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Determinants of cross-border takeovers – An empirical examination of Austrian takeover targets

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Author’s declaration

Unless otherwise indicated in the text or references, or acknowledged above, this thesis is entirely
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1 Introduction

International economics have never been as important as they are today. Trade in goods and services, flows of money, and investments in foreign economies are the outcome of a high degree of economic integration in the early 21st century and are the cornerstone of the present economic environment. Foreign direct investment (FDI) is one of the driving forces behind the current wave of globalization. According to Barba Navaretti & Venables (2004) FDI grows much faster than world merchandise trade. The dynamics behind FDI and the decision of a firm to engage in FDI have been an important subject for researchers for years. Whereas the OLI-categorization scheme by Dunning (1993) was mostly used to understand why firms go for FDI, new theories are being developed in which the firm’s decision on FDI engagement is determined in a fully adequate micro-economic model. The theoretical FDI literature has mainly focused on greenfield investment – one of the two major types of FDI, namely the building of a subsidiary in a different country from the ground up.

However in 2006, 78% of world’s FDI value was generated by the other important FDI-type “cross-border Mergers & Acquisition” (henceforth cross-border acquisitions or takeovers) (Brakman et al. 2006). The acquisition of an already existing foreign firm as an internationalization strategy has become more and more popular during the past decades. The worldwide phenomenon of industry consolidation and privatization and the liberalization of economies are responsible factors for fueling the growth of cross-border acquisitions. Whereas the dynamics of international takeovers are largely similar to domestic takeovers, cross-border activities involve unique challenges, such as handling different economic, institutional and cultural structures (Shimizu et al., 2004).

FDI, in general, is supposed to facilitate transfer of knowledge from one firm to another, hence from one country to another. One widespread argument is that firms which engage in FDI must possess some specific advantages over local competitors (Markusen, 1995). Recent literature has challenged this view. Due to a considerable body of empirical work, firms might decide to undertake FDI not because of the exploitation of advantages they already are endowed with but rather to acquire new technological knowledge. As a result, technological spillovers work as a two-way-flow of knowledge. Firms benefit from each other instead of having the laggard learn from the leader (Fosfuri & Motta, 1999).

When firms decide to acquire an existing company in a foreign country instead of building a new plant from ground up, not only the benefits of entering a new market but also the advantages of gaining access to technologies and knowledge as well as other already existing resources such as production systems are given. Cross-border acquisitions are an important alternative for strategic expansion. In the decade of the 1990’s the popularity of this strategy increased massively. While
domestic and cross-border acquisition activities follow a cyclical nature and domestic activity cooled down since its peak in the late 90’s, the total number of international activity has been increasing at a rapid rate since then (Shimizu et al., 2004).

Still, takeovers of domestic firms by foreign buyers are not only associated with benefits for host and home countries. The reaction of governments to such takeovers often seems to be motivated by concerns other than competition (Dinc & Erel, 2013). Governments clearly favor domestic over foreign ownership, even though there is evidence that multinationals bring welfare effects to domestic markets. Numbers show that in 2014, inward investment of foreign-owned enterprises accounted for 19% of jobs in Austria’s private sector, whereas in 2013 25% of private sector value added was produced by foreign-owned enterprises (OECD, 2017). Also, in 2014, the value added generated by foreign affiliates for domestic, i.e. non-export, sales accounted for 12% of GDP which is a significant value (OECD, 2017). Still, in recent years, government interventions directed against the takeover of domestic firms by foreign companies have become more common. According to Heinemann (2012) this does not appear to be linked to the financial and economic crisis but it is rather a general phenomenon. It seems that many states see their interests affected when a domestic firm falls into the hands of a non-domestic firm. Additionally, the established “Going Out” strategy of the Chinese government and other developing countries, and the underlying motive of obtaining advanced technologies and management skills via the acquisition of foreign firms, in some cases, leads to skepticism in the acquired firm’s country and the urge occurs to secure domestic knowledge and technologies.

As mentioned above, Austria’s degree of international integration is high. A considerable high share of Austria’s economic activity depends on foreign markets. Austria holds FDI (equal to over 50% of GDP in 2015) and hosts FDI – respectively around 42% of GDP in 2015 (OECD, 2017). The yearly average value of announced greenfield investments in Austria from 2007 until 2017 was around 2.180 million U.S dollars. The average value of cross-border net M&A’s was around 2.680 million U.S dollars (UNCTAD, 2018). The numbers show that international takeovers play a remarkable role in FDI for Austria’s economy. Still, the motives for the acquisition of Austrian firms have not been studied properly. In their case study Anwar & Mughal (2015) state that the Austrian firm Centrex Europe Energy & Gas AG was acquired by Gazprombank, a Russian firm which sought to get access to strategic assets. According to another case study by Nayyar (2008) the Indian company WPRO acquired the Austrian firm New Logic in order to get access to domestic technology. Hence, the acquisition of domestic resources seems to be a result of seeking domestic assets such as technologies and knowledge.

My study is part of a larger project financed by the FFG. The FFG-project aims at defining critical infrastructures (including firms and networks of firms) and discussing how these units’ resilience can be strengthened. Whereas the motives of cross-border takeovers of Austrian companies have
not been studied explicitly, the aim of my thesis as part of the FFG project is to investigate Austrian firm-level data in order to learn something about the specific motives for the acquisition of domestic firms by foreign companies. After all, beauty is in the eye of the beholder. It is difficult to talk about the motives of the acquiring firms, when one only wants to look at the acquisition target. Yet by performing econometric analysis of balance sheet and performance data of Austrian firms between 2012 and 2015 I reveal some patterns that help me to assess at least a guess of possible motives of takeovers.

At first, I summarize existing literature about cross-border takeovers, international takeovers in the context of FDI and four common motives for acquiring foreign companies on firm-level. These motives are access to resources, portfolio-diversification, faster entry into a new market and synergies. I will focus on the resource-based motive. In chapter 3, I explain the data I use and the procedure to identify acquisition targets. I give an overview of different ownership types of Austrian companies. These are domestic firms, foreign-owned firms and newly-acquired firms. Newly-acquired firms, in turn, will further be split regarding the type of acquisition, i.e. whether the buyer was domestic or not. For this reason acquired firms are grouped by the nationality of the initial owner and the nationality of the acquiring firm. The focus of the next chapter lies on Austrian firms acquired by foreign companies. Light is shed on takeover targets and the nationality of the acquiring firms and on their sector and size. In chapter, 5 I perform some univariate analysis of differences in means to find distinguishing characteristics of different ownership types. At first, domestic-owned companies are compared to foreign-owned firms, in order to look for differences in these two ownership types, namely differences in productivity, efficiency, size, etc. The next step is testing the differences in means of domestic non-acquired firms and Austrian firms acquired by foreign buyers. Differences in the means might be informative with respect to the underlying takeover motive. In addition, I compare domestic takeovers to cross-border takeovers of domestic firms. Domestic and foreign takeovers possibly appear for the same synergistic reasons (Shimizu et al., 2004; Erel et al. 2012). Though, if one follows FDI-theory and the corresponding assumption that foreign firms seek to gain domestic knowledge, this motive should be reflected in the data. In chapter 6, I perform multivariate analysis of takeover targets. By means of logit analysis, I estimate two models that include variables with respect to the resource-based motive as well as other variables derived from FDI-theory and studies, which do not distinguish between domestic and cross-border takeovers. I do so, in order to check if synergistic motives apply to the same extent for cross-border and domestic takeovers. Chapter 7 concludes.

One of the most important results of this work is: Even though, the overall share of domestic firms acquired by a foreign company has been small some patterns can be observed in the data. Firms acquired by a foreign buyer differ from domestic firms, as well as from takeover targets acquired
by domestic companies with respect to their share of intangible assets in their total assets. The univariate analysis shows that the share of intangible assets in the firms’ total assets is higher for cross-border takeover targets than for non-acquired domestic firms and targets from domestic takeovers. The results of the multivariate analysis paint a similar picture. Thus, the higher a firm’s share of intangible assets in its total assets, the higher the probability of being acquired by a foreign buyer. While several variables are tested in two models, the intangible ratio shows significance throughout all estimations. In addition, foreign companies tend to target larger firms and the higher a firm’s operating margin, the higher the probability for acquisition. Hence, acquired firms are larger in terms of sales, the management of acquired firms is more efficient, and acquisitions mainly take place in high-technology manufacturing industries and knowledge-intensive services. All these indicators support the resource-based view, which consequently states:

“Acquisition of existing foreign business allows the acquirer to obtain resources such as patent-protected technology, superior managerial and marketing skills, and overcome special government regulation that create a barrier to entry for other firms.” (Boateng et al. 2008)

2 Theoretical foundations of cross-border takeovers

In the following chapter I examine some theoretical foundations of cross-border takeovers. First, the definition of mergers, acquisitions and takeovers is discussed. The terms mergers, acquisitions and takeovers sometimes are used interchangeably. This might lead to confusion. For this reason, I will briefly explain the terms and the differences. Also, I summarize the theory regarding FDI and the role of cross-border acquisitions in FDI. Cross-border takeovers count for a particular large part in world’s FDI, i.e. it is important to understand driving forces of FDI likewise. In addition, I review the literature on firm-level motives of cross-border acquisitions. Finally, I examine some studies dealing with the strategic motives of cross-border takeovers more precisely, in order to come up with some questions that guide my study.

2.1 Mergers, acquisitions and takeovers – the definition

It is important to clarify the differences between the terms mergers, acquisitions and takeovers, since these terms are used interchangeably in most studies. Mergers and acquisitions (M&A) and takeovers appear when a parent company acquires another firm or two existing firms merge but both continue to exist (Gaughan 2007).

Even though both the terms mergers and acquisitions are connected with corporate reorganizations including the transfer of the ownership control of one firm (the target) to the
other (the acquirer), they are not exactly the same (Motis 2007). According to Hirshleifer (1995) mergers and likewise acquisitions fall into the more general concept of takeovers.

Takeovers, in turn, can be either friendly or hostile. Jetkinson and Mayer (1994) affirm that if a target firm’s manager rejects the acquisition offer, the takeover turns into hostile otherwise the takeover is friendly.

The explicit distinction of mergers and acquisitions depends on the announcement of the transaction and on the following corporation structure. When talking about mergers, the takeover bid is proposed to the representative manager of the firm and in acquisitions directly to the owners of the firm, i.e., the shareholders. In acquisitions, shareholders make independent decisions about their own shares. Acquisitions also refer to cases in which only a part of the company is bought. Contrarily in mergers shareholders make a collective decision by voting altogether (Motis 2007). According to Hirshleifer (1995), the firms involved in mergers cease to have separate identity and end up as one surviving entity.

The major part of empirical studies dealing with the motives, gains and effects of mergers and acquisitions does not clearly distinguish between these two types of deals. The reason might be that in case-by-case studies, analysts consider mergers and acquisition as equal (Motis 2007).

For this study I use the terms takeovers and acquisitions and leave out the term merger, even though sometimes the correct designation would be merger. A firm is considered to be acquired, merged or taken over by a foreign company if the foreign buyer acquires more than 50% of the firms’ shares. In contrast to most related studies dealing with takeover motives (Berkovitch & Narayanan, 1993; Seth et al., 2000; Alcalde & Espitia 2003; Boateng et al., 2008; Brar et al., 2009; Erel et al, 2012; Uygur et al., 2013) this work does not only contain information about publicly traded companies but also companies with other legal forms that were acquired by a foreign firm within the four-year period between 2012 and 2015.

2.2 The role of cross-border takeovers in FDI

According to Lee (2017) cross-border acquisitions are the major source of FDI, especially in developed countries. For this reason the understanding of cross-border takeover activity plays a crucial role in understanding FDI and globalization. According to Head and Ries (2008) about two-thirds of foreign direct investment (FDI) within the period 1987 to 2001 took the form of takeovers rather than new plants. Also, as mentioned in the introduction, in 2006 78% of FDI took form of international takeovers. Traditionally, theoretical FDI literature focused on greenfield investment. Important early works regarding this topic are Markusen’s (1984) model of horizontal FDI and Helpman’s (1984) model of vertical FDI. Carr et al. (2001) develop a 47-
equation, general equilibrium model including vertical and horizontal investment. In 2004 Bergstrand and Egger added physical capital to the knowledge-capital model of Markusen.

Since cross-border takeovers account for a particular high share of world FDI activity compared to greenfield investment, the interest in this kind of foreign investment increases steadily. The strand of literature considering FDI in the form of cross-border M&A is still small compared to research papers dealing with greenfield investment, but it is growing. Barba Navaretti and Venables (2004) distinguish takeovers from greenfield by supposing that merged firms rule out one of the varieties and the associated fixed costs of the joining firms. Similar to greenfield, cross-border takeover activity becomes more attractive relative to exporting as trade costs increase. Neary (2004) additionally focuses on the market structure implications of takeovers. He also investigates the implications of cost asymmetries between acquiring and target firms. According to Neary (2004) low-cost firms from one country acquire and subsequently shut down high-cost firms abroad. Furthermore, Nock and Yeaple (2004) contemplate takeovers as an option to gain access to a foreign firm’s non-mobile capabilities. Head & Ries (2008) develop a model explaining FDI based on an international market for corporate control, i.e. cross-border takeovers. They use bilateral FDI data for 30 OECD countries and 32 partner countries and apply their model to calculate predicted inward and outward shares of world FDI for all countries in 2001 and compare them to actual value. They find that the model fits the data reasonably well.

Also Harris & Ravenscraft (1990) state that cross-border takeovers are the largest element of FDI in the U.S. and an increasingly large part of total U.S. acquisitions. For this reason, the understanding of international takeovers requires a “marriage” of the theoretical work on FDI and corporate acquisitions. For this reason I combine FDI-theory and results of further studies on FDI determinants with the theory of cross-border takeovers.

