Abstract

Past studies argue that the increasing popularity of secondary buyouts (SBO) could be explained by capital market conditions: the market timing hypothesis. This means that Private Equity (PE) investors are more likely to exit through IPO's or strategic sales if equity markets are *hot.* When debt market conditions are more favorable PE investors are more likely to exit trough SBO's. This study extends to this by examining the effect of the implemented Quantitative Easing (QE) programs of the United Kingdom on SBO's. The final sample consists of 1.639 buyouts, out of which 250 SBO's in the timeframe 2002-2007 and 2010-2018. Firstly, established debt market proxies are used in order to test if the market timing hypothesis holds. I find evidence that the market timing hypothesis can partially explain SBO's for the timeframe 2002-2007. For the timeframe 2010-2018 is, however, no evidence found in favor of this hypothesis. Secondly, the effect of QE on the probability of exiting through SBO's is examined, while it became clear that QE has no direct effect. However, it has been proven that the QE programs increase the probability of exiting through IPO's or strategic sale via improving the equity markets. Third, this study confirms that more favorable debt markets lead to higher transaction prices at SBO's. Lastly, this study finds strong evidence that the QE programs led to higher prices at SBO's. Overall, I found evidence that the United Kingdoms' QE programs do not explain the emerge of SBO's. The results described in this study, however, show that QE led to higher pricing at SBO's.

Keywords: Exits, Private Equity, Secondary Buyouts, Quantitative Easing

ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics
Master Thesis Financial Economics

Title thesis: The Effect of Quantitative Easing on Secondary Buyouts in the United Kingdom

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Date final version: December 16, 2019

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1. Introduction

Kaplan and Stromberg (2009) stated that leveraged buyouts (LBO) activities became a valuable investment tool for Private Equity (PE) investors in the 1980s. Then popularity dropped in the 1990s; nevertheless, in the mid-2000's it became again a widely used phenomenon. Leveraged buyouts (LBO) imply that a firm to be acquired is mostly financed with a substantial level of debt. A secondary buyout (SBO) is a buyout, where a firm is previously bought through an LBO by a PE firm and is subsequently sold to another PE investor. This is called an exit through an SBO. Kaplan and Stromberg (2009) also stated that the percentage of total SBO's increased from 2% in the mid-1980s to 26% of all buyouts within the period of 2005-2007. This shows that SBO's have taken a more prominent position within buyouts.

Analysts and researchers are often skeptical about this trend. While SBO's should add no or little extra value given the success of the initial buyout through established motivations for value creation such as efficiency improvements and discipline effects (Wang 2012). This implies that either LBO's frequently fail to succeed or that there are other motivations for SBO's. One of the possible motivations for SBO's mentioned by Wang (2012) and Bonini (2015) is the market timing hypothesis. This hypothesis claims that the SBO as an exit choice for a PE fund from an initial buyout can be determined from debt market conditions and equity market conditions. In which more favorable debt conditions lead to an increase in exits through SBO's. Similarly, favorable equity returns lead to preferred exits through initial public offering (IPO) or strategic sales.

After the 2008 crisis, the Central Banks of Japan, the United States (US), the European Union (EU), and the United Kingdom (UK) used an unconventional monetary policy named Quantitative Easing (QE) in order to boost the economy (Putnam, 2013). This QE is a monetary instrument which can be used by national Central Banks.

Joyce, Miles, Scott and Vayanos (2012) state that QE was first used in respect of the Japanese real estate bubble crisis at the end of the 1990s, which led to threats of deflation in Japan. The Bank of Japan (BoJ) implemented the term called Quantitative Easing. Back then Japan was facing a liquidity trap, which implied an interest rate of around zero. The Bank of Japan aimed to buy back government securities on the capital market, in order to boost possibly the level of cash reserves of banks. Therefore, the increased reserves could have a spillover effect on the real economy. Hence, asset prices could rise, and this should take away the threat of deflation.

Krishnamurthy and Vissing-Jorgensen (2011) find strong evidence that QE programs in the US lowered the medium- and long-term interest rates of governments and corporate bonds. Similar results are found for the QE programs in the UK (Christensen and Rudebusch, 2012). This indicates that QE programs fostered favorable debt market conditions.

This study contributes to the existing discussion in motivating the puzzling phenomenon of SBO's. Past studies have tried to link capital market conditions and the preferred exit routes for PE investors. However, no examination on the effect of QE on exits routes is done so far. Therefore, is this study, based on profound research, the first study which aims to link the established market timing hypothesis of SBO's with the unconventional monetary policy used by Central Banks: QE. The following research question has therefore been formulated by me:

What is the effect of Quantitative Easing on Secondary Buyouts?

In order to answer this very question, a setup, inspired by the methodology of Wang (2012), has been used by me. In which the probability of exiting through SBO's is estimated. This study creates a setting in which the established market timing hypothesis for SBO's is tested for different periods. The first period is 2002-2007 (wave I) and has been chosen to estimate the effect of capital market conditions pre-crisis 2008. The second period is 2010-2018 (wave II) and has been selected to assess the effect after the 2008 crisis. In addition, the influence of QE on the exit choices is tested during the second wave. Subsequently, I have investigated if debt market conditions lead to higher SBO prices. Lastly, this is also tested for QE.

I use in this study a unique dataset of UK buyouts. The UK is chosen for several reasons. First, the UK implemented QE programs, whereas the information about these programs is easily obtainable. Secondly, all firms in the UK are required to submit financial reports. Third, it has been considered as the second most active buyout market worldwide. Hence, the UK is appealing to research (Wang, 2012).

The outline of this study is as following. Chapter 2 discusses the theoretical framework in which this study fits, where four hypotheses are formulated. Chapter 3 sets out the methodology and the data used in this study. Chapter 4 gives an overview of the results of these four hypotheses. Lastly, Chapter 5 provides concluding remarks regarding the outcomes, limitations, and possible avenues for future research.

2. Literature Review

2.1. Value creation in Leveraged Buyouts

Before discussing the motivations of SBO's, it is necessary to emphasize the sources of value creation for investors through LBO's. Various studies in the past have addressed several reasons for value creation for leveraged buyouts for investors. Current literature claims that an LBO mainly creates value for investors through:

- improvements in efficiency
- discipline effect of management through high leverage and active monitoring
- value creation through tax shields
- pricing

2.1.1. Operating Efficiency

Jensen (1989) and Kaplan (1989) note that the most important sources of value creation of a buyout are increase in operating efficiency. Which, is achieved through productivity gains without massive job cuts or a severe decline in Research and Development (R&D) expenditures. Besides, Smith (1990) states that this improvement is mostly due to an increase in working capital. Working capital is the difference between current assets and current liabilities. While, the operational cycle, representing the period between the payment of suppliers and receiving cash from customers, decreases significantly. There is a decrease experienced in the holding time of inventory. Furthermore, there is a reduction in collection time from customers encountered. Baker and Wruck (1989) agree on this; nonetheless, they also stated that in their casestudy of the buyout of the company *O.M. Scott* the management was able to agree on more favorable pricing of suppliers. According to Palepu (1990), this is due to the change in financial and management structure after the buyout.

The study of Perry and Williams (1994), however, shows conflicting results. In their research, they find evidence for decreasing operating efficiency and negative operating results. This is in line with the findings of Guo, Hotchkiss and Song (2011). They state that increasing operating efficiency is not the primary source of value creation for investors.

2.1.2. Discipline Effect

Another source of value creation is the disciplinary effect of LBO's (Jensen, 1986). He assumes that due to the high level of debt taken on in an LBO, agency costs can be reduced. Agency costs are costs associated with the misaligned between managers and owners of a company. Since a high level of debt leads to increased interest costs, which lowers the free cash flows of companies. Consequently, there is less excessive cash available, which could be spent on worthless investments. Hence, the incentives of the management and the PE investors are more aligned. This is in line with Myers (2003) and Stulz (1990), who note that financing choices can reduce the problems of under- and overinvesting by managers. Moreover, Kaplan (1989) claims that a firm's management often holds an increased equity stake in the company post buyout, which stimulates the alignment between management and owners.

