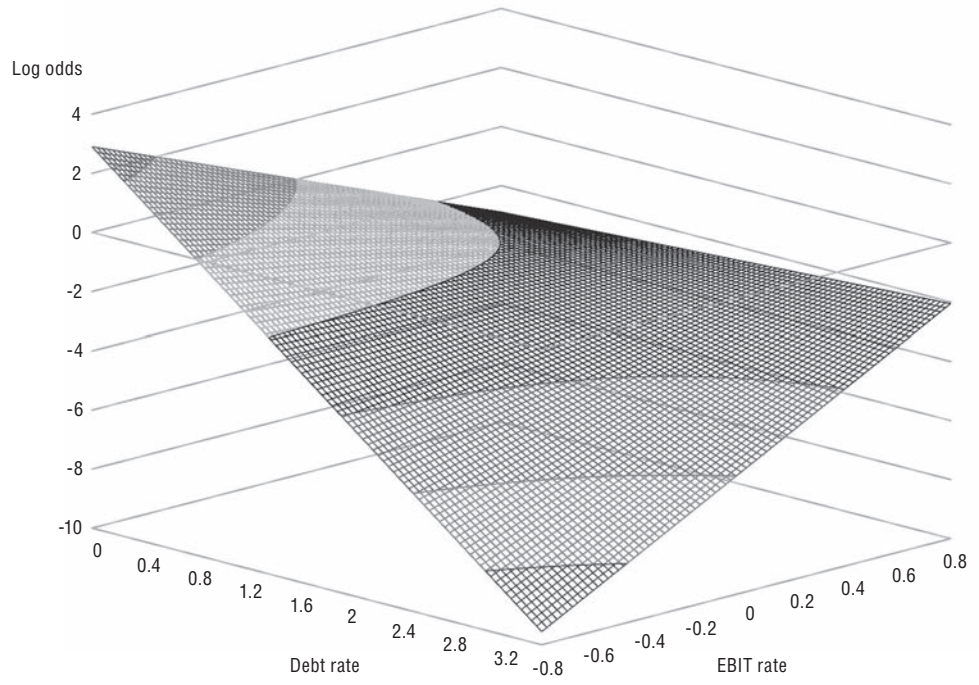
Notes: The table shows the results of a logit estimation of the probability of acquisition on acquiring firm characteristics. The data relate to the period 2006-14. Rendered values indicate the effect on log odds, not probabilities, and corresponding z values are reported between brackets. *, ** and *** indicate that the coefficient estimates are statistically significant at respectively 10%, 5% and 1%. The Pseudo R^2 statistic is McFadden's. For the interpretation of the concordance index, see the fifth section of this chapter.
Source: Authors' calculations.

The size of turnover and employment has a highly significant positive effect on the probability of every type of acquisition, but the magnitude of the positive effect decreases with size. Only for Belgian firms engaged in a foreign firm acquisition, the employment level has a monotonic positive effect on the odds. For domestic, intra- and inter-industry acquisitions, the optimal employment levels, maximising the odds of acquisition, are 2 136; 968 and 665 respectively.

The amount of intangible assets also affects the probability of all types of acquisition positively. This result may give some support to the synergetic potential hypothesis. Growth of profit and employment predict a higher chance of acquiring domestic firms, while the same goes for growth in debt, only now for international acquisitions.

The profit and debt rates are particularly influential for foreign and inter-industry acquisition probabilities and, to a lesser extent, intra-industry acquisitions. All effects are negative. Yet the significant interaction effect for these models reveals a more complex picture, as represented in Figure 3.5: lower levels of debt increase the probability of acquisition, as one would expect, yet this effect is higher for firms with lower profits.

Figure 3.5. **Log odds for Belgian firms acquiring foreign firms by earnings before interest and tax (EBIT) rate and debt rate**



Note: The logit for inter-industry and intra-industry acquisitions yields similar graphs.
Source: Authors' calculations.