### 2.3 A brief summary of FDI-theory

Whereas literature dealing with FDI counts as parallel literature to that on cross-border takeovers, FDI includes cross-border takeovers as well. In addition, other investments such as greenfield investments, retained earnings by foreign subsidiaries and loans from parent companies to their foreign subsidiaries are considered to be FDI. According to Erel et al. (2012) FDI data can be used instead of using data on specific cross-border acquisitions. Still, Erel et al. (2012) focus their empirical work on mergers and acquisitions rather than all FDI because of data quality. So do I. Nevertheless, it is important to give an overview on theory, dealing with FDI-determinants as well, since cross-border acquisitions are inevitably related to FDI.

According to Faeth (2009), there exist nine different groups of theoretic models dealing with FDI determinants. The first group consists of models dating back to the 1960s. Market size and growth,
political stability and factor costs are the main determinants of FDI. The second group includes models derived from the neoclassical theory, based on the international trade theory, in particular the Heckscher-Ohlin model. The third group considers models developed in the 1970s. The underlying assumptions are that markets are imperfect and that monopolistic advantages, product differentiation, business management experience, economies of scale and patents are the primary determinants of FDI. The fourth group adds the effect of aggregate variables on FDI, such as market size and trade barriers, into their models. According to Garavito et al. (2014) the model of greater importance in literature is in the fifth group – the Dunning’s eclectic paradigm of international production. The Dunning’s eclectic paradigm of international production combines the theory of international trade and the theory of internalization. Dunning explains FDI by three different types of advantages: ownership specific advantages of the company (Ownership), location advantages of FDI host countries (Location) and internationalization advantages of the firm’s production process (Internalization). This model is known as the OLI paradigm, with patents, know-how, management skills and reputation as ownership advantages and market access, favorable tax treatment and lower costs for production and transportation as location advantages. Internalization is associated with benefits a company derives by replacing external markets with FDI. The sixth group of models builds on industrial organization models, including internalization and OLI theory and follows the tradition of microeconomic theoretical models of Hymer, Kindleberger and Caves. They combine ownership and location advantages with technology and country characteristics. Knowledge capital is the ownership advantage, location advantages include country size and moderate to high trade costs for horizontal firms and low trade costs, stages of production with differing relative factor endowment for vertical firms. Internalization advantages only appear on the basis of joint-input property of knowledge capital. The seventh group combines the advantages of ownership and location with technology and country characteristics. The Knowledge-Capital model developed by Markusen et al. (1996) is another relevant model in this group. It combines horizontal and vertical FDI determinants in a model that allows firms to build various plants and geographically separate headquarters and production (Markusen & Maskus, 2002). The eight group assumes that firms are risk averse. Henceforth, market and macroeconomic risk factors, such as exchange rate and interest rate volatility are considered as determinants of FDI. The ninth group of models additionally includes policy variables such as tax and financial incentives, as well as subsidies (Faeth, 2009).

Faeth (2009) recommends that FDI should not be explained by single theories but more broadly by a combination of factors from a variety of theoretical models such as ownership advantages or agglomeration economics, market size and characteristics, cost factors, transport costs, protection, risk factors and policy variables. Accordingly, a combination of these factors should be used, even when the focus is on specific theories or aspects of FDI.
2.4 Literature review on motives for cross-border takeovers

The following subchapters serve as summary of several known motives for cross-border acquisitions examined by different researchers. Boateng et al. (2008) summarize following four motives for acquiring firms:

1. Acquiring resources and technology
2. Portfolio-diversification
3. Faster entry to a new market
4. Generating Synergies

2.4.1 Acquiring resources and technology

When it comes to FDI in form of cross-border takeovers a number of studies examined the motivation from the resource-based view (Baum & Oliver, 1991; Eisenhardt & Schoonhoven, 1996; Hennart, 1991, Madhok, 1997) and organizational learning perspectives (Barkema & Vermeulen, 1998; Vermeulen & Barkema, 2001). According to these studies, cross-border takeovers are motivated by an opportunity to acquire new capabilities and learn new knowledge. The acquisition of an existing foreign firm allows the acquirer to achieve resources such as patent-protected technology, superior managerial and marketing skills. Additionally, contrary to greenfield investment, takeovers allow to overcome special government regulation that create a barrier to entry for other firms (Erunza & Senbet, 1981). Shimizu et al. (2004) support this view by propose that firms may engage in acquisitions in order to exploit the targets’ intangible assets. This possible incentive comes along with Caves’ (1990) argument, who suggests that the acquisition of a foreign competitor enables the acquirer to bring a more diverse stock of specific assets under its control and therefore seize more opportunities. In addition, Shimizu et al. (2004) propose that international takeovers may also be implemented to internalize an acquirer’s intangible assets to reduce or avoid transaction costs. Internalization theory suggests that firms with intangible assets should invest in foreign countries in order to avoid the costs of transferring those assets (Buckley & Carter, 1999).

Thus, cross-border takeovers may be motivated through the internalization of the acquirer’s various intangible assets and at the same time through reverse internalization. Internalization and reverse internalization help acquirers to avoid any embezzlement of intangible assets and reduce transaction costs (Boateng et al, 2008).

2.4.2 Portfolio-diversification

Diversification is another well-documented motive for a firm’s expansion to a foreign market. It has been suggested as one of the dominant reasons for cross-border takeovers (Denis et al. 2002; Markides & Ittner, 1994; Seth, 1990; Shleifer & Vishny, 1992; Trautwein, 1990). Thus,
international acquisition does not only provide access to important resources, but also allow firms to reduce the costs and risks of entering into foreign markets (Boateng & Glaister, 2003). In contrast to domestic takeovers, international acquisitions reduce operational and financial risk due to geographical market diversification (Seth, 1990). Sources of value due to geographical market diversification can be those associated with differences in exchange-rates, market power due to international scope and ability to arbitrage tax regimes are unique to international mergers (Manzon et al. 1994; Morck & Yeung, 1992; Seth et al., 2000). In addition, since economic activities in different countries are not perfectly correlated, the diversification of a firm’s portfolio across boundaries should reduce earnings volatility and improve investors’ risk-return opportunities.

2.4.3 Faster entry into a new foreign market

An additional motive for potential acquirers is the faster entry into a foreign market by means of cross-border takeovers. Martin, Swaminathan, and Mitchell (1998) state that international takeovers can be used to access new and lucrative markets and expand the market for a firm’s current goods as well. Hence, cross-border takeovers provide the opportunity for instant access to a market with established sales volume. According to UNCTAD (2000), cross-border mergers provide the fastest way for international expansion. In comparison to building of a new plant, cross-border takeovers allow for immediate access to a local network of suppliers, marketing channels, clients and, and other skills (Kogut & Shingh, 1998; Barkema & Vermeulen, 1998; Boateng & Glaiser, 2003).

2.4.4 Generating Synergies

A number of scholars dealing with cross-border takeover provides evidence for firms engaging in mergers to generate synergies (Friedman & Gibson, 1988; Bradley et al., 1988; Trautwein, 1990). Synergies arise from combining operations and activities such as marketing, research and development, procurement and other cost components that where performed from two separate companies before the acquisition. The broad concept of synergy includes different sources of value gains, including economies of scale and scope, increasing market share and power, and taking advantage of tax- and exchange rate differentials between countries. It is argued that cross-border takeovers can increase a firm’s capacity and provide an opportunity to reduce costs through economies of large-scale production, pooling resources to produce a superior product and generate a large market share and long-run profitability by combining operations and activities of two former separate firms (Doukas & Travlos, 1998; Ghauri & Buckley, 2003; Trautwein, 1990). At the same time, synergy can also be created by exchange-rate differentials (Kish & Vasconcellos, 1993) and tax-differentials between the host and the home countries (Servaes & Zenner, 1994).
2.5 Studies dealing with the motives for cross-border takeovers

Only few empirical studies deal with the motives for cross-border acquisitions. Especially studies focused on firm-level characteristics of cross-border acquisition targets are scarce. Most of economic literature with respect to acquisitions does not distinguish between domestic and international takeover activities. While some components influencing the probability of acquisition of a domestic firm by a foreign company might be similar to domestic takeovers, the motives for the acquisition of a foreign-company can include different factors as well.

In this section I summarize some studies dealing with motives for cross-border acquisitions. Whereas most of them (Boateng et. al, 2008; Ahammad & Glaister, 2010; Erel et al. 2012) focus on the acquiring firm, Uygur et al. (2013) try to find support for motives for cross-border acquisitions by studying balance sheet and performance data of US acquisition targets.

Boateng et al. (2008) analyze the strategic motives and performance of cross-border M&As by Chinese firms. They test a sample consisting of 27 Chinese companies listed on the Shanghai and Shenzhen stock markets in 2000-2004. Boateng et al. use event study method to study the underlying motives for the acquiring firms. Their findings suggest that most of the acquiring firms have more than one single motive for the acquisition of foreign companies. The most important motive for Chinese firms entering into a foreign market is to facilitate international expansion and portfolio diversification. Increasing the market share and the power to acquire strategic assets including technology, research and development capabilities and other management know-how were the second-highest ranked motives. Most of the firms that were found “to acquire strategic assets” either as the main or supplementary reason for engaging in cross-border takeovers. Hence, their findings support the resource based view on cross-border acquisitions.

Ahammad & Glaister (2010) studied the motives for cross-border mergers and acquisition of a sample of UK firms acquiring North American and European firms. They identified the relative importance of factors motivating the decision to acquire the foreign target. They state that the relative importance of strategic motives for cross-border takeovers will vary with the regional origin as well as with the industry of the target firm. In addition they search for support of their hypothesis that the relative importance of the strategic motives for takeovers will vary according to the pre-acquisition performance of the target firm. Using a sample of UK firms acquiring North American and European firms during the 5-year period from 2000 to 2004, they carry out an exploratory factor analysis (FA). They construct their sample with data gathered via a cross-sectional survey using a questionnaire on selected UK-firms. They find that the main motive to engage in international takeovers was to enable presence in new markets, as well as the faster entry in new markets, to facilitate international expansion, to gain new capabilities, to gain strategic assets, to increase market power, to gain efficiency through synergies and to acquire
complementary resources. In terms of underlying theoretical explanations, they find that the primary strategic motives are undergirded by the theories of strategic positioning and the resource based view of the firm.

Erel et al. (2012) study the factors that potentially affect cross-border mergers but do not have an effect on domestic mergers. They study country-specific factors such as cultural differences, geographic differences, country-level governance differences and international tax effects. They use a sample of 56,978 cross-border mergers between 1990 and 2007 and perform a logit model to observe differences of cross-border and domestic deals. They find that geography matters in international takeovers. The odds of acquiring a firm in a nearby country are considerably higher than the odds of acquiring a firm in a country far away. Also currency movements do play a significant role. Hence, firms from countries whose currencies have appreciated are more likely to acquire foreign firms while firms from countries whose currencies have depreciated are more likely to be takeover targets. Relative stock market performance between two countries, also, affects the propensity of firms in these particular countries to merge. Moreover, Erel et al. provide a preliminary analysis of the patterns and reasons for cross-border mergers. Thus, cross-border mergers undoubtedly occur for the same synergistic reasons as domestic mergers. According to Uygur et al. (2013) compare the financial characteristics of U.S. companies acquired by foreign companies with a matched sample of non-acquired U.S. companies during the post crisis period 2007-2011. Their sample consists of 110 U.S. targets and 110 matched non-acquired publicly owned firms with the same size and from the same industry. They collected annual financial data from the Compustat database and use total assets, current assets, net fixed assets, sales, net income, and stock price per share and use financial ratios in order to compare the matched firms. In order to identify differences between targets and non-targets they apply Multivariate Analysis of Variance (MANOVA). Uygur et al. find support for the merger theory that acquiring companies tend to target mismanaged companies with low profitability or losses and with unused debt capacity. U.S. firms acquired by foreign companies had low profitability, mismanaged assets, and low debt ratios. The motive for the acquiring company is to raise the performance of the target und utilize the unused debt capacity for synergistic benefits. Consequently, their findings suggest that firms undertake acquisitions for synergistic reasons.

Hence, the synergy-motive is supported by Uygur et. al (2013) and Erel et al. (2012). Erel et al. (2012) provide findings that, in absence of country-level effects such as currency appreciation or macroeconomic performance, cross-border mergers do appear for the same synergistic reasons as domestic mergers. Boateng et. al (2008) and Ahammad & Glaister (2010) find evidence for the resource-based view of cross-border takeovers. Acquiring firms therefore seek to gain access to the acquisition targets' resources. The strategic positioning of the acquirer, also, does play a role in Boateng et. al (2008) and Ahammad & Glaister (2010). Uygur et al. (2014) additionally conclude
that acquired U.S. firms during the post-crisis period in 2007-2011 had low profitability, mismanaged assets and low debt ratios.

Since it is hard to derive the motives “portfolio diversification”, “faster entry to a foreign market” and “synergies” when one only wants to look at the acquisition targets, the focus of this empirical work is on the resource-based motive for cross-border acquisitions. Following the resource-based theory, acquirers are assumed to seek for domestic firms knowledge, technology and production systems. In the next chapters I investigate firm-specific characteristics that might influence the probability of a domestic firm being acquired. The aim is to assess the importance for the motive of the acquisition of resources and technology.

3 Data description & data management

In the following chapter I give an overview of the data I use for the empirical examination of Austrian acquisition targets. At first, I talk about the data source, namely the database which provides the data I use for my study. I summarize the dataset and the information provided by Bureau van Dijk. Further, I explain how acquisition targets are identified and I give insight in the composition of the data with respect to different ownership types. Observations which refer to newly-acquired firms are, further, decomposed and grouped in different acquisition types. I do so, in order to give an overview of the structure of acquisition of Austrian firms. I find that the share of Austrian firms acquired by foreign global ultimate owners is rather small and so is the probability for an Austrian firm to be acquired by a foreign acquirer.

3.1 Data source

At this point I explain the composition of the dataset I use. I use data provided by the Bureau van Dijk, namely the AMADEUS database. I describe the data and the content.