2.1.3. Tax Benefits

An additional argument why leveraged buyouts are lucrative is that tax benefits of buyouts are also a source of welfare creation (Jensen, 1989; Guo et al., 2011). Because interest payments are tax-deductible. It creates a possibility to decrease the payments of corporate taxes so-called *tax shields*. Tax shields lower the corporate tax paid by companies. Nevertheless, Jenkinson and Stucke (2011) argue that these tax shields are not a source of welfare creation for the PE investors, because tax savings are associated with higher premiums paid in an LBO. Consequently, the shareholders of the acquired company receive the gains of the tax shields.

2.1.4. Pricing

An alternative source of value creation, described in past studies is called the phenomenon of pricing. PE firms are capable of timing the market to *buy low and sell high*, Achleitner, Braun and Engel (2011) note that PE investors can obtain lower entry multiples due to outstanding negotiation skills. Besides, they state that PE investors are skilled in timing the market, i.e. to sell at a higher exit multiple. Likewise, Phalippou and Zollo (2005) also find evidence in favor of the market time by showing that PE returns are associated with market returns.

2.2. Potential Motivations of Secondary Buyouts

Having discussed the primary value drivers for LBO's, it is noteworthy now to discuss the potential underlying motives for SBO's. The following three main motives for SBO's are discussed below:

- Efficiencies improvements
- Collusion
- Market timing

2.2.1. Efficiencies Improvements

A motivation for SBO's discussed in the literature is improvements in efficiencies. There are two opposing views in this respect. On the one hand, as already discussed, one of the fundamentals sources of welfare creation in a first-time buyout is improvement in efficiencies. Assuming that the first buyout was a success to increase efficiencies, there should not be much to gain in the second buyout. This view emphasizes that a typical SBO deal is associated with negative operational performance (Freelink and Volosovych, 2012). Similarly, Wang (2012) and Bonini (2015) both show that the operating returns where positive, but argue that there was no indication for increased efficiency.

On the other hand, it could be that a second PE investor can increase operating efficiency. Degeorge, Martin, and Phalippou (2016) describe potential motivations for this increasing operating performance. They state that SBO's perform better if i) the PE fund which buys a company from another PE investor differs in terms of focus on how to improve the company such as margin growth vs. sales growth for instance; ii) if the educational background or career paths of the managers differ; iii) if a global fund buys it from a regional fund. Similary, Achleitner and Figge (2014) find evidence that operating improvements of SBO's are similar to that of primary buyouts.

2.2.2. Collusion

Another view of SBO's is that they are undertaken mainly because of collusive motives. This view implies that PE funds trade their investments among each other. Several factors are important in this respect. First, Bonini (2015) sets out that this could happen because PE funds have a finite investment horizon, which could foster the urge to collide. Secondly, Bonini (2015) also argues that there are limited players active in the PE fund market, which can raise new funds based on past performances. Hence, PE funds could help each other on a *quid pro quo* base to boost returns by giving exit opportunities. However, Bonini (2015) finds some indication that the more substantial PE funds transact more amongst each other and at higher deal values. But, it does not provide sufficient and significant support for the collusion motive. Wang (2012), finds no evidence for this collusion motive.

2.2.3. Market Timing

At last, an alternative explanation could be that capital market conditions motivate SBO's. When PE funds exit, there are several strategies. First, it can exit through an IPO. Baker and Wurgler (2002) shed light on the fact that there tends to be managerial timing on issuing equity when the equity market is showing positive market returns. Likewise, Pagano, Panetta, and Zingales (1998) find that in their research of Italian firms, that for Italian firms IPO's tend to happen more frequently if the industry of the firm is showing positive market returns.

In addition, both studies of Lerner (1994) and Giot and Schwienbacher (2007) find evidence that Venture Capital (VC) firms in the United States align their exit route with the stock market conditions. This outcome means that when the stock market shows positive returns, it is interpreted as a *hot* equity market, which implies that an IPO is the preferred exit strategy. Furthermore, Cao (2011) finds evidence that the duration of LBO's, which is the time difference between the acquisition of a firm through an LBO and the exit of the investor, is negatively associated with *hot* equity market conditions. That would mean that PE investors would even expedite their exit, based on the market conditions.

Second, a way of exiting is selling the acquired firm to a strategic buyer. Merger and acquisition (M&A) waves are in past literature often explain by two views. The first view is known as the *neoclassical view*. This view rationalizes that industry shocks encourages M&A waves (Maksimovic and Phillips, 2001; Mitchell and Mulherin, 1996; Harford, 2005). I.e. industries

reorganize as a reaction to shocks through M&A. The second view is known as the *behavioral view*. The view claims that favorable market returns stimulate M&A waves (Rhodes-Kropf and Viswanathan, 2004; Rhodes–Kropf, Robinson and Viswanathan, 2005; Shleifer and Vishny, 2003). Rhodes et al. also (2005) claim that especially stock acquisition is more profound during *hot* equity market periods.

On the other hand, Vermaelen and Xu (2013) emphasize that managers indeed have incentives to pay acquisitions with stocks when their firm is overvalued. However, it is often only accepted when a bidder can justify stock financing as being part of their optimal capital structure. Thus, this second view would explain the reason why PE investors would exit by selling it to a strategic buyer when the equity market is *hot*.

Nonetheless, when the equity market is showing negative returns, the equity market could be labeled as *cold*. During this downtime exiting through either an IPO or a strategic sale would be less lucrative. Throughout this *cold* equity period, SBO's could be an attractive alternative (Wang, 2012). More explicitly, Axelson, Jenkinson, Strömberg and Weisbach (2013) find evidence that debt market conditions mainly foster buyouts. Buyouts increased popularity when debt conditions were more favorable. PE investors have even better access to debt markets (Ivashina and Kovner, 2011). I.e. they can obtain a higher leverage level than other investors as well as lower interest rates. Those findings are on par with the results of the study by Demiroglu and James (2010), who claim that PE investors can negotiate better debt covenants, such as longer loan maturities and better pricing. Those aspects combined make SBO's an attractive exit opportunity by selling it to another PE fund when debt markets are *hot*.

Wang (2012) finds evidence that PE funds are more likely to exit through an SBO when debt markets are favorable. This view is also backed by Bonini (2015), who states that SBO's increase rapidly in the response of a more favorable debt market. Similarly, Jenkinson and Sousa (2015) find that IPO's are a more convenient exit route when the equity market conditions are *hot* as well as that SBO's are preferred when the debt is cheap. Based on this, the first hypothesis can be formulated:

H1: Exiting through SBO's is more likely when debt market conditions are favorable and less likely when the equity market is hot

2.3 Quantitative Easing

As discussed in the introduction the Central Banks of Japan, the US, the EU and the UK introduced in response of the 2008 crisis. Fawley and Neely (2013), discuss that the central banks differed in the focus of their programs. The primary focus of the European Central Bank (ECB) and the BoJ focused on direct lending to banks. While the Bank of England (BoE) and the Federal Reserves (FED) focused on the purchase of bonds. As explained in the introduction this study will mainly focus on UK's QE program.

2.3.1. UK's Monetary Policy from 1992

Before discussing the QE programs of the UK, it is useful to address in brief the UK's monetary policy before the 2008 crisis. In 1992 the UK entered the European Exchange Rate Mechanism (EERM), implying that the UK started adopting a new monetary strategy with an inflation target regime more in line with the EU. The target was set between the range of 1% and 4%. This very target was decided by the Chancellor of the Exchequer[1]. Besides, the Chancellor agreed on the monetary policy based on the inflation target. However, in 1995 they changed the inflation target to 2.5% or even lower.

Nonetheless, the setup changed in May 1997. From that moment, the British government set the inflation target. However, the Monetary Policy Committee (MPC) was established by the BoE. They operated independently, and they set short term interest rates to achieve the targeted inflation rate, set by the government (Bowen, 2007).