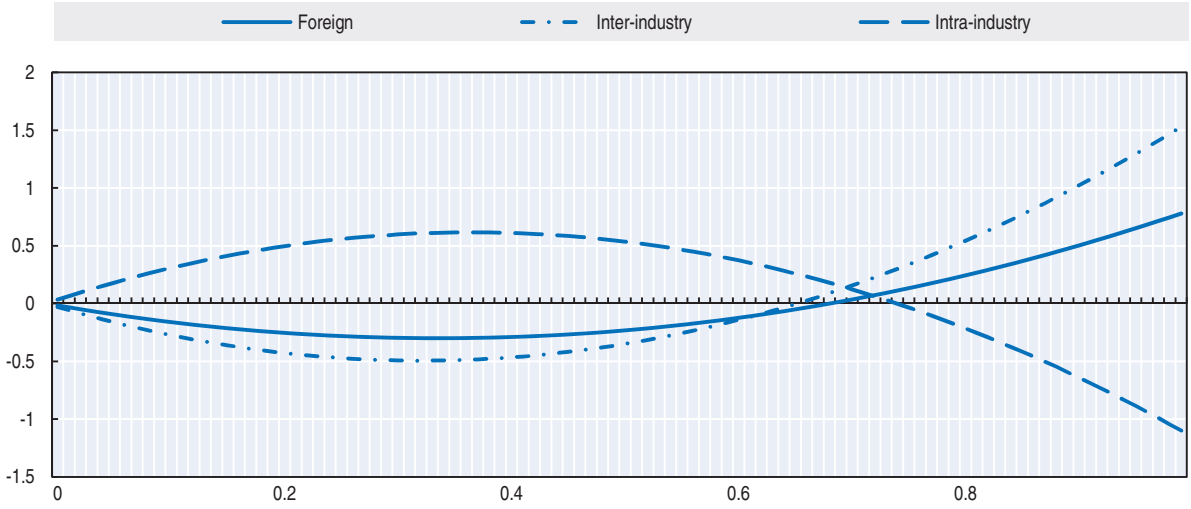
Mirroring this, firms with lower profits are more likely to perform an acquisition, but the increase is more important for firms with low debts. These findings conform to the growth-resource mismatch hypothesis. Interestingly, the HH index and its square have a significant effect on foreign, intra-industry and inter-industry acquisitions, but the signs of the coefficients differ.

Finally, older firms have lower odds of taking over foreign firms or firms in other industries, although this negative effect is decreasing. Hence, for the supposedly more diversifying

foreign and inter-industry acquisitions, the odds are negatively affected by low levels of concentration and even more so by intermediate levels, while the odds are positively affected for companies in very concentrated industries.

However, for intra-industry acquisitions, the odds are actually positively affected by low levels of concentration, even more so by intermediate levels of concentration, and negatively by higher levels of concentration. The relation between log odds and the HH index according to the three models is depicted in Figure 3.6.

Figure 3.6. **Log odds of acquisition by level of market concentration (HH index)**



Note: The solid and dash-dot lines depict the log odds of foreign and inter-industry acquisitions respectively, while the dashed curve shows the log odds for intra-industry acquisition.
Source: Authors' calculations.

Conclusions

Belgian firms do not appear to be very active in M&A deals, whether as targets or as acquirers. Against the worldwide trend, the number of acquisitions involving Belgian firms has even decreased over the last decade. This finding calls for future assessment of the causes of the low involvement of Belgian firms in M&A deals. Possible factors to take into account are financing constraints, differences with regard to other countries in share ownership and rules of corporate governance, but also the fact that multinational enterprises have had high stakes in the Belgian economy for a long time.

Given the low number of M&As with Belgian firms in each given year, the results of analyses of business demographics and job creation are very robust for Belgium and confirm the important role of young firms in net job creation and the substantial net job destruction of small old firms. The disproportionate share of firms involved in M&A deals in Belgian high-growth firms suggests that for the small group of Belgian firms that are active in M&A deals, acquisitions are instrumental in achieving high growth.

Young Belgian firms appear to be less inclined to acquire other firms than young foreign firms to acquire Belgian firms. Although the DynEmp project established a low start-up rate in Belgium, it also indicated that surviving start-ups witness substantial post-entry growth. It would be interesting to investigate the reasons for the apparent preference of young firms for organic growth as opposed to external growth through acquisition and

the impact of this choice on resource allocation efficiency within industries. Factors that explain the overall low involvement of Belgian firms in M&A deals may be especially relevant for young firms.

Estimation of employment growth after acquisition indicates that concerns about possible job destruction through foreign acquisitions are not warranted for Belgium. For foreign inter-industry acquisitions there are actually positive effects on employment growth of target firms in the years after acquisition. Domestic intra-industry acquisitions, on the other hand, negatively affect post-acquisition employment growth in target firms, an effect that is partially moderated by job creation in domestic acquiring firms. These results show the importance of accounting for potentially different motives for acquisition (e.g. consolidation or efficiency versus diversification), which should be further investigated.

Growth in turnover appears to be a more important indicator than employment growth for the attractiveness of firms as a target of acquisition. For all types of acquisitions, intangible assets positively affect the probability of acquisition. The probability of a Belgian firm acquiring another firm is determined by industry concentration, mostly in a non-linear way.

Future research could extend the focus of this chapter by taking into account more characteristics of M&A firms, such as the nationality of the target and acquiring firms in cross-border acquisitions or the share of ownership. From a general welfare perspective it would also be interesting to investigate other effects of acquisitions, such as the potential creation of spin-outs due to the mismatch between the aspirations of individual employees and the management strategy in the post-acquisition integration period or the impact on productivity growth and within-industry reallocation. Given the important role of industry concentration in the decision of acquisition, an assessment at the industry level of the impact of M&As on competition, innovation and efficiency growth could also be envisaged.