The data I use for my study is provided by the AMADEUS database which is a comprehensive database of 14 million companies across Europe, collected by the Bureau van Dijk. In order to enable searching and analysis, data from over 35 sources is combined, whereby the financial information is provided in a standardized format to allow for cross-border searching and analysis.

For my empirical examination I use an AMADEUS dataset consisting of information about 52,786 firms located in Austria within the period 2012 to 2016.

The initial dataset consists of 170,689 observations corresponding to 52,786 Austrian firms between 2012 and 2016. The data includes general descriptive information about the firm such as the firm number that is an ID assigned by the AMADEUS database, the Bureau van Dijk Identification Number (BvDID-number), the name of the company, the location, the date of incorporation and information about the nationality of the firm owner in form of the country's ISO
The descriptive part of the dataset includes the number of employees and the sector. The sector is described by the 2-digit and 4-digit NACE code and additionally the 2-digit and 4-digit sector name. The firms’ international activity is measured by an export-dummy.

The information about the ownership structure contains facts about the “global ultimate owner” (GUO) of the company. The GUO is defined as the owner of more than 50% of the firm’s share (Bureau van Dijk, 2018). The data regarding the GUO consists of the BvDID-number of the GUO, the 2-digit owner number that is the GUO’s country code, the NACE code of the GUO and the ownership percentage. Dummy’s that say something about the shareholder type, which identify a financial corporation or public involvement, are also included in the data.

Standard financial items used for this study are selected items of the balance sheets, profit and loss accounts and standard ratios. Information such as the profit or loss before tax, operating revenue, profit margin, cashflow, total assets, intangible assets, added value, sales, costs of employees and material costs are used for the econometric estimations.

Information is provided for the years 2012, 2013, 2014, 2015 and 2016. For each firm there exists at least one observation in one of these years, at best there exist observations for every year. That is not always the case. For the year 2012 the dataset includes observations of 58% of the firms, in 2013 48%, in 2014 69%, in 2015 73% whereas in 2016 76% of the total firms are covered. For 29% of all firms data is available for each year between 2012 and 2016. For 18% of the firms information is available for four years, for 18% for three years, for 16% for two years and for 19% of all firms exists only one observation in the dataset.

### 3.2 Identifying acquisition targets

First, firms are assigned to different ownership types, i.e. domestic, foreign-owned and newly-acquired. I explain the procedure allocating observations to the different groups. After this observations containing information about newly-acquired firms, are assigned to four different groups of acquisition. The method used for classification is explained in chapter 4.2.2.

#### 3.2.1 Domestic, foreign-owned and newly-acquired firms

Firms can either be domestic, foreign-owned or newly acquired. To identify whether a firm was acquired by another firm within the observation period, I use the GUO’s identification number of Bureau van Dijk (GUOBvDID-number). If this number changes between year $t$ and $t + 1$, there has

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1It is important to mention that the observed firms are all located in Austria, i.e. they are Austrian firms or foreign-owned firms located in Austria. Therefore the country’s ISO code does provide information about the nationality of the owner and not the location of the firm.
been an acquisition in year $t$. For example if the firm $i$'s GUOBvDID-number in 2014 deviates from the number in 2015, firm $i$ was acquired in 2014$^2$.

I classify the types as follows:

- Domestic firms do not show a changing GUOBvDID-number during the whole observation period and the GUO’s country code is AT (Austria).
- Foreign-owned firms as well do not exhibit a changing GUOBvDID-number during the observation period but the GUO’s country code is not AT.
- Newly acquired firms are observations with a changing GUOBvDID-number between at least two years.

Table 1: Domestic, foreign-owned and newly acquired firms classified according years

<table>
<thead>
<tr>
<th></th>
<th>Domestic firms</th>
<th>Foreign-owned firms</th>
<th>Acquired firms</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>23 932</td>
<td>4 049</td>
<td>2 466</td>
<td>30 447</td>
</tr>
<tr>
<td>2013</td>
<td>19 564</td>
<td>3 287</td>
<td>2 607</td>
<td>25 458</td>
</tr>
<tr>
<td>2014</td>
<td>28 399</td>
<td>4 646</td>
<td>3 677</td>
<td>36 722</td>
</tr>
<tr>
<td>2015</td>
<td>29 136</td>
<td>5 045</td>
<td>4 204</td>
<td>38 385</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>101 031</strong></td>
<td><strong>17 027</strong></td>
<td><strong>12 954</strong></td>
<td><strong>131 012</strong></td>
</tr>
</tbody>
</table>

Table 1 shows the distribution of the observed firms among ownership type and year. I drop the observations from 2016 in the table above. The data does not provide information about acquisitions in 2016, thus 131,012 observations are left. 77% of the total observations within the observation period belong to the group of domestic owned firms. 13% of all observations correspond to multinational firms. 10% of the whole population are newly-acquired firms. The share of foreign-owned firms is 13% for each year, whereas the share of domestic firms slightly decreases from 2012 to 2015. This indicates the presented increase in the share of newly-acquired firms. In general the shares only vary marginally between the years and the shares of the whole population are stable.

To sum up, the largest part of the observations consists of firms owned by Austrian GUOs, whereas the second highest share is provided by foreign-owned companies. On average 10% of each years observations change ownership every year. Newly acquired firms can be assigned to different types of acquisitions as well.

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$^2$ There is no information about takeover targets in 2016. Since 2016 is the latest available year, a change in the GUOBvDID-number between 2016 and 2017 cannot be observed. For this reason observations of this year will be neglected in the data description.
### 3.2.2 Types of acquisition

I differentiate the firms that change ownership not only by the GUO's BvID-number. There occur four different types of acquisition, when one considers the origin of the acquirer as important:

- When the country code of the GUO in year $t$ is $AT$ and the code does not change after the acquisition in year $t + 1$ the acquisition is considered as domestic. The transfer of ownership happens between Austrian GUOs. This type of acquisition will further be named **ATAT-acquisition**.

- When the country code of the GUO in year $t$ is $AT$ and changes after the acquisition, i.e. the country code is **not AT** in year $t + 1$, a domestic-owned firm is acquired by a foreign GUO in year $t$. This type will further be named **ATnonAT-acquisition**.

- When the country code of the GUO in year $t$ is **not AT** but is $AT$ in year $t + 1$ an Austrian firm takes over a foreign-owned firm in year $t$. This type will further be named **nonATAT-acquisition**.

- When the country code in year $t$ is **not AT** and is, as well, **not AT** in year $t + 1$, the ownership transfer in year $t$ happens between two multinational firms. This type will further be named **nonATnonAT-acquisition**.

**Table 2: Distribution of acquisitions among acquisition types**

<table>
<thead>
<tr>
<th>Year</th>
<th>ATAT</th>
<th>ATnonAT</th>
<th>nonATAT</th>
<th>nonATnonAT</th>
<th>Acquisitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>59%</td>
<td>5%</td>
<td>3%</td>
<td>33%</td>
<td>2466</td>
</tr>
<tr>
<td>2013</td>
<td>70%</td>
<td>5%</td>
<td>3%</td>
<td>22%</td>
<td>2607</td>
</tr>
<tr>
<td>2014</td>
<td>57%</td>
<td>5%</td>
<td>4%</td>
<td>34%</td>
<td>3677</td>
</tr>
<tr>
<td>2015</td>
<td>70%</td>
<td>6%</td>
<td>3%</td>
<td>21%</td>
<td>4204</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>8303</td>
<td>694</td>
<td>461</td>
<td>3496</td>
<td>12954</td>
</tr>
</tbody>
</table>

Table 2 shows the distribution of acquisitions among the different acquisition types. In total 12,954 of all observations consider acquired firms. The shares are calculated for each year with respect to the total amount of acquisitions in the particular year. The 12,954 observations do not correspond to 12,954 firms. Some firms have been acquired more than once throughout the observation period and some firms acquired more than one firm. Nevertheless, the table above shows the percentage share of the different acquisition types for each year separately as well as the shares of the totalized acquisitions. Consequently no firm occurs twice in one year. On average 64% of all acquisitions belong to the ATAT-type, i.e. Austrian firms buying another Austrian firm. nonATnonAT-acquisitions exhibit the second highest share (27%). ATnonAT-acquisitions account for 5% of total acquisitions, whereas nonATAT-acquisitions make up for 4%.
The numbers suggest that Austrian acquirers tend to target Austrian firms, while foreign acquirers show a preference for already foreign-owned firms. The shares of Austrian firms acquired by a foreign GUO and for foreign-owned firms acquired by an Austrian GUO are rather small. Given that the overall share of acquired firms in the whole population is about 10%, the share of ATnonAT-acquired firms of the whole population, including firms of all three ownership types, is considerably small. Additionally, 2,480 of all 3,496 nonATnonAT-acquisitions, hence more than two thirds, are characterized by an ownership transfer within the GUOs home country. Hence, the number of firms acquired by a GUO not located in the same country as the former GUO is low.

A little less than a third of all acquisitions can be considered as FDI. The number of cross-border acquisitions of total acquisitions in the case of Austria is about 33% on average for the years 2012-2015, considering ATnonAT- and nonATnonAT-acquisitions as cross-border acquisitions and therefore as FDI.

### 3.3 Preparing the data

The aim of my study is to assess takeover targets and find out something about the possible motives of foreign acquires in buying Austrian firms. For this matter I compare Austrian owned firms, which were not acquired within the observation period, with Austria owned firms, which were acquired by a foreign buyer between 2012 and 2015. I look for differences in financial indicators in the year before the acquisition, since these values give information about the potential motives of the acquiring firms. I have to come up with a sample consisting of Austrian owned non-acquired firms and ATnonAT-acquired firms fulfilling some demands. The main focus is on testing the resource-based view of international takeovers. For this reason the intangible ratio, namely the share of a firm's intangible assets in its total assets, is from great importance and the must not show unreasonable values. I prepare the dataset as follows:

After identifying the acquisition targets, observations of 2016 are dropped. In determining the takeover targets of 2015 information about the GUO in 2016 does play a key-role, but when comparing acquired with non-acquired firms, information of 2016 is no longer needed. The next step is to eliminate observations with missing or unreasonable data, i.e. key variables are missing values or key variables are zero or negative values. That is a negative operating revenue, a negative number of employees, a negative added value, negative sales, negative costs of employees, negative material costs, and negative intangible assets. Moreover, observations whereas the intangible assets exceed the total assets are dropped. Total assets include debts, i.e. they can be lower than the intangible assets or even negative. However, this observations are not taken into account for further empirical examination. One of the key variables of my analysis is
the share of intangible assets of total assets. A negative value or does not make sense here. Thus observations with total assets lower than intangible assets are dropped.

In order to avoid the excessive influence of outliers, important variables are winsorized at the 1% and 99% levels. Winsorization is one method of handling the problem of outliers. Outlying values that are at the very high or low end of the distribution are decreased or increased to values that are still at the high or low end, but not as extreme (Reifman & Keyton, 2010).

After deleting observations with missing or unreasonable values key indicators, ATAT-, nonATnonAT-, nonATAT-acquired and foreign-owned firms are dropped and only information of ATnonAT-acquired firms and domestic non-acquired firms is kept. Moreover, only one observation per firm remains in the sample, that is, the first available observation for each firm. Finally, if there was an acquisition within the observation period the observations of the acquired firm in the acquisition year remains in the sample and observations of the other years are left out in the calculations, no matter if the acquisition took place in the first available year or not.

Table 3: Domestic vs. ATnonAT-acquired firms

<table>
<thead>
<tr>
<th></th>
<th>domestic</th>
<th>ATnonAT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>18 177</td>
<td>99</td>
<td>18 276</td>
</tr>
<tr>
<td>2013</td>
<td>4 559</td>
<td>100</td>
<td>4 659</td>
</tr>
<tr>
<td>2014</td>
<td>1 446</td>
<td>84</td>
<td>1 530</td>
</tr>
<tr>
<td>2015</td>
<td>7 270</td>
<td>125</td>
<td>7 395</td>
</tr>
<tr>
<td>Total</td>
<td>31 452</td>
<td>408</td>
<td>31 860</td>
</tr>
</tbody>
</table>

Table 3 shows the composition of the remaining observations. In the end a set of 31.860 observations, containing information about 31.860 firms are left. 31.452 firms are domestic firms, owned by an Austrian GUO and not acquired within the period. 408 firms, more precisely 1.3% are ATnonAT-acquired firms. Hence, the share of ATnonAT-firms is very small, only 1.3% of all domestic firms (ATAT-acquired firms are excluded) were acquired by a foreign global ultimate owner.

The remaining 31.860 firms serve as basis for my calculations. Depending on which variables I include, observations with missing information regarding the variables I am interested in will be dropped.

4 Characteristics of takeover-targets

In the following chapter I examine the characteristics of ATnonAT-acquisition. First I investigate acquired firms with respect to the home country of the acquiring GUO. Furthermore, I shed light
on the takeover targets’ sector. In the second subsection, I categorize the economic sectors with respect to services, manufacturing and other sectors. The manufacturing sector, in turn, is divided into four subsections: high-technology, medium-high-technology, medium-low-technology and low-technology. Similarly, the service sector, where the composition looks as follows: Knowledge-intensive services (KIS) and less knowledge-intensive services (LKIS), where KIS are again divided into four groups: knowledge-intensive market services, high-technology knowledge-intensive services, knowledge-intensive financial services and other knowledge-intensive services. The third subchapter contains information about the acquired firms’ size with respect to their employees employed.

4.1 Distribution with respect to the acquirers’ home country

Table 4 shows the distribution of takeover-targets with respect to their acquirer's home country. Almost 90% of the ownership transfer took place between Austria and another OECD-country, hence within developed countries. 13% of all acquisitions took place between an Austrian firm and a non-OECD GUO. Even though there has lately been a trend toward “capital flowing uphill”, namely emerging market investors acquiring assets in the developed world (Chari et. al, 2012), the numbers for the Austrian case show clearly, that investors are mainly based in developed countries.