Nickell (2006) describes that at the beginning of 2001 the monetary policy of BoE was relaxed due to positive domestic growth rates. He also points out that until the end of 2003 the BoE set the inflation rate at 2.5%. By the end of 2003, however, the BoE lowered the inflation rate at 2%, due to the fact that BoE switched from the Retail Prix Index (RPIX) inflation measure to Consumer Price Index (CPI). Whereas, the most important difference is that the CPI uses the geometric mean to calculate price changes, and the RPIX uses the arithmetic mean. Therefore, the lowering of the inflation rate had no implications for the monetary policy in the UK (Nickell, 2006). Moreover, the MCP reacted to inflation deviations by using its short term

[1] Minister of Finance in the UK

interest rate instrument (Adam, Cobham and Girardin, 2005; David, 2013). Conclusively, it can be stated that BoE's monetary policy until the crisis of 2008 was stable and conventional.

2.3.2. UK's QE Programs

However, in March 2009 the MPC announced its first unconventional QE program (QE1) in response to the financial crisis of 2008. Joyce, Lasaosa, Stevens and Tong (2011) state that was announced because the BoE wanted to increase nominal spending. This QE1 contained undertaking open market asset purchases by buying UK government bonds (gilts) as well as private securities. By February 2010, it purchased up to 200 billion £ sterling of assets.

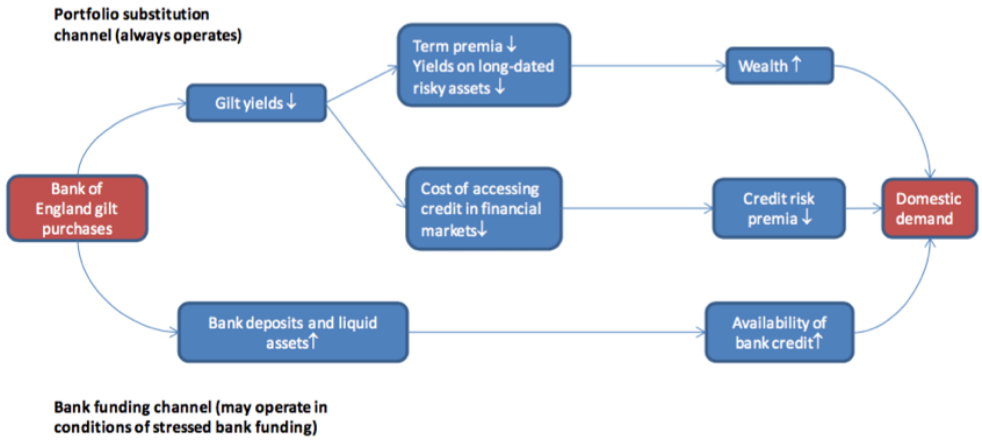
In addition, a second program (QE2) was announced by the BoE in October 2011 in response to the Euro debt crisis (Churm, Joyce, Kapetanios, and Teodoridis, 2015). This program consisted of gilts purchases as well as the introduction of the Funding Lending Scheme (FLS). This FLS was a program where banks were offered cheap funding, where the fees were linked to additional lending to the real economy (Chum et al., 2015). By June 2012, the BoE had purchased an additional amount of 175 billion £ sterling of gilts.

Following Allen (2017), the MPC decided in August 2016 to start the QE3 program by spending another 60 billion £ sterling buying UK gilts as well as spending 10 billion £ sterling on buying corporate bonds. Furthermore, the MPC made an additional 100 billion £ sterling available for the in 2016 introduced Term Funding Scheme (TFS). The BoE describes the TFS as a way of longer-term funding to banks at rates close to Bank Rate. The Bank Rate is also known as the rate that the BoE charges for short-term loans to banks.

2.3.3. Transmission Mechanisms

Miles (2011) sets out two main channels in which the QE is transmitted into the economy. The first is the so-called *portfolio substitution channel*, which can be seen in the upper half of figure 1. The BoE re-purchases government bonds (gilts). Miles (2011) claims that gilts are often possessed by non-banks, such as pension funds and insurance companies.

Figure 1: Transmissions Channels Quantitative Easing



Source: Miles (2011)

Consequently, these re-purchases increase the bank deposits of the sellers of the gilts. Therefore, the banks increase their mandatory holdings of reserves at BoE. In the case of a liquidity trap, and if gilts and bank deposits were perfect substitutes, the situation would be that the additional money supply would not affect bond yields. People would exchange gilts for money, and banks would accept higher reserves at BoE.

However, gilts and bank deposits are not perfect substitutes because long term assets (gilts) are swapped for short term assets (bank deposits). As mentioned before, institutional investors often hold gilts who have long term liabilities, and therefore the investments are frequently matched to long term assets. Consequently, it is reasonable that these investors are inclined to partially buy other long term assets, such as corporate bonds and equities, with the money received from the central bank. Additionally, the duration risk is also shortened, since the amount of holdings in long term assets is reduced. Duration risk is the risk involved in holding longer-term assets. Hence, this reduction would require lower gilt yields. Similarly, this lower duration risk should lower the term premiums, which would lead to overall lower yields for long term assets.

On the other hand, due to the increased demand for the riskier long term assets and the decrease in yields, it is reasonable that the prices of risky long term assets will rise. This would generate capital gains for holders of risky assets. Hence, the initial wealth would increase. This should

be used to increase spending. Consequently, the UK's GDP would grow. Joyce et al. (2012) argue that the combination of lower yields and the increase of asset prices eases credit conditions. This mechanism lowers the costs of obtaining credits in financial markets as well as the credit risk premiums. Hence, it should trigger an increase in the UK's domestic demand.

The second channel described by Miles (2011) is the *bank funding channel.* This channel can be seen in the lower half in figure 1 above. This bank funding channel is only expected to operate under stressed funding conditions to banks. Stressed funding conditions means that banks are restrained in lending money, while they are anxious about their ability to re-finance. Via this way, as discussed earlier, payments received in exchange for gilts, it increases the bank deposits and the central bank's reserves. If the bank their reserves at BoE would exceed its demand for liquidity, it is more willing to lend money. Miles (2011) argues that the effect via this bank funding channel is rather weak. Because it could be that the increase in bank deposits come in as short-term deposits, banks might want to hedge themselves against the risk of a possible bank-run. A bank-run implies that much cash is withdrawn at short notice, which could lead to the bankruptcy of a bank. However, the money received as from the gilts could also be used as previously mentioned to buy longer-term assets. In that case, it increases the chance the banks are more inclined to expand their lending.

Besides the two discussed channels by Miles (2011), Christensen and Rudebusch (2012) set out another channel in which the QE could affect the economy. That is the so-called *signaling channel.* This channel entails that bond purchase programs of the central bank signals information about current and future economic conditions, and the related monetary policies to it. Christensen and Rudebusch (2012) use as an example that bond purchase announcements could signal a greater commitment to a more relaxed monetary policy. Consequently, investors revise down their expectations, and their expectations for future short-term interest rates drop. Hence, long-term yields fall.

2.3.4. Impact of UK QE Programs

Since the execution of the QE programs, several studies have written on its effect. Joyce, Lasaosa, Stevens and Tong (2011) researched the impact of QE1. They find evidence in favor of the transmission through portfolio substitution effect by showing that the medium and long-term gilt yields have dropped with 100 basis points. Besides, Joyce et al. (2011) also find some

evidence that the QE had a broader impact on other asset prices, such as corporate bonds. However, there was not find any clear indication that the QE was impacting equity returns.

Furthermore, Christensen and Rudebusch (2012) find also evidence the first QE program worked well via the portfolio substitution channel by showing that the program had put downward pressure on the term premia in the UK. However, they did not find evidence for the signaling effect by the MPC. According to Kapetanios, Mumtaz and Stevens (2012), the first QE program was successful in terms of GDP growth. They estimate real GDP growth of around 1.5% due to the first QE program.

Similarly, Churm et al. (2015) find a positive GDP growth for QE2 in the UK and estimated a GDP growth of 0.6% due to the QE program. Furthermore, Philippas, Papadamou and Tomuleasa (2019) find in their research about QE1 and QE2 evidence in favor of the bank funding channel. They state that credit conditions were eased. However, they also mention that this more favorable credit conditions led to more risk-taking behavior of banks. Moreover, Boneva, De Roure and Morley (2018) researched the impact of the 10 billion £ sterling corporate bond purchases in QE3, they find that the corporate bond yields also decreased.