Notes

1. Zephyr does not impose a minimum value for M&A deals to be included. Thomson currently applies a USD 1 million minimum threshold (previously USD 10 million).
2. The reported number and value of M&As differs depending on the data provider. Although the overall pattern is comparable with other sources, the time series of the Institute for Mergers, Acquisitions and Alliances (IMAA) used in Figure 3.1 does not show a record high for the value in 2015, as reported by Dealogic, Thomson Reuters and Zephyr.
3. Zephyr data are used in several firm-level M&A studies (e.g. Huyghebaert and Luypaert, 2010; Stiebale and Trax, 2011; Oberhofer, 2013; Furlan, Oberhofer and Winner, 2015).
4. *www.bvdinfo.com/en-gb/our-products/economic-and-m-a/m-a-data/zephyr*.
5. Nearly all legal entities active in Belgium have an obligation to deposit an annual account at the Central Balance Sheet Office which makes these accounts available for the public.
6. Sector S.11, following the European System of National and Regional Accounts (ESA 2010).
7. From Belfirst, over 2001-14, 13 610 mergers by acquisition can be identified involving a Belgian company, 6 335 of which are not considered by Zephyr. The acquisitions reported in Belfirst are based on information regarding the legal situation as provided by the Crossroads Bank for Enterprises (CBE), a register that contains all basic data regarding enterprises and their individual business locations in Belgium. The deals recorded in Zephyr involving Belgian companies represent, on average, 76% of the employment (per head) in companies involved in acquisitions reported in Belfirst.
8. For most countries the number of M&A deals involving a national company as a target is very close to the number of deals involving a national company as an acquirer.
9. This dramatic increase can to some extent be explained by acquisitions involving firms from emerging economies.

10. Data by the Institute for Mergers, Acquisitions and Alliances (IMAA) confirm the generally low number and decline in M&As involving Belgian firms.
11. The top 10 of industries in terms of the total number of firms involved in acquisitions differs from the ranking in Table 3.1 as the total number of firms involved depends on the total number of firms in each given industry. For example, wholesale trade, except for motor vehicles and motorcycles (NACE 46) has the largest number of firms involved in an acquisition, both for deals involving a Belgian target and deals involving a Belgian acquirer, but relative to the total number of firms in this industry the ratio is only 0.12 for target firms and 0.10 for acquirers.
12. Total employment is defined as the sum of persons employed by all companies that have deposited their annual account and balance sheet (Belfirst data).
13. Only firms for which the age of the target and the acquiring firm are known are considered in this table. These firms account, on average, for 85.4% of the total number of employees in the sector of non-financial corporations (S.11 ESA 2010) over 2002-14.
14. Over the period 2002-07, the contribution of non-exiting old small incumbents that were not involved in any M&A deal was slightly positive, as was the contribution of non-exiting old large incumbents.
15. For the majority of deals considered by Furlan, Oberhofer and Winner (2015) the acquired share equals 100%.
16. Firms that were not dissolved through merger or acquisition may have been dissolved or stopped activities in the years after acquisition. As pointed out in the data section, Belfirst contains a relatively large number of mergers by acquisitions not considered in Zephyr, in which target firms are dissolved. As the vast majority of these acquisitions can be identified as intra-group deals, they are not considered for further analysis.
17. Due to data availability the years 1997 up to 2000 as well as 2015 are not included in the estimations.
18. Over the period 2001-14, for acquisitions with a Belgian target the median deal value of domestic acquisitions was USD 11 million, for foreign acquisitions USD 22 million, for intra-industry acquisitions USD 26 million and for inter-industry acquisitions USD 13 million. For deals with a Belgian acquiring firm the median deal value of domestic acquisitions was – by definition – also USD 11 million, for foreign acquisitions USD 18 million, for intra-industry acquisitions USD 27 million and for inter-industry acquisitions USD 12 million. The average deal value is much larger but highly skewed by a small number of very large deals.
19. The number of acquisitions in which targets are dissolved is too small for a meaningful further breakdown than the one in Table 3.7.
20. A deal is labelled as intra-industry if all target and acquiring firms have the same four-digit primary activity NACE code.
21. Estimations in which the three-digit level, instead of the four-digit-level, is considered to define intra-industry versus inter-industry deals provide very similar results. These results are not reported but available upon request.
22. For the majority of acquisitions of Belgian target firms 100% of ownership is transferred.
23. Some firms are the target of more than one acquisition in the same year.
24. The results of the robustness tests are not reported but available upon request.
25. The number of acquisitions in which targets are dissolved is too small for a more detailed breakdown than the one in Table 3.11.
26. Results not reported but available upon request.
27. In particular, the estimates depend on the relative variance of unobserved characteristics, so that differences in coefficients across models (e.g. logit versusprobit) and across different samples may primarily reflect differences in normalisation or in the relative importance of observed versus. unobserved variables. See, for example, Train (2003).
28. Industries are, as in the fourth section, considered at the NACE four-digit level (Rev. 2).
29. That is $\rho^2 = 1 - \frac{L(\beta)}{L(\bar{\beta})}$ with $\hat{\beta}$ the log likelihood function, $\bar{\beta}$ the maximum likelihood estimate and R^2 a vector containing zeroes for the predictor coefficients. This value can be interpreted as a maximum likelihood analogue for the coefficient of determination R^2 in OLS, so that is also known as pseudo-R^2.

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