Furthermore, 69% of the acquiring GUOs were located in EU-member countries, and 59% were located in the Eurozone. Germany as GUOs home country does account for a particular large part of all acquisitions. More than one third (37%) of all acquired firms were acquired by a German firm. Switzerland does as well make up for a high share of all acquisitions. 45 out of 408 firms, namely 11%, were acquired by a Swiss firm. All in all 55% of the GUOs are headquartered in one of Austria’s neighboring countries. This clearly supports Erel et al. (2012) findings that geography matters. According to their findings the odds of acquisition activities between nearby countries are higher than for countries far away. Switzerland and Liechtenstein, two of the neighboring countries, are considered to be tax-friendly. Hence, firms might locate their headquarters there in order to save taxes. Other European countries with high shares of GUO of acquired firms are the United Kingdom with 6% and France with 7%.

Table 4: Acquirers’ home countries

<table>
<thead>
<tr>
<th>Number of ATnonAT-acquisitions</th>
<th>OECD-countries</th>
<th>355</th>
<th>87%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-28</td>
<td>281</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>Eurozone</td>
<td>240</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>149</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>13</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>
Only 17% of all acquirers are settled in non-European countries. 5% of all acquirers are from the US, 2% from Mexico and respectively 1% from Russia and China. China, in particular, is subject of several research papers with respect to cross-border takeovers. The reason is that there has been a recent wave of Chinese outbound acquisitions which is suspected to aim at acquiring access to resources, new technology, and distribution networks in the target country (Chari et al., 2012). In the Austrian case 7% of all non-European acquisitions, respectively 1% of all cross-border acquisitions were performed by a Chinese acquirer.

According to Hines’ (2010) list of tax havens 17% of the GUO are located in tax havens, namely Luxemburg, Cayman Islands, Switzerland, Bermudas, Honkong and British Virgin Islands. Furthermore, including the EU list of non-cooperative jurisdictions for tax purposes (2017) the Republic of Korea, Samoa and the United Arab Emirates are considered as tax havens as well. After combining these two lists 18% of all acquirers are from countries that are considered to be tax havens. As well, after excluding tax havens within Europe 14% of all non-European acquirers are headquartered in financial offshore centers. In many of these cases it is not possible to tell, where the GUO is truly based. Firms outsource their headquarters to mentioned countries in order to avoid taxation in Austria or another country with higher taxes. This is of course not the case for all acquisitions of companies settled in a tax-friendly country, but still, the avoidance of domestic taxes has to be considered as a possible motive for some of these acquisitions.

### 4.2 Sectoral distribution of target firms

The domestic firms in my sample are mainly operating in the service sector. 69% of all domestic-owned firms were operating in services, where 20% are located in knowledge-intensive services (KIS) and 49% operate in less-knowledge intensive services (LKIS).

15% of all Austrian-owned firms in the sample are recorded as manufacturing firms. Based on the Eurostat approach (2009) the manufacturing sector can be separated in four different sub-
sectors: 1) high-technology industries, 2) medium-high-technology industries, 3) medium-low-technology industries and 4) low-technology industries.

The rest of the firms (17%) is engaged in other sectors. This sectors are electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities and construction.

The distribution among the different sectors differs when it comes to ATnonAT-acquired firms (see Table 5). First, the shares change among the manufacturing and the service sector; only 7% of the acquired firms operate in other sectors than manufacturing and services. In addition, there is a change towards high-technology industries and medium-high-technology industries in manufacturing and a change towards knowledge-intensive services in the service sector.

Table 5: Sectoral distribution of target firm

<table>
<thead>
<tr>
<th></th>
<th>Whole population</th>
<th>ATnonAT-acquired firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>High-tech</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Medium-high-tech</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Medium-low-tech</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Low-tech</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Services</td>
<td>69%</td>
<td>74%</td>
</tr>
<tr>
<td>Knowledge-intensive</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>Less knowledge-intensive</td>
<td>49%</td>
<td>47%</td>
</tr>
<tr>
<td>Other sectors</td>
<td>17%</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Observations</td>
<td>38 165</td>
<td>408</td>
</tr>
</tbody>
</table>

Table 6 shows the break-up of the knowledge-intensive part of the service sector more precisely. According to Eurostat the KIS consists of four different parts: 1) knowledge-intensive market services (excluding high-tech and financial services), 2) high-tech knowledge-intensive services, 3) knowledge-intensive financial services and 4) other knowledge-intensive services.

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3) 1) High-technology: Manufacture of basic pharmaceutical products and pharmaceutical preparations; Manufacture of computer, electronic and optical products; 2) Medium-high-technology: Manufacture of chemicals and chemical products; Manufacture of electrical equipment, manufacture of machinery and equipment n.e.c.; Manufacture of motor vehicles, trailers and semi-trailers, manufacture of other transport equipment; 3) Medium-low-technology: Manufacture of coke and refined petroleum products; Manufacture of rubber and plastic products; Manufacture of other non-metallic mineral products; Manufacture of basic metals; Manufacture of fabricated metal products except machinery and equipment; Repair and installation of machinery and equipment; 4) Low-technology: Manufacture of food products, beverages, tobacco products, textiles, wearing apparel, leather and related products, wood and of products of wood, paper and paper products, printing and reproduction of recorded media, furniture and other manufacturing (see aggregations of manufacturing based on NACE Rev. 2, 2009)

4) 1) Knowledge-intensive market services (excluding high-tech and financial services): Water transport, Air transport, Legal and accounting activities, Activities of head offices, management and consultancy activities, Architectural engineering activities, technical testing and analysis; Advertising and market research; Other professional, scientific and technical activities; Employment activities; Security and investigation activities; 2) High-tech knowledge-intensive
### Table 6: Distribution of knowledge-intensive services

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Whole population</th>
<th>ATnonAT-acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>KI market services</td>
<td>50%</td>
<td>37%</td>
</tr>
<tr>
<td>High-tech KIS</td>
<td>13%</td>
<td>29%</td>
</tr>
<tr>
<td>KI financial services</td>
<td>20%</td>
<td>19%</td>
</tr>
<tr>
<td>Other KIS</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>6 283</td>
<td>108</td>
</tr>
</tbody>
</table>

While the share in the whole population of domestic-owned firms for high-technology KIS is the lowest with 13% of all Austrian-owned firms that are operating in KIS, there is a bias towards high-technology KIS when it comes to acquisition targets. 29% of all acquisition targets in knowledge-intensive sectors are operating in high-technology KIS. The shares for all other kinds of KIS are lower for ATnonAT-acquisition targets than for the whole population. In general, half of all firms in KIS provide market services, while 20% belong to financial services and 17% to other knowledge-intensive services.

The sectoral distribution of Austrian-owned firms as well as of takeover targets therefore shows that there is a bias for acquiring firms to buy firms operating in high-technology and knowledge-intensive industries and sectors. This supports the resource-based view on cross-border acquisitions. According to this view acquiring firms seek to gain access to the acquisition targets resources such as knowledge and technology. The different shares of the sectoral distribution with respect to acquisition targets clearly indicate that acquirers tend to target firms in high-technology and knowledge-intensive sectors. The reason might be the aim of internalizing domestic technologies and knowledge or reverse internalization in order to transfer its own technology and knowledge to the acquired firm.

### 4.3 Distribution with respect to firms’ size

Empirical studies found support for the assumption that foreign buyers or investors tend to acquire larger firms. Hence, table 7 shows the distribution of the whole population of Austrian-owned firms and of ATnonAT-acquisition targets with respect to firm size measured in employment. The firms are assigned to four different groups. Mini enterprises with less than 10 employees, small enterprises with 10 to 49 employed people, medium enterprises with between...
50 and 249 employees and large enterprises which employ more than 250 people. The data collected by the AMADEUS database shows some bias towards larger with more than 250 employees firms but this is not problematic for this study.

The second column shows the percentage shares of each group of the total number of observations in my sample. 11% of all Austrian-owned firms are mini enterprises, 55% belong to the group of small enterprises, 27% are medium enterprises and only 7% employ 250 or more persons. Breaking down the part of domestic-owned firms, which were acquired within the observation period the shares change. At first, the share of mini enterprises is with 15% higher for acquired firms than for the whole population. Second, the share of large enterprises is higher (15%) for acquired firms than for the whole population. Firms which employ between 50 and 250 employees also show a higher share when it comes to acquisition targets.

Table 7: Distribution among firm’s size

<table>
<thead>
<tr>
<th></th>
<th>Whole population</th>
<th>ATnonAT-acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10 Employees</td>
<td>11%</td>
<td>15%</td>
</tr>
<tr>
<td>10-49 Employees</td>
<td>55%</td>
<td>39%</td>
</tr>
<tr>
<td>50-249 Employees</td>
<td>27%</td>
<td>30%</td>
</tr>
<tr>
<td>250 or more Employees</td>
<td>7%</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Observations</td>
<td>9 032</td>
<td>207</td>
</tr>
</tbody>
</table>

Consequently, the share for small enterprises decreases from 55% to 39%. Hence, the data supports former findings which state that acquirers tend to target larger companies, but there is evidence as well, that the proportion of mini-enterprises is higher for acquired firms than for the sample population. It might however be that former studies excluded mini-enterprises from their research (Garavito et al, 2013).

To sum up, foreign firms tend to target large enterprises with more than 250 employees. The share of firms assigned to this group is more than twice as high when one looks only at acquired firms. The small of acquired firms with more than 10 but less than 50 employees is smaller by about 16 percentage points. Mini enterprises and medium enterprises show higher shares in the ATnonAT-population. Thus, the acquisition probability only decreases for small-enterprises with 10 to 49 employees, all other groups show higher shares than in the whole population.
5 Univariate analysis of the financial characteristics of target firms

In this chapter I examine firm specific financial characteristics of targets and domestic and foreign-owned firms. In particular, the focus is on the differences of domestic and foreign-owned firms, acquired and non-acquired firms and ATnonAT- and ATAT-acquired target firms.

I carry out univariate analysis of the financial characteristics and compare the means of any two samples. Economic literature and empirical data provides evidence that multinational enterprises, and foreign-owned companies, are more productive and perform better than domestic owned firms. The following pages will show, that this is true for my sample of Austrian firms. A further question that arises here is whether firms which became multinational by the acquisition by a foreign GUO were more profitable than non-acquired firms ex-ante. The results show that this is not the case. In addition comparing ATnonAT-firms with domestic firms leads to some findings that indicate that the acquisition of domestic intangible assets, is a driving force for foreign acquirers. In addition, following Erel et al. (2012), I analyze whether there were differences in the financial characteristics of ATAT- and ATnonAT-targets. Erel et al. (2012) state that domestic and foreign acquisitions occur for the same synergistic reasons.

Thus, in the next subchapters I carry out three different t-test of differences in sample means. First I explain the variables I use and the underlying method. Further I will test the mean-differences of foreign-owned and domestic firms, ATnonAT-acquisition targets and domestic firms and ATnonAT- and ATAT-acquisition targets.

5.1 Variables and Method

The AMADEUS database provides different financial indicators, which are compared in the next subchapters. To find firm-specific determinants that drive cross-border acquisition activities, I use financial numbers and ratios.

At first, the (i) amount of total assets (including debts), (ii) sales, (iii) intangible assets, (iv) cashflow, (v) operating revenue and (vi) profit before tax are subject of the empirical examination.

Second, different financial ratios are compared. These financial ratios are shown in Table 8.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor productivity</td>
<td>$\frac{Added \ value}{Employees}$</td>
<td>The labor productivity is the value added per employee. It gives information about the productivity of the firm's employees.</td>
</tr>
</tbody>
</table>
Asset productivity \(\frac{Added\ value}{Total\ assets}\)

The asset productivity is the added value in relation to the total amount of assets. It gives information about the productivity of the firm's assets.

Capital intensity \(\frac{Total\ assets}{Employees}\)

The capital intensity gives information about the amount of capital compared to the number of employees.

Intangible ratio \(\frac{Intangible\ assets}{Total\ assets}\)

The intangible ratio is the percentage of intangible assets of total assets. Intangible assets are all types of assets that are not physical in nature. Intangible assets can be goodwill, brand recognition and intellectual property, such as trademarks, copyrights and patents.

Asset turnover \(\frac{Sales}{Total\ assets}\)

The asset turnover is an efficiency measure. It gives information about a company's use of its assets in generating sales.

Operating margin \(\frac{Operating\ revenue}{Sales}\)

The operating margin measures how much revenue a company makes on a dollar of sales. It gives information about the management of a firm. The operating revenue is the revenue generated from a company's primary business activities.

Profit margin \(\frac{Profit\ or\ loss\ before\ tax}{Operating\ Revenue}\)

The profit margin shows how much percentage of the operating revenue has turned in profits. It gives information about the profitability of a firm.

In order to avoid “comparing apples with oranges”, i.e. comparing firms from one sector with firms from another sector with different sectoral trends in ratios, such as capital intensity or intangible ratio, treated firms are paired with untreated firms from the same year, same sector and belonging to the same size in terms of employees.

In the next chapters I perform univariate analyses testing the differences in means of three different ownership types. First I compare 627 foreign-owned firms with 627 domestic firms from the same year, same sector and same size in terms of employees. Second I contrast the means of 59 ATnonAT-acquired firms and 59 matched Austrian owned non-acquired firms. Third, I analyze differences in the means of 52 ATnonAT-acquired firms and firms acquired by a domestic buyer.