The results of BoE QE's programs are in line with the findings of the other before mentioned QE countries. Researchers find also that the QE programs of the FED, ECB, and BoJ had decreased the yields on government bonds (Krishnamurthy and Vissing-Jorgensen, 2011; D'Amico, English, López-Salido, and Nelson, 2012; D'Amico and King, 2013; Altavilla, Carboni and Motto, 2015; Fukunaga, Naoya Kato, and Koeda, 2015). That is also in line with the conclusions of Engen Laubach and Reifschneider (2015) and Gagnon (2016) who both conclude that there is strong evidence from several studies that QE has a downward pressure on interest rates as well as that it has a positive effect on economic growth. Besides, Joyce, Liu and Tonks (2014) state that investors in response of the QE programs they shifted their investments from both government bonds as well as equity to corporate bonds in order to diversify their portfolios. Hence, the equity markets show little returns. Similarly, Shogbuyi and Steeley (2017) find little equity returns in response of the QE programs in the UK and the US. Based on this, the second hypothesis can be formulated:

H2: The Quantitative Easing program created an environment in which exiting through SBO's is more likely to happen

2.4. Pricing

Furthermore, it is noteworthy to look at the premiums paid at buyouts. Firstly, Vladimirov (2015) mentions that premiums with (M&A) are lower when the transaction is paid by cash compared to purchases financed with debt and stocks. Moreover, he concludes that equity, like issuances as financing choices, is often a consequence of restricted possibilities of reaching out to the debt market. Additionally, debt is the cheapest form of financing. Therefore, Vladimirov (2015) states that a M&A financed with debt enables firms to bid more aggressively. Hence, paying higher premiums is more likely when a transaction is highly leveraged. This outcome is in line with the conclusions of before mentioned Axelson et al. (2013) well as Jenkinson and Stucke (2011). Both studies look at LBO's specifically and based on both analyzes, strong evidence appears that an increase in the leverage level of an LBO leads to a higher premium bid with a public-to-private LBO.

In addition, both studies of Jenkinson and Stucke (2011) and Axelson et al. (2013) explain that most PE firms have easy access to the debt market and often PE funds bid against each other in an LBO bidding. Therefore, taking on a higher leverage level can help in outbidding the rival PE funds. Hence, higher leverage leads to higher bids. This view sounds contradicting with the vision described in previous chapter 2.1.4. in respect of pricing. Because there it is stated that PE funds use their skills in other to pay a lower price (Achleitner et al., 2011). However, it does not necessarily mean that it opposes each other, while higher leverage is used as a tool by PE funds to overbid other bidders at the lowest *overbid* price as possible.

Focusing on SBO's past researchers has shown that the transaction values of these are significantly higher compared to first-time buyouts. One of the reasons given is that those higher transaction prices for SBO's are fueled by favorable debt market conditions (Wang, 2012; Achleitner and Figge, 2014). This view is consistent with Achleitner et al. (2011). As already discussed in chapter 2.1.4. they argue that PE firms tend to exit at a higher price. That implies that when the exit is an SBO, that price should be higher than primary buyouts. Based on this, the third and fourth hypothesis can be formulated:

H3: Favorable debt markets increase the prices paid at SBO's

H4: The Quantitative Easing program increases the prices paid at SBO's

3. Methodology and Data

3.1. Methodology

This section discusses the methodology used in this study in order to answer the research questions. A setup is chosen in which first established proxies for debt and equity market conditions are tested on SBO's in two different M&A waves: 2002-2007 and 2010-2018. Sequentially, the effect of QE on SBO's during the second M&A wave is tested. The research is divided into two main sections, i.e.

- Market timing of SBO's
- Prices paid in SBO's

3.1.1. Market Timing

For testing the hypothesis that SBO's are more likely to happen when there are favorable debt market conditions, the empirical setting of Wang (2012) is used. That means that a *probit regression* is used, where the probability of SBO's exit is estimated compared to the probability of exits via an IPO or a strategic sale.

Two different proxies for debt market conditions are used: the natural logarithm of the high yield (HY) market size and the leveraged loan spread. The natural logarithm of HY market size is added, in which a positive relationship is expected with SBO's based on the results of the study of Wang (2012) and this because a more favorable debt market conditions should lead to increased leverage. The other proxy, the leveraged loan spread, which is the spread between the HY rate and LIBOR and is expected to have an inverse relationship with SBO's, while a lower spread should lead to cheaper debt (Axelson et al. 2013). Hence, more favorable debt market conditions. However, Wang (2012) finds a positive relationship between leveraged loan spread and SBO's. Nonetheless, also based on the literature on how the BoE wanted to transmit the QE by lowering the yields, a negative coefficient is expected for leveraged loan spread.

The proxy used for the equity market conditions is the natural logarithm of the industry IPO volume by using Fama & French 10 industry classification in the year of exit. A higher IPO volume should indicate a *hot* equity market (Wang, 2012). Therefore, a higher industry IPO volume should decrease the probability of an SBO. Thus, a negative coefficient is expected.

An interaction term between equity- and debt market conditions is added. To test if any debt market conditions indirectly affect the exit choices through equity markets.

The firm-specific control variables used are the natural logarithm of assets and EBT growth. Also, this study uses the average industry sales growth (FF10) in order to control for industry characteristics. The control variables are also based on the setting of Wang (2012). However, Wang (2012) uses earnings before interest, tax, depreciation and amortization (EBITDA) growth, but I use earnings before tax (EBT) since it has better data coverage. That leads to the two following regressions:

(1) $Probit\ regression: SBO\ dummy = constant + \beta 1 * log\ HY\ Market\ size + \beta 2 * log\ Industry\ IPO\ volume + \beta 3 * \log HY\ market\ size * log\ Industry\ IPO\ volume + \beta 4 * log\ Assets + \beta 5 * Average\ industry\ sales\ growth + \beta 6 * EBT\ growth + \varepsilon$

(2) $Probit\ regression: SBO\ dummy = constant + \beta 1 * Leveraged\ spread + \beta 2 * log\ Industry\ IPO\ volume + \beta 3 * Leveraged\ spread * Industry\ IPO\ volume + \beta 4 * log\ Assets\ \beta 5 * Average\ industry\ sales\ growth + \beta 6 * EBT\ growth + \varepsilon$

Regarding testing the second hypothesis in which the effect of QE on SBO's is estimated, the same setup is used as the regressions (1) and (2). At first, a regression is done by replacing QE as a proxy for debt market conditions. A dummy variable is created, where one means that the open market purchases undertaken in the year of buyout are above the mean of open market purchases by the BoE and zero otherwise. Based on QE literature, it is expected that QE increases the probability of an SBO. Secondly, in order to estimate if QE led to more lending used for SBO's another regression is established. In which the QE dummy will be regressed in combination with the HY market size variable, also here it is expected that QE has a positive impact. That leads to following regressions 3-4:

(3) $Probit\ regression: SBO\ dummy = constant + \beta 1 * QE\ dummy + \beta 2 * log\ Industry\ IPO\ volume + \beta 3 * QE\ dummy * log\ Industry\ IPO\ volume + \beta 4 * log\ Assets + \beta 5 * Average\ industry\ sales\ growth + \beta 6 * EBT\ growth + \varepsilon$

$$(4)\ Probit\ regression: SBO\ dummy = constant + \beta 1 * QE\ dummy + \beta 2 * log\ HY\ market\ size + \beta 3 * QE\ dummy * log\ HY\ market\ size + \beta 4 * log\ Assets + \beta 5 * Average\ industry\ sales\ growth + \beta 6 * EBT\ growth + \varepsilon$$

3.1.2. Heckman Selection Model

Due to the fact that this study uses probit regressions, there could be potentially a self-selection bias, which is addressed by Heckman (1979). That means that exits are only observed if it has achieved an exit. To correct for this self-selection bias, probit regressions 1-4 are also estimated using a two-stage *Heckman Model*. Which implies that in the first stage the probability of exiting through an IPO, strategic sale, or an SBO for a full sample of buyouts is estimated. This is done by measuring economic significance pre buyout, by using the natural logarithm of assets one-year prior the buyout and the EBT/sales one-year prior the buyout (Wang, 2012). In this first stage, a *rho* is calculated, which is used in the second stage to correct for self-selection bias. If the *rho* is significantly different from zero, there is a self-selection bias problem.