To test the significance of the differences of two different groups the t-test of differences in means is applied. The t-test of means is used to compare the means of two different samples and gives information about the significance of the differences in means. The t-statistics are computed to test the null hypotheses that the mean values for both groups do not differ under assumption of unequal variances.
The test statistic is t-distributed and is calculated as follows:

\[ t_{df} = \frac{\bar{\pi}_1 - \bar{\pi}_2}{\sqrt{\frac{\hat{\sigma}_1^2}{n_1} + \frac{\hat{\sigma}_2^2}{n_2}}} \]

Where \( \bar{\pi}_1 - \bar{\pi}_2 \) is the difference of the mean values of group 1 and group 2 and \( \sqrt{\frac{\hat{\sigma}_1^2}{n_1} + \frac{\hat{\sigma}_2^2}{n_2}} = \hat{\sigma}_{\bar{\pi}_1 - \bar{\pi}_2} \) is the estimated standard deviation of the mean difference. \( \hat{\sigma}_1^2 \) and \( \hat{\sigma}_2^2 \) are the estimated variances, respectively for group 1 and group 2. \( n_1 \) is the number of observations in group 1, whereas \( n_2 \) is the number of observations in group 2. The subscript \( df \) denotes the degrees of freedom. \( df \) is given by \( n_1 + n_2 - 2 \) (Kim, 2015).

The null hypothesis states that there is no difference in the means of the two compared samples, respectively:

\[ H_0: \text{There is no significant difference in the means of group 1 and group 2.} \]

If the p-value, corresponding to the t-test statistic exceeds 0.10, the null hypothesis is kept and there is no significance in the difference of the means. In turn, if the p-value is lower 10% the \( H_0 \) is rejected.

### 5.2 Foreign-owned vs. domestic firms

Table 9 contains the mean values for domestic and foreign owned firms. The studied sample consists of 627 foreign-owned firms matched with 627 observations of domestic firms operating in the same sector, from the same year and belonging to the same size in terms of employees. The last two columns show the difference in means and their significance. The null hypothesis is rejected if the p-value is below 0.10. If the p-value is above 0.10 there is no statistical significant difference in the means of the two tested groups.

<table>
<thead>
<tr>
<th>Univariate Analysis</th>
<th>Mean foreign-owned</th>
<th>Mean domestic</th>
<th>Difference in means</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>961</td>
<td>959</td>
<td>2</td>
<td>No significance</td>
</tr>
<tr>
<td>Sales</td>
<td>92 393</td>
<td>65 949</td>
<td>26 444</td>
<td>***</td>
</tr>
<tr>
<td>Intangible assets</td>
<td>895</td>
<td>582</td>
<td>313</td>
<td>***</td>
</tr>
<tr>
<td>Cashflow</td>
<td>8 606</td>
<td>5 146</td>
<td>3 460</td>
<td>***</td>
</tr>
<tr>
<td>Operating revenue</td>
<td>94 515</td>
<td>67 973</td>
<td>26 542</td>
<td>***</td>
</tr>
<tr>
<td>Profit before tax</td>
<td>5 910</td>
<td>3 850</td>
<td>2 060</td>
<td>***</td>
</tr>
<tr>
<td>Labor productivity</td>
<td>329</td>
<td>287</td>
<td>42</td>
<td>No significance</td>
</tr>
<tr>
<td>Asset productivity</td>
<td>26</td>
<td>18</td>
<td>8</td>
<td>***</td>
</tr>
<tr>
<td>Capital intensity</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>No significance</td>
</tr>
</tbody>
</table>
Table 9 shows that the differences in the means of domestic and foreign-owned firms are quite significant even though the firms are operating in the same sector and are from same size. While there is no statistical significance in the difference of total assets, labor productivity, capital intensity, operating margin and profit margin all other variables present high significance on the 1%-level.

Consequently, the column presenting the differences in means shows that all values are higher for foreign-owned companies. The values for sales, intangible assets, cashflow, operating revenue, and profit before tax are higher and also significant. As well, asset productivity of foreign-owned firms is higher and the asset turnover exceeds the value for domestic companies. The share of intangible assets of total assets is higher for multinational firms and the difference is significant on the 1% level.

Hence, foreign-owned firms are larger in terms of sales, have higher values for intangible assets, cashflow, operating revenue and as well higher profits as domestic firms even if the firs are compared with non-acquired firms from the same sector, year and of the same size. In addition foreign-owned firms outperform Austrian firms in terms of productivity, efficiency and show a higher share of intangible assets.

These results correspond with previous studies. Globerman, Ries and Vertinsky (1994) study foreign affiliates and domestic firms in Canada and conclude that foreign-owned firms have significantly higher labor productivity. Doms and Jensen (1998) also find significant contrasts in performance between foreign-owned and domestic firms. They use U.S. manufacturing plant-level data for 1987 and examine differences in characteristics such as total factor productivity and labor productivity and find that foreign-owned companies are more productive, more capital intensive and pay higher wages than domestic firms after controlling for industry, size, location and age.

5.3 **ATnonAT-acquired firms vs. domestic firms**

Out of the 207 ATnonAT-acquired firms I have the whole information for 59 firms. Thus, Table 10 presents the t-test of differences in means of a sample consisting of 59 ATnonAT-acquired firms
compared with 59 matched domestic firms. The ATnonAT-acquired firms and their non-acquired domestic counterparts are operating in the same economic sector, the observations belong to the same year and treated firms are matched on size.

When testing the differences in means of acquired and non-acquired firms, not the current values are used. Since the difference in the specific variables before the acquisition might lead to some conclusions about the underlying motive for the takeovers the variables' values of the year before the acquisition are compared. Hence, when the acquisition took place in year $t$ the variables' values from year $t - 1$ are studied.

The means for almost all variables and ratios are higher for acquired firms. Although matched with respect to size, acquired firms seem to be larger in terms of assets and sales. Likewise, the average value of the intangible assets of acquired firms is higher than for their domestic counterparts, as is the ratio of intangible assets compared to total assets. Since the mean value of sales is higher, the means for operating revenue and profit before tax are higher as well. Acquired firms, in addition, were more capital-intensive and the asset turnover ratio and the operating margin are higher.

The numbers show however that the acquired firms' cashflow and some ratios, such as the productivity ratios and the profit margin in the year before the acquisition are lower for takeover targets.

This corresponds to several studies, whose findings suggest that acquisition targets often are mismanaged and less efficient (Uygur et al., 2013; Harris et al., 1982; Dietrich & Sorensen, 1984; Kumar & Rajib, 2007). Still, other efficiency ratios, such as asset turnover and the operating margin are higher for acquired firms. These results lead to no concrete conclusion about the targets' prior management yet.

Table 10: T-test of differences in means, domestic vs. ATnonAT-acquired firms

<table>
<thead>
<tr>
<th>Univariate Analysis</th>
<th>Mean ATnonAT</th>
<th>Mean domestic</th>
<th>Difference in means</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets $_{t-1}$</td>
<td>57 063</td>
<td>53 271</td>
<td>3 792</td>
<td>No significance</td>
</tr>
<tr>
<td>Sales $_{t-1}$</td>
<td>90 191</td>
<td>64 666</td>
<td>25 525</td>
<td>No significance</td>
</tr>
<tr>
<td>Intangible assets $_{t-1}$</td>
<td>687</td>
<td>555</td>
<td>132</td>
<td>No significance</td>
</tr>
<tr>
<td>Cashflow $_{t-1}$</td>
<td>8 630</td>
<td>9 595</td>
<td>-965</td>
<td>No significance</td>
</tr>
<tr>
<td>Operating revenue $_{t-1}$</td>
<td>91 510</td>
<td>67 374</td>
<td>24 136</td>
<td>No significance</td>
</tr>
<tr>
<td>Profit before tax $_{t-1}$</td>
<td>6 678</td>
<td>5 739</td>
<td>939</td>
<td>No significance</td>
</tr>
<tr>
<td>Labor productivity $_{t-1}$</td>
<td>198</td>
<td>521</td>
<td>-323</td>
<td>No significance</td>
</tr>
<tr>
<td>Asset productivity $_{t-1}$</td>
<td>0.547</td>
<td>0.624</td>
<td>-0.077</td>
<td>No significance</td>
</tr>
<tr>
<td>Capital intensity $_{t-1}$</td>
<td>773</td>
<td>411</td>
<td>362</td>
<td>No significance</td>
</tr>
<tr>
<td>Intangible ratio $_{t-1}$</td>
<td>0.023</td>
<td>0.010</td>
<td>0.012</td>
<td>**</td>
</tr>
</tbody>
</table>
Asset turnover$_{t-1}$ 1.869 1.836 0.032 No significance
Operating margin$_{t-1}$ 1.108 1.087 0.020 No significance
Profit margin$_{t-1}$ 0.0645 0.086 0.022 No significance

| Observations | 59 | 59 |

*Indicates a level of significance between 5% and 10%
**Indicates a level of significance between 1% and 5%
***Indicates the highest level of significance with a p-value below 1%.

Even though there is no significance in the differences of means of almost all indicators there is a significant interest in the intangible ratio. The mean of the intangible ratio is higher for target firms than for domestic-firms and the difference is significant on the 5% level. This seems to support the resource based view on cross-border acquisitions. Acquired firms tend to show a higher share of intangible assets in their total assets. Intangible assets include non-physical capital, such as patents, trademarks, copyrights and other types of intellectual property and might as well be seen as indicator of a firm's research activities. Hence, the mean value of acquired firms' intangible assets in total assets, which is significantly higher than for non-acquired firms, indicates a resource-based motivation of the acquirers.

5.4 ATnonAT-acquired firms vs. ATAT-acquired firms

In order to find out whether the resource-based motive is valid for ATnonAT-acquisitions and ATAT-acquisitions equally I also test the differences in means of ATnonAT-acquisition targets and ATAT-acquisition targets. The tested sample consists of 52 ATnonAT-acquired firms matched with 52 ATAT-acquired matched companies. In this case matching is more challenging because the 52 matched ATAT-firms are drawn from only 9.303 ATAT-acquired firms.

The results paint the same picture as the results for the last subchapter. Whereas the only statistical significant difference in means is the difference in the means of the intangible ratio, all other tested variables do not show significant differences. Even though the differences in means are not significant on the 10% level, the numbers show that compared to domestic firms acquired by a domestic acquirer, ATnonAT-acquired firms are larger in terms of total assets, sales, intangible assets, cashflow, operating revenue, profit before tax, labor productivity, capital intensity, operating margin and profit margin. Only the value of asset productivity is higher for ATAT-acquired firms, yet not statistical significant.

Table 11: T-test of differences in means, ATAT vs. ATnonAT-acquired firms

<table>
<thead>
<tr>
<th>Univariate Analysis</th>
<th>Mean ATnonAT</th>
<th>Mean ATAT</th>
<th>Difference in means</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalassets$_{t-1}$</td>
<td>61 207</td>
<td>50 540</td>
<td>10 667</td>
<td>No significance</td>
</tr>
<tr>
<td>Variable</td>
<td>ATAT t-1</td>
<td>ATnonAT t-1</td>
<td>ATAT - ATnonAT</td>
<td>Significance</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------</td>
<td>-------------</td>
<td>----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Sales t-1</td>
<td>97,079</td>
<td>68,529</td>
<td>28,549</td>
<td>No significance</td>
</tr>
<tr>
<td>Intangible assets t-1</td>
<td>708</td>
<td>538</td>
<td>169</td>
<td>No significance</td>
</tr>
<tr>
<td>Cashflow t-1</td>
<td>9,428</td>
<td>7,290</td>
<td>2,138</td>
<td>No significance</td>
</tr>
<tr>
<td>Operating revenue t-1</td>
<td>98,445</td>
<td>70,388</td>
<td>28,056</td>
<td>No significance</td>
</tr>
<tr>
<td>Profit before tax t-1</td>
<td>7,459</td>
<td>4,183</td>
<td>3,276</td>
<td>No significance</td>
</tr>
<tr>
<td>Labor productivity t-1</td>
<td>204</td>
<td>145</td>
<td>58</td>
<td>No significance</td>
</tr>
<tr>
<td>Asset productivity t-1</td>
<td>0.532</td>
<td>0.604</td>
<td>0.071</td>
<td>No significance</td>
</tr>
<tr>
<td>Capital intensity t-1</td>
<td>777</td>
<td>669</td>
<td>108</td>
<td>No significance</td>
</tr>
<tr>
<td>Intangible ratio t-1</td>
<td>0.023</td>
<td>0.010</td>
<td>0.013</td>
<td>**</td>
</tr>
<tr>
<td>Asset turnover t-1</td>
<td>1.924</td>
<td>2.267</td>
<td>0.342</td>
<td>No significance</td>
</tr>
<tr>
<td>Operating margin t-1</td>
<td>1.116</td>
<td>1.033</td>
<td>0.083</td>
<td>No significance</td>
</tr>
<tr>
<td>Profit margin t-1</td>
<td>0.066</td>
<td>0.061</td>
<td>0.004</td>
<td>No significance</td>
</tr>
</tbody>
</table>

**Observations** 52 52

Values in thousands of Euros

*Indicates a level of significance between 5% and 10%  
**Indicates a level of significance between 1% and 5%  
***Indicates the highest level of significance with a p-value below 1%.

For the case of ATAT- vs. ATnonAT-firms the intangible ratio shows the only statistical significant difference in means. Even though cross-border takovers and domestic takeovers might take place for the same synergistic reasons, Table 11 shows that there has been a significant difference in the share of the intangible assets in total assets. It follows that the resource based motive is stronger for foreign acquirers than for domestic and focuses on one specific resource: firm-specific knowledge.

There has not been any statistical significant difference in means but in the means of the intangible ratio. Thus, ATnonAT-acquisitions seem to be driven by the resource-based motive a little more than ATAT-acquisitions. Even though ATnonAT- and ATAT-acquisitions might appear for the same synergistic reasons the resource-based motive seems to be stronger for ATnonAT-acquisitions.

It is not subject of this study to test the motives for domestic takeovers, thus, I leave the question concerning the motives for domestic takeovers unanswered. Still, the results of Table 11 give a little insight in the differences in the motives and especially the importance of acquiring strategic intangible resources in cross-border acquisitions when comparing matched samples based on sector, year and size.

To sum up, it is true for the Austrian case that foreign-owned firms perform better on average than domestic firms. The univariate analysis of differences in means shows that most of the studied numbers and ratios are significantly higher for foreign-owned firms even after controlling for industry and size effects.
The analysis of ATnonAT-acquired companies compared to domestic firms shows that these differences were not present before firms became part of a multinational company. Indeed, acquired firms show higher values for almost all numbers and ratios, but only the ratio of intangible assets to total assets is significant.

Yet it has to be mentioned, that due to the matching of one firm with exact one other firm the sample is quite small. The variables added value, profit before tax and cash flow contain a large number of observations with missing values in the whole dataset. Excluding these variables and using two or more matched controls might lead to more significant differences.

When comparing one ATnonAT-acquired firm with one matched ATAT-acquired counterpart, the sample is quite small. Still, the matches are good, there is almost no significance in the differences of means. The only significant difference is, again, in the mean of the intangible ratio. Hence, ATnonAT-acquired firms show a higher intangible ratio in the year before the acquisition than ATAT-acquired firms. Despite the fact of low significance in the differences, the results show that there might be other driving forces, apart from macroeconomic indicators, that distinguish ATAT-acquisitions and ATnonAT-acquisitions. The results lead to the assumption, that the resource based view applies more for foreign acquirers.

6 Multivariate analysis of firm-specific characteristics

In the following chapter I carry out multivariate analyses of firm-specific characteristics. Whereas the previous chapters give some insights in the differences in means of acquired and domestic firms, in this chapter I apply logit analysis in order to learn which target characteristics influence the buyer's acquisition decision.

At first I give an overview of studies dealing with motives for takeovers and FDI using logit or probit estimation techniques. Further, based on prior observations from the data and summarized motives for cross-border acquisitions, I formulate hypotheses, which I subsequently test. I also explain the underlying motivation for using a logit model. I formulate two different logit models of the analysis of takeover decisions, which I test consequently. I apply two different methods. An ordinary logistic regression and a logistic regression for rare events. As already mentioned in the chapters before, the probability of acquisition of a domestic firm by a foreign global ultimate owner is low. Due to the rare nature of the event, I use a method, developed by King & Zeng (2001) that corrects the probability and estimates for rare events, in order to avoid biased results. Finally I carry out the different analyses and discuss the results.
6.1 Related studies using logit or probit estimation

Several studies analyze characteristics of acquisition targets by carrying out probit or logit analyses. Even though most of these studies look at takeover targets in general and not cross-border takeover targets in particular, the underlying method and framework is the same.

Harris et al. (1982) perform a fixed and random coefficient probit analysis in order to estimate the takeover-probability of a firm and motives for takeovers. Their study includes product market characteristics as well as financial characteristics of acquired firms. Unlike earlier studies, which classically only classify firms as acquired or non-acquired, they use probit analysis. The reason is the underlying decision framework. Following Harris et al. (1982) the characteristics of any firm can be used to construct an unobservable index of the firm’s attractiveness as a potential acquisition target. Sufficiently attractive companies are acquired, others avoid acquisition. Furthermore, unlike earlier studies, the sample used by Harris et al. is constructed to keep the ratio of acquired to non-acquired firms in the sample in line with its ratio in the population of major U.S. corporations. Using a sample of 61 acquired firms in 1976 and 1977, 45 acquired firms in 1974 and 195 and approximately 1200 non-acquired firms, they carry out a fixed and a random coefficient probit analysis. Their findings suggest that in the statistical models to estimate the probability of acquisition size and financial variables play the primary role. Product market variables, in contrast, provide little explanatory power. The use of a fixed coefficient probit specification, leads to the conclusion that smaller firms and companies with lower price earnings ratio are more likely to be acquired. Using a random coefficient probit analysis method more effects are captured. While the random coefficients show significance of asset turnover in affecting the probability of acquisition, the fixed coefficient estimates do not. As well, even though the statistical significance of the models is given, only a very small portion of the factors contributing to acquisition is captured by the statistical models. The models are solely based on characteristics of the acquired firms that is only one part of the future relationship. Thus they give some insights into the factors influencing the acquisition probability. However, the models still are far short of providing a good explanation of acquisition activity.

Dietrich and Sorensen (1984) use logit analysis to study characteristics of takeover targets between 1969 and 1973, confined to four industries. Their results show that the probability of a company becoming a target increases when the company has a low asset-turnover, low payout ratio, low trading volume and low leverage.

Palepu (1986) performs a logit analysis and investigates the usefulness of six acquisition hypotheses in predicting takeover probability. The six hypotheses concern an inefficient management, a growth-resource imbalance, an industry disturbance, the firm size, an asset undervaluation and the price-earnings ratio. Using a sample consisting of 163 firms that were
acquired between 1971 and 1979, and a random sample of 256 firms that were not acquired as of 1979 he estimates an acquisition model. He finds clear support for his size hypothesis. Additionally target companies are characterized by low growth and low leverage.

Meador et al. (1996) carry out a logit binary regression analysis to determine the factors which predict acquisition target companies. They perform analysis for two subsamples, one including horizontal and the other including vertical takeovers and their total samples containing all acquisitions. They use a sample consisting of 50 horizontal mergers, 50 vertical mergers acquired between 1981 and 1985. In order to overcome the bias introduced by self-selected subjects they match these with 100 non-acquired firms by asset size. They find that the model for horizontal acquisitions has a stronger predictive ability. Variables such as long-term market value, market to book value, asset growth and sales growth are significant. According to Meador et al. (1996) the lack of significant variables in the analysis of vertical mergers in their study could be that the decision to acquire a company with a vertical relationship to the acquiring firm is more or less company specific. The reasons for these kind of acquisitions usually depend on the makeup of the two involved companies.

Zanakis and Zpounidis (1997) evaluate the financial features of Greek takeover targets during the period 1983 until 1990. For their multivariate analysis, they use 40 acquired firms matched with 40 non-acquired firms operating in the same industrial sector. They perform logit analysis using 16 financial ratios regarding profitability, managerial performance and solvency. They report only modest success in identifying the characteristics of target companies, except the influence of leverage on the acquisition probability.

Kumar & Rajib (2007) try to find distinguishing characteristics of Indian takeover target firms by means of logit analysis. They use a sample consisting of 215 target firms and 490 non-acquired control firms to test several hypotheses. They suppose that acquired firms have lower profitability than non-acquired firms and that acquired firms show growth-resource imbalances. As well, they argue that merger waves are created due to economic shocks as a result of changes in technology, market structure and regulation. Further they state that larger firms in terms of sales and assets are less likely to become acquisition targets due to greater costs of absorbing larger targets in the acquirer’s organization. Moreover, they test the undervaluation hypothesis and the price earning hypothesis. Their findings support the size hypothesis and inefficient management hypothesis. Thus, larger firms are less likely to become acquisition targets and liquidity does have a positive influence on the probability of a firm becoming a target.

Probit or logit models also are used to find distinguishing characteristics of FDI receiving firms. Garavito et al (2014) perform an empirical examination of the determinants of foreign direct investment on data for the Colombian economy. They estimate an econometric model for the determinants of the probability that a firm receives FDI, i.e. a foreign firm invests in or acquires a
Colombian firm. As well, they test for factors that might help to explain the foreign share in a firm’s capital. Using a sample consisting of 5,364 firms, mainly operating in the sectors manufacturing, trade and financial services during the 2000-2010 period, they run a population averaged panel probit regression. Their findings suggest that for the Colombian economy a firm’s probability of receiving FDI decreases for companies operating in all economic sectors in relation to the petroleum sector. As well, in terms of size, the probability declines for small and medium sized firms compared to large companies. Moreover, firms listed on the National Stock Market and firms that conduct foreign trade activities are more likely to receive FDI. Furthermore, capital intensity, on firm as well as on sector level does have a positive influence on the probability of having FDI. A higher sectoral labor remuneration also attracts foreign investors. Their results, in addition, show that investing firms are risk averse, the higher the volatility in the terms of trade, the lower the likelihood of receiving FDI. The second model they estimate considers the foreign share of firms’ capital as a dependent variable. Their results show that sectorial variables, such as labor remuneration, capital intensity, labor productivity and profitability have a positive and statistically significant effect on a firms’ share of foreign capital. The corporate income tax rate negatively affects the foreign share, while the correlation between the rule of law and a firm’s share is positive. Summed up, regarding to Garavito et al. (2014), foreign investors’ decisions appear to be biased in favor with an already significant access to important market shares, well-established business structures and marketing channels.

6.2 Hypotheses

My study is part of a larger project financed by the FFG. The FFG-project aims at defining critical infrastructures (including acquired firms) and discuss how resilience of these units can be strengthen. Hence, I am particularly interested in the characteristics of Austrian firms that are acquired by a foreign firm. In order to identify firm-specific characteristics, which might influence the acquisition probability of Austrian firms by foreign companies I further formulate three hypotheses. I include different assumptions regarding motives for cross-border acquisitions (see chapter 2.3) and previous results of empirical studies not only dealing with cross-border acquisitions but also with acquisition in general and FDI-determinants (see chapter 6.1) and implications from my own calculations in chapter 4.

Since Harris & Ravenscraft (1990) suggest that the understanding of international takeovers requires a “marriage” of the theoretical work on FDI and cross-border takeovers, my econometric model will include firm-specific determinants for cross-border takeovers paired with firm-level determinants for. While I test the resource-based view of cross-border acquisitions, I add some additional explaining variables derived from FDI-theory and M&A theory in general.
As mentioned in chapter 2, a common explanation for takeover activity is that firms seek technological expertise and knowledge. Thus, they engage in cross-border acquisition in order to gain access to the targets’ intangible assets such as patents, copyrights, franchises, goodwill, trademarks, trade names, software and other intangible computer based assets. This suggests that, compared to non-acquired firms, firms which experienced a cross-border acquisition should show a higher share of intangible assets compared to their total assets. Consequently the first hypothesis states that the probability for being acquired is higher for firms with a higher share of intangible assets in relation to their total assets compared to non-acquired companies.

**H1: The probability of being acquired is higher for firms with a higher share of intangible assets compared to total assets.**

\[
\frac{\text{intangible assets}}{\text{total assets}}^A > \frac{\text{intangible assets}}{\text{total assets}}^{NA}
\]

Uygur et al. (2014) find that after the financial crisis U.S. cross-border takeover targets have on average low profitability, mismanaged assets and low debt ratios – thus, acquiring companies tend to target mismanaged companies. The motive of replacement of inefficient management is also supported by several studies dealing with domestic takeover motives (Harris et al., 1982; Dietrich & Sorensen, 1984; Kumar & Rajib, 2007). This leads to the second hypothesis.

**H2: The probability of being acquired is higher for less efficient firms.**

\[
\frac{\text{sales}}{\text{total assets}}^A < \frac{\text{sales}}{\text{total assets}}^{NA}
\]

The third hypothesis states that acquirers will rather target firms operating in high-technology manufacturing industries and knowledge-intensive services. This supports the assumption that acquiring firms seek technological expertise and knowledge. In addition, it is well known that multinational companies are responsible for much of the world’s research and development expenditures and innovative activities. Thus, FDI and cross-border acquisitions are considered to take place in high-technology and knowledge-intensive sectors. While the manufacturing sector is separated in high-technology, medium-technology, medium-low-technology and low-technology, services can either be knowledge based or less knowledge based. Since acquirers are interested in gaining access to domestic technology and knowledge or they want to transfer their expertise easier in new markets, I expect, that the probability of being acquired increases for firms that are operating in the high-tech manufacturing sector and in the knowledge intensive service sector. The results in shown Table 5 (chapter 4) also support this assumption.

**H3: The probability of being acquired is higher for firms operating in high-technology manufacturing industries and knowledge-intensive services.**
In addition, I add some other explanatory variables to my model, such as the firm’s capital intensity, derived from FDI-theory (Garavito et al., 2013) the operating margin (Uygur et al., 2013) and the size of the firm in terms of their sales (Kumar & Rajib, 2007) and employees (Harris, 1982; Palepu, 1986; Garavito et al., 2013) in order to control for other differences likely to affect the takeover decision.

6.3 The logit model

The outcomes of logit and probit models are almost the same in the estimated coefficients and their significance. Thus, it does not matter which model is used. I use logit estimation to investigate factors influencing a firm’s probability of being acquired by a foreign GUO. Following King & Zeng (2001) I run a logit estimation for rare events in order to correct for biased coefficients due to a large sample size with a very small proportion of acquired firms (1.67 % respectively).

The logit model is used to model binary outcomes. It is a discrete choice model and the binary dependent variable can be interpreted as the outcome of an individual’s choice between two alternatives. In my study a potential foreign acquirer decides whether he buys an Austrian firm or not.

According to Harris et al. (1982) it is impossible to observe and measure the exact probability that a firm will be acquired. What one can observe is the sample of companies over a specific period of time and then identify which of those firms were acquired by a foreign firm and which were not. For this reason one must estimate a model with a binary dependent variable. This looks as follows:

\[ y = g(X) \]

\( y \) is a dummy variable representing whether the firm was acquired or not, respectively 0 if there was no acquisition and 1 if the firm has been acquired. \( X \) is a vector of financial and other characteristics of the firm. To model this relationship a number of techniques can be used. These techniques include linear probability functions, logit analysis, probit analysis and discriminant analysis. The advantage of the logit specification is that it includes the decision making process of the acquiring firms rather than simply classifying firms as acquired or non-acquired.