3.1.3. Pricing of Buyouts

In order to test the third hypothesis which makes clear that favorable debt market conditions lead to higher pricing in secondary buyouts. A linear (OLS) regression is done with the price of the deal as the dependent variable. Three different proxies are used for the pricing of buyouts: [A] natural logarithm of the deal value [B] natural logarithm of deal value/ EBT [C] natural logarithm of deal value/ sales. These proxies are similar to the study of Wang (2012). The proxy for the debt market conditions used for the regressions is HY market size based on the study of Wang (2012). Based on literature, mentioned earlier, a positive coefficient is expected. The setting is that the full sample of buyouts is regressed to notice the effect of debt market conditions on the full sample. Additionally, a secondary dummy variable is created, which denotes one if the buyout is an SBO and zero otherwise to disentangle the effect on SBO's. As control variables, I use the control variables used in probit regressions 1-4.

Additionally, in line with (Wang, 2012), I add another variable which is PE buyer reputation, to control for the acquirer's reputation. The variable is a dummy that denotes one if it is within the top 50 of the largest PE funds. Furthermore, the UK's GDP growth rate is added as a

macroeconomic control term, based on the study of Axelson et al. (2013). That gives the following OLS regressions:

$$(5)\ OLS\ regression: \log Deal\ value = constant + \beta 1 * \log HY\ market\ size + \beta 2 * Secondary\ dummy * \log HY\ market\ size + \beta 3 * \log Assets + \beta 4 * Average\ industry\ sales\ growth + \beta 5 * EBT\ growth + \beta 6 * PE\ buyer\ reputation + \beta 7 * GDP\ growth\ rate + \varepsilon$$

$$(6)\ OLS\ regression: log\ Deal\ value/\ EBT = constant + \beta 1 * log\ HY\ market\ size + \beta 2 * Secondary\ dummy * log\ HY\ market\ size + \beta 3 * log\ Assets + \beta 4 * Average\ industry\ sales\ growth + \beta 5 * EBT\ growth + \beta 6 * PE\ buyer\ reputation + \beta 7 * GDP\ growth\ rate + \varepsilon$$

$$(7)\ OLS\ regression: log\ Deal\ value/\ Sales = constant + \beta 1 * log\ HY\ market\ size + \beta 2 * Secondary\ dummy * log\ HY\ market\ size + \beta 3 * log\ Assets + \beta 4 * Average\ industry\ Sales\ Growth + \beta 5 * EBT\ growth + \beta 6 * PE\ buyer\ reputation + \beta 7 * GDP\ growth\ rate + \varepsilon$$

A similar setup is created to estimate the effect of QE on pricing in order to test the fourth hypothesis. Regarding the QE variable, I use the natural logarithm of (1+ the change in QE) in the year of exit to quantify the effect of QE without losing observations due to taking a logarithm of a negative number. As discussed in the literature review a positive impact of QE on pricing is expected. That brings us to the following OLS regressions 8-10:

$$(8)\ OLS\ regression: log\ Deal\ value = constant + \beta 1 * log(1 + Change\ in\ QE) + \beta 2 * Secondary\ dummy * log(1 + Change\ in\ QE) + \beta 3 * log\ Assets + \beta 4 * Average\ industry\ sales\ growth + \beta 5 * EBT\ growth + \beta 6 * PE\ buyer\ reputation + \beta 7 * GDP\ growth\ rate + \varepsilon$$

$$(9)\ OLS\ regression: log\ Deal\ value/\ EBT = constant + \beta 1 * log(1 + Change\ in\ QE) + \beta 2 * Secondary\ dummy * log(1 + Change\ in\ QE) + \beta 3 * log\ Assets + \beta 4 * Average\ industry\ sales\ growth + \beta 5 * EBT\ growth + \beta 6 * PE\ buyer\ reputation + \beta 7 * GDP\ growth\ rate + \varepsilon$$

$$(10)\ OLS\ regression: log\ Deal\ value/\ Sales\ = constant + \beta 1 * log(1 + Change\ in\ QE) + \beta 2 * Secondary\ dummy\ * log(1 + Change\ in\ QE) + \beta 3 * log\ Assets + \beta 4 * Average\ industry\ sales\ growth + \beta 5 * EBT\ growth + \beta 6 * PE\ buyer\ reputation + \beta 7 * GDP\ growth\ rate\ + \varepsilon$$

3.2. Data

3.2.1. Data Collection and Management

In this study a unique sample of buyouts is collected from the UK. The buyout data is collected from Zephyr (Bureau van Dijk), because this source has better coverage on smaller deals and deals in Europe (Wang, 2012). A sample of completed deals with a UK target firm between are collected to research two M&A waves (2002-2007 and 2010-2018). I start with a total of 14,143 buyouts. By using the targets Bureau van Dijk ID (BvdID) the financials of the targets are easily obtained from Orbis (Bureau van Dijk). So I draw heavily on the data availability of Bureau van Dijk.

The debt market conditions HY market size and leveraged loan spreads are stem from from ThomsonOne (T-1). Likewise, the IPO volumes are also retrieved from T-1. Furthermore, the QE data is hand-collected from the Asset Purchase Facility Quarterly Reports published by the BoE, which is published every quarter since the beginning of the QE programs. Also, the list of the 50 largest PE funds is obtained from the PEI300[2] list. Lastly, the yearly GDP growth rate of UK are retrieved from the OECD.

After the data management, the final sample consists 1,639 buyouts. A detailed description of the sample construction is seen in Appendix II. The division of the buyouts is seen in table 1. Since this study mainly focuses on the different exits routes this is the most important breakdown. In addition, in table 2 the division of SBO's in the final sample are seen. It can be stated from table 2 is that SBO's tend to be more pronounced it the second wave.

[2] https://www.privateequityinternational.com/pei-300/

Table 1: Division of the UK buyouts in the sample

This table summarizes the division of the UK buyouts within the final sample. Secondary buyout represents the buyouts which are secondary buyouts, as well as tertiary buyouts quaternary buyout or quinary buyout. Because these exits also represent exits where a PE fund buys it from another PE investor. Strategic buyer exit are the exits with a strategic rationale. IPO are exits through public offerings. Other exits are the remaining exits. Other buyouts represent all the other buyouts.

Buyout	Number of transactions	Percentage
Secondary buyout	250	15%
Strategic buyer exit	202	12%
IPO	46	3%
Other exit	112	7%
Other buyouts	1,029	63%
Total	**1,639**	**100%**

Table 2: Number of secondary buyouts per year in the final sample in the UK

This table summarizes the number of secondary buyouts per year in the final sample. 2008 and 2009 are not reported while these years are not taken into account in this study.

Deal year	Number of Secondary Buyouts	Percentage
2002	5	2%
2003	3	1%
2004	8	3%
2005	10	4%
2006	7	3%
2007	11	4%
2010	10	4%
2011	17	7%
2012	19	8%
2013	28	11%
2014	33	13%
2015	40	16%
2016	32	13%
2017	22	9%
2018	5	2%
Total	**250**	**100%**