I specify two logit models to explain the influences on a firm’s probability of being acquired by a foreign firm. The first model is as follows:

\[ ATnonAT_{it} = \beta_0 + \beta_1 \text{Intangible ratio}_{i,t-1} + \beta_2 \text{Asset turnover} + \beta_3 \text{Operating margin}_{i,t-1} + \beta_4 \ln(\text{Capital intensity})_{i,t-1} + \beta_5 \ln(\text{Sales})_{i,t-1} + \varepsilon_{it} \]
Where $ATnonAT_{i,t}$ is a dummy-variable and is either 0 if there was no acquisition and 1 if there was an ATnonAT-acquisition of firm $i$ in year $t$. The explanatory variables are the $Intangible ratio_{i,t-1}$, which is assumed to have a positive influence on the acquisition probability. Second, $Asset turnover_{i,t-1}$ is included. Since H2 states that acquirers tend to target mismanaged firms, the influence is presumed to be negative. Further, $Operating margin_{i,t-1}$, an additional indicator of the efficiency of a firm’s management, the natural logarithm of a firm’s capital intensity $\ln(capital\ intensity)_{i,t-1}$; and the natural logarithm of sales; $\ln(sales)_{i,t-1}$; is included. I use logarithmic scales for sales and capital intensity since these variables cover a large range of values each and the use of their logarithms rather than the actual values reduces this large range to a more manageable size for logit regressions.

Explanatory variables show values from year $t-1$ since the acquisition decision is based on the firm’s performance of the year before the acquisition. $\beta_0$ is the constant and $\beta_1, \beta_2, \beta_3, \beta_4$ and $\beta_5$ are coefficients giving the effects of the explanatory variables on takeover probability. They can either be positive or negative depending on the direction of the variable’s influence on the acquisition probability. $\epsilon_{i,t}$ is the error term.

The second model I run, additionally includes dummy variables regarding the firm’s economic sector. $high\_tech_i$ is a dummy and 1 if firm $i$ belongs to the high-technology manufacturing industry. $KIS_i$ is 1 if firm $i$ provides knowledge-intensive services.

It looks as follows:

$$ATnonAT_{i,t} = \beta_0 + \beta_1 Intangible\ ratio_{i,t-1} + \beta_2 Asset\ turnover_{i,t-1} + \beta_3 Operating\ margin_{i,t-1} + \beta_4 \ln(Capital\ intensity)_{i,t-1} + \beta_5 \ln(Sales)_{i,t-1} + \beta_6 high\_tech_i + \beta_7 KIS_i + \epsilon_{i,t}$$

Often researchers study rare events where thousands of zeros (in this case no-acquisition firms) meet few ones (ATNonAT-acquired firms). According to King & Zeng (2001) these variables have often proven difficulties to explain and predict. According to King & Zeng this problem arises due to two sources. First, statistical procedures, such as logit regression, can quite underestimate the probability of rare events and thus lead to biased estimates. Second, commonly used data collection strategies are inefficient for rare events data. In the case for ATNonAT-acquisitions the first problem is the cause of biased results of estimates.

King & Zeng (2001) developed a method for correcting for underestimated estimates and probabilities. By weighting the sample such that the weighted proportion of 1s and 0s in the sample equals the true proportion in the population. Since the proportion of the rare event, i.e., the acquisition in the sample lower than 2 %, namely 1,67 %, the weight of ATNonAT-acquisition firms is 0.02 when running a logit estimation correcting for rare events.
6.4 Goodness-of-fit

There exist several tests to evaluate the overall quality of a binary response model. I explain McFaddens “pseudo $R^2$”, the Likelihood ratio test and the Pearson Goodness-of-Fit test.

6.4.1 McFadden’s pseudo $R^2$

The “pseudo $R^2$”. McFadden’s pseudo $R^2$ formula looks as follows:

$$R^2 = 1 - \frac{\log L(\hat{\theta}_u)}{\log L(\theta_r)}$$

whereas $\log L(\hat{\theta}_u)$ is the estimated log likelihood of the full model and $\log L(\theta_r)$ is the estimated log likelihood of the model including no explanatory variables but only the constant $\beta_0$. For discrete binary response models, the value of the log likelihood function is always negative. The restricted maximum likelihood is smaller than the unrestricted one. This must be the case for all restrictions. Only if the unrestricted estimator happens to satisfy the restriction and $\hat{\theta}_r = \hat{\theta}_u$ the restricted and unrestricted maxima will be the same. Disagreements between the restrictions and the data are indicated by a higher log-likelihood of the unrestricted model. If this drop is large enough, the restrictions are rejected (Winkelmann & Boes, 2006).

Each omitted variable serves as restriction. It is known that $\log L(\hat{\theta}_r) \leq \log L(\hat{\theta}_u)$. Thus $|\log L(\hat{\theta}_u)| \leq |\log L(\hat{\theta}_r)|$. It follows that

$$0 \leq 1 - \frac{\log L(\hat{\theta}_u)}{\log L(\theta_r)} \leq 1$$

If the full model has no explanatory power, the McFadden $R^2$ will be zero. This is the case, when all slope parameters are zero and restricted and unrestricted models are the same. Respectively, if the model is a perfect predictor, the McFadden $R^2$ will be 1, even though this value cannot be reached for parameter values that are finite (Winkelmann & Boes, 2006).

Yet, for continuous data it is not always the case that a larger value of the pseudo $R^2$ indicates a better fit. Regarding Winkelmann & Boes (2006) apart from point estimates and standard errors, one should always report the value of the log-likelihood function and a test statistic, such as the likelihood ratio test statistic, of the full model against the constant-only model.

6.4.2 Likelihood ratio test

The Likelihood ratio test, also, helps to compare two different models. In my study I compare, again, the restricted and the unrestricted model. The unrestricted model is the full model and the restricted is the constant-only model. The test formula for the likelihood ratio test statistic looks as follows:
\[
LRT = 2(\log L(\hat{\theta}_u) - \log L(\theta_r)) \sim \chi^2_q
\]

The test statistic is \(\chi^2_q\) distributed, whereas \(q\) denotes the number of restrictions and each omitted variable serves as restriction.

The likelihood ratio test tests the full model against the restricted model. The null hypothesis states that the true parameters fit the restricted model. If the p-value is below 0.10, the H0 is rejected and the variables induces have some explanatory power.

6.4.3 **Pearson goodness-of-fit test**

The Pearson chi-square test is used to test the validity of a distribution assumed for a random phenomenon. In case of my study I test whether the sample I use for my logit estimations is consistent with the underlying theoretical distribution of logit regressions. The test evaluates the null hypotheses against the alternative. The H0 is:

\[H_0: \text{The data fits the assumed distribution.}\]

The chi-square test statistic is defined as:

\[\chi^2 = \sum \frac{(observed - expected)^2}{expected}\]

If this value exceeds the upper \(\alpha\) critical value of the \(\chi^2(k-1)\) distribution (where \(k\) denotes the number of counts) and \(\alpha\) is the desired level of significance, the H0 is rejected. Hence, if the p-value is below 10 % the null hypothesis is rejected and the data does not fit the assumed distribution (Smyth, 2013).

6.5 **Sample**

In this chapter I drop the variables value added (consequently labor productivity and asset productivity), cashflow (consequently profit margin) and profit before tax. The number of observations with missing values for these variables is high. Hence, the sample would be too small if these variables remain in the models.

I keep all observations which are either from ATnonAT-firms or from non-acquired domestic firms and keep the first observation for each firm in order to avoid the presence of more than one observation in the sample dealing with the same firm.

*Table 12: Sample-distribution with respect to year and acquisition*

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-acquired domestic firms</th>
<th>ATnonAT-firms</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>617</td>
<td>12</td>
<td>629</td>
</tr>
</tbody>
</table>
I end up with 7.475 different observations from the same amount of firms. 629 observations are from 2012, 3.266 from 2013, 2.208 from 2014 and 1.372 from 2015. 98% of all remaining observations are from domestic firms, whereas only 2%, namely 125 firms, of the whole sample were acquired by a foreign firm between 2012 and 2015. The number of ATnonAT-acquired firms remaining in the sample more than doubles, compared to chapter 5.

In 2014, the number of acquisitions is the highest with 39 acquisitions. 38 firms were acquired in 2013, 36 in 2015 and 12 in 2012. Only 2% of the remaining sample are acquired firms and the acquisition of an Austrian firm by a foreign GUO is, respectively, a rare event, which can lead to biased results when running a logit estimation. Whereas data can be stratified when one still has to collect data, i.e., the rare event is oversampled and the common undersampled, this does not apply for already collected data (Winkelmann & Boes, 2006). Since I use a large dataset that is already collected, I use all information regarding domestic and ATnonAT-acquired firms available without missing values for my calculations. I exclude ATAT-firms, since running a logit estimation, considering ATAT-firms as 0, namely non-acquired, would lead to biased estimates. Nevertheless, the logit coefficients might still be biased, due to the tiny share of acquired firms in the sample. For this reason I run second estimations, correcting for potential bias due to the rare nature of the ATnonAT-acquisitions.

In contrast to chapter 5, the focus is now on the influence of the different variables on the probability of a firm’s acquisition and not only on the differences between acquired and non-acquired firms. While the exact probability of acquisition does not play a key role for my findings, running a logit regression, and thus observing the effects of the variables on the acquirer’s acquisition decision, might help to learn something about the underlying motives for takeovers.

### 6.6 Results

In this subchapter I explain the results of the logit estimation of the first specified model without the dummies controlling for different sectors. At first, I run an ordinary logit regression. The second step is a logit regression for rare events, following King & Zeng (2001). I do the same for model 2 and summarize the results.
6.6.1 Results 1st model

Table 13 shows the estimation results for model 1. Whereas the second column presents the estimated coefficients, the last column shows the corresponding p-values. Column 3 shows the estimated standard errors and column 4 the value of the z-statistic.

The coefficient for the variable $Intangible\ ratio_{t-1}$ is positive and significant on the 10 % level. Thus, the probability of acquisition increases for firms with a higher value of intangible assets compared to their total assets. The $Asset\ turnover_{t-1}$ ratios coefficient is, as expected, negative. There is no statistical significance. The $operating\ margin_{t-1}$ shows a positive coefficient whereas there is as well no observed statistical significance in the positive influence of the variable. The natural logarithm of the $capital\ intensity_{t-1}$ shows a coefficient above zero, again the p-value is above 0.10 and indicates no statistical significance. The natural logarithm of $Sales_{t-1}$ influence on the probability is positive and highly significant on the 1 % level.

**Table 13: Logit estimation results for model 1**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Err.</th>
<th>Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible ratio$_{t-1}$</td>
<td>2.06</td>
<td>1.17</td>
<td>1.67</td>
</tr>
<tr>
<td>Asset turnover$_{t-1}$</td>
<td>-0.08</td>
<td>0.06</td>
<td>-1.26</td>
</tr>
<tr>
<td>Operating margin$_{t-1}$</td>
<td>0.10</td>
<td>0.11</td>
<td>0.87</td>
</tr>
<tr>
<td>ln(capitalintensity)$_{t-1}$</td>
<td>0.08</td>
<td>0.07</td>
<td>1.04</td>
</tr>
<tr>
<td>ln(Sales)$_{t-1}$</td>
<td>0.48</td>
<td>0.06</td>
<td>8.04</td>
</tr>
<tr>
<td>Constant</td>
<td>-8.91</td>
<td>0.62</td>
<td>-14.29</td>
</tr>
</tbody>
</table>

Log Likelihood: -597.603  Goodness of Fit Tests  Chi-square  P-value
Observations: 7475  LR chi2(5) 75.44  Pearson 7305.71  0.9017
Prob > chi2: 0.000  Hosmer Lemeshow: 5.67  0.6841
Pseudo R$^2$: 0.0594

*Indicates a level of significance between 5 % and 10 %
**Indicates a level of significance between 1 % and 5 %
***Indicates the highest level of significance with a p-value below 1 %.

The lower part of table 13 shows the evaluation of the estimated model. The likelihood ratio test statistic with 5 degrees of freedom is 75.44. The corresponding p-value is highly significant at the 1 % level and presents a value of 0.000. Thus the model satisfies the assumption, that the unrestricted model outperforms the restricted constant-only model.

The McFadden pseudo R$^2$ has a value of 5.94 %, which is no bad value for a micro-level analysis of this kind. The p-values of the Pearson and Hosmer-Lemeshow tests both show values that exceed 0.10. Therefore the null hypothesis is kept for both. The data fits the assumed distribution.
Table 14: Logit estimation results corrected for rare events for model 1

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Robust Coefficient</th>
<th>Std. Err.</th>
<th>Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible ratio $t-1$</td>
<td>2.33</td>
<td>0.96</td>
<td>2.43</td>
<td>0.02**</td>
</tr>
<tr>
<td>Asset turnover $t-1$</td>
<td>-0.06</td>
<td>0.06</td>
<td>-1.05</td>
<td>0.30</td>
</tr>
<tr>
<td>Operating margin $t-1$</td>
<td>0.22</td>
<td>0.06</td>
<td>3.90</td>
<td>0.00***</td>
</tr>
<tr>
<td>ln(capitalintensity) $t-1$</td>
<td>0.09</td>
<td>0.06</td>
<td>1.34</td>
<td>0.18</td>
</tr>
<tr>
<td>ln(Sales) $t-1$</td>
<td>0.48</td>
<td>0.06</td>
<td>8.09</td>
<td>0.00***</td>
</tr>
<tr>
<td>Constant</td>
<td>-9.09</td>
<td>0.59</td>
<td>-15.33</td>
<td>0.00***</td>
</tr>
</tbody>
</table>

Observations: 7475

*Indicates a level of significance between 5% and 10%
**Indicates a level of significance between 1% and 5%
***Indicates the highest level of significance with a p-value below 1%

Table 14 shows the logit estimation results that are corrected for rare events. The estimates show that the coefficients are rather stable. Since the variance is reduced, the coefficients show higher significance. In contrast to the ordinary logit model the influence of Operating margin in $t-1$ is significant on the 10% level, when one corrects for rare events.

The other coefficients present the same sign in the ordinary and the corrected model. The significance level for Intangible ratio $t-1$ increases for the corrected estimates. The coefficient is still positive but and significant on the 5% level.

6.6.2 Results 2nd model

Table 15 presents the results estimated for model 2. The coefficient for Intangible ratio $t-1$ is again positive and significant on the 10% level. The asset turnover’s coefficient is again negative, but there is again no significance in model 2. Operating margin $t-1$ and log(Capital intensity) $t-1$ do not show any significant influence on the acquisition probability. The logarithm of Sales in $t-1$, in turn, once more presents a positive highly significant coefficient.

The added sectoral dummies, which reveal if a firm belongs to high-technology manufacturing sectors or to knowledge intensive services, show both positive coefficients. Whereas the KIS-dummy is not significant, the p-value of 0.115 is close to 0.10. The coefficient for the high-tech-dummy is highly positive and, as well, significant on the 1% level. This indicates that the probability for acquisition increases significantly, if a firm operates in high-technology manufacturing.

Table 15: Logit estimation results for model 2

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Robust Coefficient</th>
<th>Std. Err.</th>
<th>Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible ratio $t-1$</td>
<td>2.33</td>
<td>0.96</td>
<td>2.43</td>
<td>0.02**</td>
</tr>
<tr>
<td>Asset turnover $t-1$</td>
<td>-0.06</td>
<td>0.06</td>
<td>-1.05</td>
<td>0.30</td>
</tr>
<tr>
<td>Operating margin $t-1$</td>
<td>0.22</td>
<td>0.06</td>
<td>3.90</td>
<td>0.00***</td>
</tr>
<tr>
<td>ln(capitalintensity) $t-1$</td>
<td>0.09</td>
<td>0.06</td>
<td>1.34</td>
<td>0.18</td>
</tr>
<tr>
<td>ln(Sales) $t-1$</td>
<td>0.48</td>
<td>0.06</td>
<td>8.09</td>
<td>0.00***</td>
</tr>
<tr>
<td>Constant</td>
<td>-9.09</td>
<td>0.59</td>
<td>-15.33</td>
<td>0.00***</td>
</tr>
</tbody>
</table>

Observations: 7475

*Indicates a level of significance between 5% and 10%
**Indicates a level of significance between 1% and 5%
***Indicates the highest level of significance with a p-value below 1%

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The lower part of Table 15 shows the evaluation of model 2. The likelihood ratio test statistics with 7 degrees of freedom is 93.14 and the corresponding p-value is 0.000. For this reason, the H0 is rejected. Thus, the unrestricted model is a better fit than the restricted constant-only model.

The McFadden pseudo $R^2$ is 0.0731, and consequently higher than the pseudo $R^2$ from model 1. The Pearson and Hosmer-Lemeshow goodness of fit tests, as well, show p-values above 10%. Therefore, the H0 is kept. Both tests show that the data fits the expected distribution.

Table 16: Logit estimation results corrected for rare events for model 2

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Err.</th>
<th>Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible ratio $t-1$</td>
<td>2.22</td>
<td>0.96</td>
<td>2.32</td>
</tr>
<tr>
<td>Asset turnover $t-1$</td>
<td>-0.02</td>
<td>0.05</td>
<td>-0.53</td>
</tr>
<tr>
<td>Operating margin $t-1$</td>
<td>0.23</td>
<td>0.06</td>
<td>3.99</td>
</tr>
<tr>
<td>ln(capital intensity) $t-1$</td>
<td>0.10</td>
<td>0.06</td>
<td>1.63</td>
</tr>
<tr>
<td>ln(Sales) $t-1$</td>
<td>0.45</td>
<td>0.06</td>
<td>7.54</td>
</tr>
<tr>
<td>high-tech-dummy</td>
<td>1.08</td>
<td>0.23</td>
<td>4.62</td>
</tr>
<tr>
<td>KIS-dummy</td>
<td>0.40</td>
<td>0.26</td>
<td>1.54</td>
</tr>
<tr>
<td>Constant</td>
<td>-10.34</td>
<td>0.60</td>
<td>-17.52</td>
</tr>
</tbody>
</table>

*Indicates a level of significance between 5% and 10%
**Indicates a level of significance between 1% and 5%
***Indicates the highest level of significance with a p-value below 1%.

Table 16 presents the corrected estimation results. Signs and significance do not differ, except the significance for Operating margin $t-1$. Again, as observed above, after the correction of the estimates for model 1, the p-value of Operating margin $t-1$ shifts from above 0.10 to 0.000.
indicating high significance of the variable. Hence, after correcting for rare events, the Intangible ratio, the Operating margin and the logarithm of Sales in the year before the acquisition as well as the dummy for high – technology sectors show a significant influence on a firm’s probability of being acquired.

As well, I perform a likelihood ratio test, testing whether the full model (model 2) outperforms the restricted model (model 1). The likelihood ratio test statistic with 3 degrees of freedom is 17.70 and the p-value is 0.001. Hence, model 2, which includes sectoral dummies and a dummy testing for the firms’ size, as well, is a better fit than model 1.

6.6.3 Discussion of the results

The overall results of both models do not differ too much. After correcting the estimates for the rare nature of the event both models show significant estimates for the Intangible ratio, the Operating margin and the logarithm of Sales in $t - 1$.

Hence, the probability of acquisition increases for firms that have a higher value of intangible assets compared to their total assets. This outcome is significant in both models, for the ordinary logit estimation, as well as for the corrected estimation. The resource-based view, indeed, can be supported with these results. Whereas the outcome of the univariate analysis in chapter 5 already indicated that acquired firms’ intangible ratio was significantly higher than the share of non-acquired firms, this additional support serves as a strong demonstration of the relevance of a firms’ intangible assets for potential acquirers.

Second, the size of the firms in terms of assets shows positive influence on the acquisition probability throughout all estimations. The significance level of the positive coefficients, in addition, is always 1% and thus indicates high significance. This outcome does not correspond to former results regarding acquisitions in general. Whereas the size hypothesis states that large firms are less likely to become acquisition targets when one does not differentiate between domestic and foreign acquisitions (Kumar & Rajib, 2007) this findings suggest the contrary. Consequently, foreign acquirers tend to target larger Austrian firms.

The operating margin also shows consistently positive coefficients. Statistical significance is only given when one corrects the estimates for rare events. The operating margin measures a firm’s management, i.e. shows how much revenue a firm makes from its sales. Whereas in general, acquisition targets are assumed to be mismanaged and less profitable, in the Austrian case, the results show contrary results. Whereas the operating margin presents a positive influence on the acquisition probability and thus contradicts the hypotheses that acquirers are likely to buy mismanaged firms, the outcome for the asset turnover ratio shows different results.
The dummy for high-technology manufacturing industries shows a high coefficient for both estimates of model 2. In addition the coefficients are highly significant on the 1 % level. Hence, the probability of being acquired is higher for firms operating in high-technology manufacturing industries such as manufacture of basic pharmaceutical products and pharmaceutical preparations and manufacture of computer, electronic and optical products. The dummy for knowledge intensive services also shows positive coefficients but no significance in both estimates. Nevertheless, the findings of chapter 4 indicate that there is a bias towards knowledge-intensive services in ATnonAT-acquisitions, especially high-technology knowledge-intensive services. Even though the multivariate analysis shows no significant influence on the acquisition probability, prior results suggest that acquiring firms tend to target firms operating in knowledge-intensive services rather than less knowledge-intensive services.

The asset turnover measures a firm’s efficiency. It is an indicator for the efficient use of a firm’s assets. The results show, even though there is no significance, a negative coefficient throughout all estimations. Hence, in the case of a firms’ asset management the former mentioned hypothesis would apply, although not on a significant level.

The natural logarithm of the firm’s capital intensity shows positive coefficients, yet there is no significance throughout all estimates. This contradicts Garavito’s et al. (2013) findings. According to them Colombian firms that received FDI show significant higher capital intensity.

7 Summary and concluding remarks

Different motives for cross-border acquisitions have been discussed in literature. While portfolio-diversification, faster entry into a new market and exploitation of synergies are well-known strategic motives for foreign acquirers, they are hard to prove without having information on the acquiring company and its interests. Yet for Austrian firms, the fourth motive – the acquisition of resources and technology – is particular important. This motive can be supported with the data.

One important conclusion is: 10% of all firms in the sample were acquired within a 4-year period. From these 10% only 5% were domestic firms acquired by a foreign company. The data shows that foreign firms tend to target companies that are already foreign owned (approximately 30% of all acquisitions). Over 60% of all acquisitions concern an Austrian owned target and an Austrian buyer. 3 % of all acquisitions relate to takeovers of foreign-owned firms by domestic companies. Hence, foreign firms take over foreign-owned firms whereas domestic firms buy other Austrian firms. Less than 10% of all studied firms deviate this proposition, so the ownership transfer between two different countries is rather the exception than the rule.

By grouping targets with respect to the location of the buyer, their sector and size some interesting patterns can be observed. First, firms operating in high-technology manufacturing industries and
knowledge-intensive sectors are popular takeover targets. When it comes to the acquirer’s home country, German acquirers are in the lead (37% of all ATnonAT-acquisitions). 55% of all acquirers are located in one of Austria’s neighboring countries. 87% of acquiring firms are headquartered in developed countries. Only 17% of all acquirers are not based in Europe, from which U.S. acquirers show the highest share with 5% of all acquisitions. Chinese and Russian acquirers count for 1% each of all acquisitions. Moreover, tax-friendly countries such as the Caribbean Islands are found in the list of the acquirer’s nationality. Thus, some acquisitions might be the outcome of tax-avoiding behavior of the management, by locating an offshore company in a financial offshore center. There is no clear pattern with respect to targets’ sizes, measured in employment. Whereas the share of large enterprises in the population of targets of cross-border takeovers is twice as high compared to the domestic firm population, the share of mini and medium enterprises is higher too.

In chapter 5 I matched foreign-owned firms with domestic-owned counterparts operating in the same sector, in the same year and also from same size and performed a univariate analysis of differences in means. The results show that foreign-owned affiliates are more productive, larger in terms of assets, and perform better than domestic firms in several indicators. The results are less significant when it comes to the comparison of ATnonAT-firms and domestic firms. Studied firms operating in the same sector, from the same size and from the same year do not show significant differences in means of the tested variables, except for the intangible ratio. This fact supports the resource-seeking motive of acquiring firms. Intangible assets include patents, copyrights, franchises, goodwill, trademarks and trade names as well as software and other intangible computer based assets and are strategic resources of interest. The comparison of ATnonAT- and matched ATAT-target firms reveals the same pattern. While there are no significant differences in almost all variables, ATnonAT-firms show higher intangible ratios. Hence, the resource-based motive does apply particularly for cross-border acquisitions.

I use logit regression and logit regression for rare events to perform a multivariate analysis of the targets’ characteristics. It is not subject of this study to predict acquisition targets but logit estimations give information about the influence of firm-specific characteristics on the acquisition probability and hence lead to conclusions about the underlying motives. Firms acquired by a foreign firm are significantly larger in terms of sales than non-acquired firms and their operating margin, i.e. their profitability, is higher. In addition, a higher share of intangible assets increases the acquisition probability. The coefficient for the intangible ratio in the logit regressions is consistently positive and significant. Hence, the resource-based motive of cross-border acquisitions is supported again. Moreover, my regression results show a significant positive coefficient for the high-technology dummy. This reflects the assumption of that there is a preference in acquiring firms operating in high-technology manufacturing industries. The dummy
for knowledge-intensive services does not show significant results. Variables, such as asset turnover, capital intensity and dummies for large firms have no statistical significant influence on the acquisition probability.

To sum up, the resource-based motive is supported consistently throughout this empirical investigation. Acquired firms show higher intangible ratios than to non-acquired firms and the economic sectors of the target firms are considered to be knowledge-intensive and high-technology intensive. From the several interesting facts which are revealed, two main conclusions can be drawn:

1. Domestic firms tend to acquire domestic firms. Foreign-owned firms tend to acquire foreign-owned firms. The share of Austrian firms acquired by a foreign global ultimate owner is rather low.

2. Austrian firms, which were acquired by a foreign global ultimate owner, show significantly higher intangible ratios than comparable firms. Moreover, ATnonAT-firms intangible ratio is significantly higher compared to ATAT-firms, thus there is a difference in this ratio even among the two groups of takeover targets.

Hence, my work supports the resource-based motive. Constructing and testing a sample consisting of a large share of all Austrian-based firms between 2012 and 2015, I find support for the importance of firms' intangible assets in the acquiring firms' acquisition decision. Austrian firms acquired by a foreign company show higher value of intangible assets compared to their total assets and additionally, the results of the logit regression show that the probability of acquisition by a foreign company increases significantly for firms with higher intangible ratios.

Even though one underlying motive of takeovers of Austrian firms by foreign companies might be the acquisition of domestic strategic assets such as knowledge and technology, one should mention that knowledge transfer does not only work in one direction. While firms might seek to gain access to Austrian intangible assets, Austria also benefits from the reverse transfer of knowledge and technology to acquired firms and thus into our economy. How well this transfer works, and how acquired firms perform after the ownership transfer is not subject of this study but leaves subject for further studies regarding cross-border takeovers. Moreover, the differences between targets of domestic companies and foreign companies could lead to some further conclusions about specific characteristics of cross-border acquisition targets.

Also, it is not subject of this study to speculate about other strategic motives of acquiring firms than the resource-based motive. The faster entry into a new market, the exploitation of synergies or portfolio diversification all are possible motives next to the resource-seeking motive. My study provides some support for the relevance of a firms’ intangible assets in international takeovers of
Austrian firms and thus the resource-based motive. Questions about other possible motives leave room for further research.
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9 Bibliography


EUROSTAT, 2009. "High-technology' and 'knowledge based services' aggregations based on NACE Rev. 2, s.l.: s.n.


Friedman, A. & Gibson, R., 1988. Philip Morris Co. is bidding $90 a share for Kraft Inc. in $11 billion tender offer. Wall Street Journal, 18 October, p. 3.


OECD, 2017. *Austria - Trade and Investment statistical note*, s.l.: OECD.


Union, C. o. t. E., 2017. The EU list of non-cooperative jurisdictions for tax purposes. 5 December.