Table 3: Summary statistics

This table summarizes the summary statistics of this variables used in this study. The variable Change in QE is in billion £ and represents the amount of open market operations undertaken by the Bank of England in a given year. Total QE dummy equals one if Change in QE was above mean in a given year and zero otherwise. Leveraged spread is the average high yield spread in a given year measured in basis points. HY Market and Industry IPO are in billion $ and in the year of buyout. Industry IPO is the amount of IPO issuance in the year of buyout within the same industry and is based on the F&F 10 industry classification. Log assets is the logarithm of assets (million US $) in the year of buyout and one year prior the buyout. EBT growth is the growth rate of EBT (million US $) of the targeted firm between the year of the buyout and one year prior the buyout. EBT/Sales are both measured in million US $ are in the year of deal and one year prior to the deal. Average industry sales growth is the average growth rate within the sample of an industry based on the F&F10 industry classification. PE buyer reputation is a dummy variable where one is if the acquirer is a top 50 PEI fund and zero otherwise. GDP growth rate is UK's real GDP growth rate in the year of the buyout. SBO dummy equals one if exit is an SBO and zero if exit is IPO or sale to strategic buyer. Exit dummy equals 1 if the exit is an SBO, IPO or sale to strategic buyer and zero otherwise. Secondary equals one if deal is an SBO and zero otherwise. Deal value is in million $. The variables are further explained in appendix I.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Variables of interest					
Change in QE	1,639	33.166	40.306	-0.08	109.716
Log (1+ Change in QE)	1,639	2.103	2.014	-0.083	4.707
Total QE dummy	1,639	0.378	0.485	0	1
Leveraged spread	1,639	371.205	44.046	268.543	446.495
HY market size	1,639	72.513	28.575	35.068	140.37
Log (HY market size)	1,639	4.205	0.4	3.557	4.944
Industry IPO	1,639	6.476	7.536	0	27.684
Log (Industry IPO)	1,639	7.604	2.143	-1.911	10.229
Control variables					
Log (Assets)	3,278	26.331	1.454	4.487	29,93
EBT growth	1,639	0.079	1.838	-0.844	71.652
EBT/Sales	3,278	0.038	1.603	-8.245	85.152
Average industry sales growth	1,639	5.359	2.698	0.224	11.066
PE buyer reputation	1,639	0.028	0.165	0	1
GDP growth	1,639	2.163	0.458	1.386	3.286
Deal variables					
SBO dummy	498	0.502	0.5	0	1
Exit dummy	1,639	0.304	0.46	0	1
Secondary	1,639	0.153	0.36	0	1
Deal value	932	110.701	213.005	0.01	2,297.19
Log (Deal value)	932	3.314	1.85	-4.605	7.739
Deal value/EBT	932	-0.053	1.625	-49.613	0.079
Log (Deal value/EBT)	551	-22.646	2.216	-29.439	-2.541
Deal value/Sales	932	0.001	0.027	0	0.832
Log (Deal value/Sales)	932	-22.99	2.45	-31.621	-0.184

3.2.2. Summary statistics

The summary statistics of this sample are presented in table 3. The most important variables are variables of interest: the QE variables, the HY market size variables, leveraged spread variable and the industry IPO variables. This figure shows that the variable Change in QE has a negative minimum, while in the years 2014 and 2015 the BoE sold more gilts rather than it purchased. Respectively, 80 million £ sterling in 2014 and 11 million £ sterling in 2015. For the control variables log assets and EBT/ sales include both the financials in the year of the buyout and one year before. Also, only 2.8% of the buyouts were acquired by the 50 largest PE funds. Regarding the pricing of the buyouts, it is seen that only 932 out of the 1,639 buyouts reported deal values. Because for many deals is the price paid undisclosed. However, it would bias the results if only disclosed deal values would be used in the study.

3.2.3. Correlation matrix

In addition, it is interesting to see how the different debt proxies and QE are related to each other. Therefore, table 4 shows a correlation matrix for the two debt proxies and QE. As expected HY market size and leveraged spread correlate negatively, which confirms the inverse relationship as earlier discussed.

Both QE variables also correlate negatively with HY market size, this is different from the expectations. While, it could indicate that borrowing did not increase during the QE program. Both QE dummies do strongly correlate with each other, this is logical because both variables are calculated from the QE purchase program of the BoE. Furthermore, the positive correlations between leveraged spread and the QE variables could indicate that spreads did not decrease during the QE program, as discussed theoretically in the literature review. These outcomes look somewhat contradicting. However, at this stage it is not possible to say which proxy better explains the impact on the probability of exiting through an SBO. Therefore, all proxies are used.

Table 4: Correlation matrix debt market proxies and QE

This table shows the results of the correlations between established debt market proxies and the QE variables

Variable	Log (HY market size)	Total QE dummy	Log (1+ Change in QE)	Leveraged spread
Log (HY market size)	1.000			
Total QE dummy	-0.270	1.000		
Log (1+ Change in QE)	-0.366	0.885	1.000	
Leveraged spread	-0.127	0.128	0.354	1.000

4. Results

4.1. Market Timing

4.1.1. Wave I

Tables 5 and 6 show the results of the first M&A wave. Regarding the debt market proxy: HY market size (table 5). Column 1 shows the results if only the HY market size and the control variables are regressed; it shows that there is positive but insignificant relationship between HY market size and the probability of an SBO. If only the equity market conditions are taken into account (column 2), the result shows a negative and significant effect and means that a favorable equity market increase the probability of an exit through an IPO or a strategic sale.

Combining both debt and equity market proxies (column 3), gives results in line with the first hypothesis. Debt market conditions are positively, with a coefficient of 0.50, and significantly associated on a 5% level with SBO's and favorable equity market conditions are significantly on a 1% level negatively (-0.122) related to the probability of an SBO. However, when adding an interaction term (column 4), results for both proxies as well as the interaction term are insignificant and therefore economically meaningless. Regarding, the control variables, it can be concluded that larger firms are associated with exits through IPO's and strategic sales, which contradicts with the findings of Wang (2012), who finds that larger firms tend to exit with SBO's. In conclusion, the usage of the proxy of HY market size in the first wave gives some evidence in favor of the marketing timing hypothesis.

Table 5: The effect on the probability of SBO's 2002-2007 using HY Market Size

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (4) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Log (HY market size) is the logarithm of the HY issuance in the year the buyout. Log (Industry IPO) is the logarithm of UK's IPO volume in the year of buyout, based on F&F 10 industry classification. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (5) and (6), (5) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (6) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (5) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit				Heckman selection	
	(1)	(2)	(3)	(4)	(5)	(6)
	SBO dummy	SBO dummy	SBO dummy	SBO dummy	Exit dummy	SBO dummy
Log (HY market size)	0.316		0.500**	-1.168		-0.708
	(0.241)		(0.236)	(1.362)		(0.773)
Log (Industry IPO)		-0.076*	-0.122***	-1.027		-0.587
		(0.040)	(0.040)	(0.661)		(0.423)
Log (HY market size) * Log (Industry IPO)				0.220		0.127
				(0.160)		(0.100)
Log (Assets)	-0.144*	-0.134	-0.153*	-0.133		-0.059**
	(0.087)	(0.083)	(0.087)	(0.085)		(0.025)
Average industry sales growth	0.031	0.017	0.011	0.031		0.017
	(0.037)	(0.030)	(0.034)	(0.036)		(0.022)
EBT growth	0.763	0.867	1.078	1.107		0.663
	(1.134)	(1.194)	(1.199)	(1.177)		(0.882)
Log (Assets 1-year prior buyout)					0.003	
					(0.055)	
EBT/Sales 1-year prior buyout					0.562	
					(0.430)	
Rho					-1.879**	
					(0.794)	
Constant	2.128	3.828	2.579	8.739*	-0.538	5.662*
	(2.937)	(2.358)	(2.750)	(4.994)	(1.445)	(3.297)
Cluster by industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	96	96	96	96	298	298
Pseudo R2	0.036	0.035	0.056	0.072		

Table 6: The effect on the probability of SBO's 2002-2007 using Leveraged Spread

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (3) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Leveraged spread is the average HY spread in the year of the buyout. Log (Industry IPO) is the logarithm of UK's IPO volume in the year of buyout, based on F&F10 industry classification. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (4) and (5), (4) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (5) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (4) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit			Heckman selection	
	(1)	(2)	(3)	(4)	(5)
	SBO dummy	SBO dummy	SBO dummy	Exit dummy	SBO dummy
Leveraged spread	-0.007	-0.005	-0.011		-0.009
	(0.005)	(0.005)	(0.038)		(0.024)
Log (Industry IPO)		-0.066*	-0.347		-0.269
		(0.038)	(1.424)		(0.861)
Leveraged spread * Log (Industry IPO)			0.001		0.001
			(0.005)		(0.003)
Log (Assets)	-0.139	-0.138	-0.136		-0.061
	(0.086)	(0.084)	(0.084)		(0.038)
Average industry sales growth	0.036	0.023	0.025		0.018
	(0.028)	(0.030)	(0.033)		(0.021)
EBT growth	0.731	0.871	0.845		0.478
	(1.074)	(1.155)	(1.225)		(0.776)
Log (Assets 1-year prior buyout)				0.004	
				(0.060)	
EBT/Sales 1-year prior buyout				0.558	
				(0.456)	
Rho				-1.639***	
				(0.380)	
Constant	5.308*	5.280*	7.119	-0.585	5.390
	(3.142)	(2.930)	(10.829)	(1.589)	(6.970)
Cluster by industry	Yes	Yes	Yes	Yes	Yes
Observations	96	96	96	298	298
Pseudo R2	0.032	0.038	0.038		

Regarding, the regressions with leveraged spread as a proxy for debt market conditions (table 6), it can be indeed stated that leveraged spread is negatively associated with the probability of an SBO, which in line with the expectations that lower spreads lead to more SBO's. However, the coefficients are almost zero and insignificant across all regressions. So, these very results are economically meaningless. Moreover, the industry IPO volume shows again a negative relation with SBO's. However, this is only significant at a 10% level in column 2, with a coefficient of -0.066. Hence, using the leveraged spread as debt proxy in this first wave gives us little evidence for accepting the first hypothesis.

Both tables show that the interaction between equity and debt markets is positive, but insignificant. So, there is no indication that the interaction between the equity and the debt markets influence exit decisions in the first wave. For both the HY market size as well as the leveraged spread regressions, the Heckman selection models indicate that there is a self-selection bias for this first wave. Since the *rho* is significant. It could be that a lack of data availability on the financials for the first wave led to a selection bias. As earlier discussed, the financials are retrieved from Orbis and are downloaded for the last ten relative years. Due to missing financials a substantial number of buyouts are dropped in the first wave.

The results, as described above, show some indication that debt market conditions herded SBO's in the first M&A and that favorable equity markets foster both IPO exits as well as sales to strategic buyers. However, one must be careful by generalizing the results of the first wave for the first hypothesis. Because, the results are mostly insignificant and there are indications of selection bias.

4.1.2. Wave II

The results for the second wave are shown in tables 7 and 8. Using the HY market size in the second wave as a proxy for debt market conditions (table 7), gives us opposing results compared to the first wave. The negative coefficient of the HY market size across all columns indicate that it decreases the likelihood of an SBO, which contradicts the first hypothesis. However, these coefficients are all insignificant. Therefore, based on these results it can not be stated that favorable debt market conditions influences exit decisions in the second wave.

Conversely, when using the debt market proxy leveraged spread (table 8), it is interesting to note that the coefficients of leveraged spread in columns 1 to 3 are all positive and significant. Although, the coefficients are rather small (0.4% in columns 1 and 2, and 1.1% in column 3) there is some indication that higher leveraged spreads lead to a small increase in the probability of an SBO exit, which is not on par with the expectations.

Regarding the industry IPO volume, there are ambiguous results. On the one hand, in columns 2 and 3 (table 7) the coefficients are positive but insignificant. On the other hand, when adding an interaction term between the equity and the debt market the coefficient becomes negative and insignificant. Moreover, in table 8 the coefficients industry IPO volumes are all positive but insignificant. Based on these results there is however no indication that equity market conditions have an impact on the chosen exit route during the second wave.

Furthermore, results in both tables make not clear that the interaction between equity and debt market influence equity decisions. In addition, both tables show evidence that larger firms tend to exit through an SBO, which opposes to the findings of the first wave, but this is in line with the results of Wang (2012). Also, in both models there is no signal of selection bias in the second wave.

The results as discussed above, do not provide sufficient evidence that exit decisions are chosen because of market timing. This rather contradicts with the outcomes of the first wave and the past results of several studies. This could indicate that other factors could better explain the emerge of SBO's after the 2008 crisis. On the one hand, it could be that other motivations such as the collusions motive or increased efficiencies can better explain SBO exits. On the other hand, the effect of QE could perhaps also justify the emerge of SBO's.

Table 7: The effect on the probability of SBO's 2010-2018 using HY Market Size

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (4) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Log (HY market size) is the logarithm of the HY issuance in the year the buyout. Log (Industry IPO) is the logarithm of UK's IPO volume in the year of buyout, based on F&F10 industry classification. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (5) and (6), (5) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (6) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (5) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit				Heckman selection	
	(1)	(2)	(3)	(4)	(5)	(6)
	SBO dummy	SBO dummy	SBO dummy	SBO dummy	Exit dummy	SBO dummy
Log (HY market size)	-0.144		-0.166	-0.445		-0.410
	(0.152)		(0.157)	(0.712)		(0.716)
Log (Industry IPO)		0.016	0.023	-0.128		-0.116
		(0.046)	(0.046)	(0.363)		(0.357)
Log (HY market size) * Log (Industry IPO)				0.036		0.033
				(0.083)		(0.082)
Log (Assets)	0.131***	0.131***	0.130***	0.130***		0.119***
	(0.022)	(0.023)	(0.023)	(0.023)		(0.037)
Average industry sales growth	-0.028*	-0.022	-0.017	-0.016		-0.015
	(0.017)	(0.026)	(0.026)	(0.025)		(0.026)
EBT growth	0.051	0.053	0.048	0.046		0.042
	(0.034)	(0.039)	(0.039)	(0.037)		(0.044)
Log (Assets 1 year prior buyout)					0.011	
					(0.018)	
EBT/Sales 1 year prior buyout					-0.115	
					(0.079)	
Rho					-0.486	
					(0.715)	
Constant	-2.656***	-3.420***	-2.771***	-1.625	-0.826*	-0.958
	(0.982)	(0.667)	(-1.016)	(3.205)	(0.459)	(2.342)
Clustered by industry	yes	yes	yes	yes	yes	yes
Observations	402	402	402	402	1341	1341
Pseudo R2	0.020	0.019	0.021	0.022		

Table 8: The effect on the probability of SBO's 2010-2018 using Leveraged Spread

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (3) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Leveraged spread is the average HY spread in the year of the buyout. Log (Industry IPO) is the logarithm of UK's IPO volume in the year of buyout, based on F&F10 industry classification. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (4) and (5), (4) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (5) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (4) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit			Heckman selection	
	(1)	(2)	(3)	(4)	(5)
	SBO dummy	SBO dummy	SBO dummy	Exit dummy	SBO dummy
Leveraged spread	0.004***	0.004***	0.011*		0.010
	(0.001)	(0.001)	(0.006)		(0.008)
Log (Industry IPO)		0.022	0.386		0.363
		(0.044)	(0.363)		(0.422)
Leveraged spread * Log (Industry IPO)			-0.001		-0.001
			(0.001)		(0.001)
Log (Assets)	0.130***	0.129***	0.130***		0.122***
	(0.022)	(0.023)	(0.023)		(0.041)
Average industry sales growth	-0.026	-0.015	-0.012		-0.011
	(0.017)	(0.026)	(0.026)		(0.026)
EBT growth	0.043	0.040	0.037		0.035
	(0.036)	(0.040)	(0.038)		(0.045)
Log (Assets 1-year prior buyout)				0.011	
				(0.017)	
EBT/Sales 1-year prior buyout				-0.115	
				(0.079)	
Rho				-0.389	
				(0.897)	
Constant	-4.638***	-4.896***	-7.714***	-0.813*	-6.852
	(0.746)	(0.975)	(2.843)	(0.438)	-4.912
Cluster by industry	Yes	Yes	Yes	Yes	Yes
Observations	402	402	402	1,341	1,341
Pseudo R2	0.023	0.023	0.024		

4.2. Influence QE on SBO's

The results of table 9 indicate that the QE programs have a negative but insignificant influence of the probability on SBO's. However, it is interesting to note that the interaction term between QE and industry IPO volume, in column 3, indicates that the probability of an SBO decreases by 9.6%, and is significant at a 5% level. This implies that QE has led, via a more favorable

equity market, to a preferred exit choice of IPO's and strategic sales rather then exits through SBO's. Moreover, the negative, but insignificant coefficient -0.327 of the interaction term between QE and HY market size (table 10, column 3), indicates that the QE programs did not increase the probability of an SBO through more favorable debt market conditions. Therefore, these results indicate a rejection of hypothesis 2. In fact, the results show evidence that QE fosters exits linked to equity markets in the second wave.

Appendix III shows a robustness check where the QE dummy is replaced by the Change in QE. This variable equals the amount of open market operations undertaken by the BoE. The results of this robustness check indicates that the amount of QE is negatively associated with SBO's, but this effect is insignificant and rather small. In addition, the interaction term between Change in QE and industry IPO is -0.001 and insignificant. This indicates UK's QE program itself tends to foster exit decisions through more favorable equity markets, however the results are not robust.

These results could indicate that the effect of UK's QE programs fueled favorable equity market conditions, rather then the debt market conditions. This opposes my expectations, but it would explain the negative interaction between QE and the industry IPO volume. Miles (2011) argues that QE could transmit through equity markets. In addition, Georgiadis and Gräb (2016), set out that the ECB's QE programs have had positive effects on global equity markets. Hence, it could very well the case that BoE's QE programs led to more favorable equity market conditions, which opposes existing views on the influence of UK's QE programs on equity markets. Besides, it could also be that money creation generated by the QE, transmitted into the economy in different ways. For example, it could be that the increased liquidity in the UK led to more cross-border investments in other markets. It is already shown that the FED's QE programs increased investments into emerging markets such as countries in Asia (Cho and Rhee, 2014; Bhattarai, Chatterjee and Park, 2015).

In addition, the Heckman selection models in tables 9 and 10 do not indicate any form of selection bias. In addition, in line with the other outcomes for the second wave larger firms tend to increase the probability of exiting through SBO's with around 13%. However, as earlier discussed, in the first wave opposing results were found. Besides, there are indications in both QE estimations that higher industry growth rates tend to increase the likelihood of exiting through IPO's or strategic sales.

Table 9: The effect on the probability of SBO's 2010-2018 using QE and Industry IPO Volume

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (3) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Total QE dummy equals one if BoE open market operations are above the mean in the year of the buyout and zero otherwise. Log (Industry IPO) is the logarithm of UK's IPO volume in the year of buyout, based on F&F10 industry classification. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (4) and (5), (4) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (5) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (4) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit			Heckman selection	
	(1)	(2)	(3)	(4)	(5)
	SBO dummy	SBO dummy	SBO dummy	Exit dummy	SBO dummy
Total QE dummy	-0.054	-0.042	0.690		0.626
	(0.122)	(0.110)	(0.420)		(0.465)
Log (Industry IPO)		0.014	0.063		0.057
		(0.044)	(0.041)		(0.038)
Total QE dummy * Log(Industry IPO)			-0.096**		-0.087
			(0.045)		(0.053)
Log (Assets)	0.131***	0.130***	0.130***		0.116***
	(0.022)	(0.023)	(0.023)		(0.038)
Average industry sales growth	-0.031*	-0.024	-0.022		-0.020
	(0.018)	(0.026)	(0.023)		(0.023)
EBT growth	0.054	0.053	0.057		0.051
	(0.037)	(0.040)	(0.039)		(0.047)
Log (Assets 1 year prior buyout)				0.012	
				(0.019)	
EBT/Sales 1 year prior buyout				-0.115	
				(0.078)	
Rho				-0.562	
				(0.649)	
Constant	-3.225***	-3.362***	-3.752***	-0.836*	-2.764*
	(0.634)	(0.649)	(0.560)	(0.471)	(1.529)
Cluster by industry	Yes	Yes	Yes	Yes	Yes
Pseudo R2	0.020	0.020	0.250		
Observations	402	402	402	1,341	1,341

Table 10: The effect on the probability of SBO's 2010-2018 using QE and HY market size

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (2) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Total QE dummy equals one if BoE open market operations are above the mean in the year of the buyout and zero otherwise. Log (HY market size) is the logarithm of the HY issuance in the year of buyout. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (3) and (4), (3) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (4) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (4) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit		Heckman selection	
	(1)	(2)	(3)	(4)
	SBO dummy	SBO dummy	Exit Dummy	SBO dummy
Total QE dummy	-0.114	1.282		1.153
	(0.129)	(1.236)		(1.224)
Log (HY market size)	-0.203	0.026		0.023
	(0.171)	(0.250)		(0.217)
Total QE dummy * Log (HY market size)		-0.327		-0.294
		(0.271)		(0.271)
Log (Assets)	0.129***	0.131***		0.112***
	(0.022)	(0.022)		(0.038)
Average industry sales growth	-0.029*	-0.032*		-0.027**
	(0.018)	(0.017)		(0.013)
EBT growth	0.047	0.056		0.048
	(0.036)	(0.041)		(0.048)
Log (Assets 1 year prior buyout)			0.011	
			(0.018)	
EBT/Sales 1 year prior buyout			-0.115	
			(0.079)	
Rho			-0.670	
			(0.614)	
Constant	-2.305**	-3.347**	-0.827*	-2.202
	(1.125)	(1.347)	(0.469)	-2.165
Cluster by industry	Yes	Yes	Yes	Yes
Pseudo R2	0.022	0.023		
Observations	402	402	1,341	1,341

4.3. Pricing

The results concerning the third hypothesis are shown in table 11. As earlier mentioned, only 932 deals provided deal value information. In addition, for columns (3) and (6) there are less observations due to exclusion of negative deal multiples from negative EBT's. The relationship of debt market conditions on pricing in buyouts is in the first wave positive, but this effect is insignificant. In the second wave it shows that only for column (4) the effect is positive with an HY Market Size coefficient of 0.269 and significant on a 10% level. However, for (5) and (6) this coefficient is again negative and insignificant. In conclusion, it can be stated that there is not enough evidence that positive debt market conditions do influence pricing in the full sample of buyouts.

Nevertheless, when the deal is an SBO it made clear that favorable debt market conditions positively and significantly influence the price. In turn this means that more favorable debt market conditions lead to higher prices in SBO's. This is true for all three proxies across the two waves, which indicates that my third hypothesis is confirmed and these results are robust.

Concerning the results of QE on pricing (table 12) indicate that it negatively impacts the pricing on all buyouts in the second wave. Which is derived from the significant negative coefficients of -0.086 and -0.171 in columns (1) and (2) of the QE variable. This seems counter-intuitive with my expectations that QE should lead to higher M&A prices in general. However, I found evidence which supports the fourth hypothesis that QE in combination with SBO lead to higher prices. Following the models (1) to (3) the price are 18% till 37% higher and are all significant at a 1% level. Therefore, I find evidence to accept the fourth hypothesis and it seems robust. A possible explanation for the difference between the effect on general buyouts and SBO's could be that especially PE funds make use of cheaper debt to outbid their rivals (Ivashina and Kovner, 2011; Axelson et al., 2013).

Regarding the control variables, it is made clear that the larger funds tend to pay higher prices, this is the case across all regressions in both tables 11 and 12. Moreover, it is interesting to see that in the second wave the multiples tend to be higher for smaller and less profitable firms. However, this contradicts to the outcomes for the first wave.

Table 11: The effect on pricing using HY market size

The table shows the results for the regressions (1)-(3) estimating the effect on pricing. Columns (1) to (3) are the OLS regressions for the buyouts between 2002 and 2007. Columns (4) to (6) are the OLS regressions for buyouts between 2010-2018. The dependent variable of (1) and (4) is the logarithm of the Deal value of the buyout. For (2) and (4) the dependent variable is logarithm of the Deal value of the buyout divided by the target's Sales in the year of the buyout. (3) and (6) have as dependent variable the logarithm of the Deal value of the buyout divided by the EBT of the targeted firm in the year of buyout. Log (HY market size) is the logarithm of the HY issuance in the year of buyout. Secondary is a dummy variable where one is denoted if the buyout was an SBO and zero otherwise. Log (Assets) are the target's assets in year of the buyout. EBT growth is ratio EBT between one year prior to buyout and year of buyout. Average industry sales growth rate, is average growth rate for firms within the same F&F 10 industry. Whereas, GDP growth is the real GDP growth rate in the year of buyout. PE buyer reputation is a dummy variable where one is denoted if the acquirer is a top 50 PEI fund and zero otherwise. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	2002-2007			2010-2018		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log (Deal value)	Log (Deal value/Sales)	Log(Deal value/EBT)	Log(Deal value)	Log(Deal value/Sales)	Log(Deal value/EBT)
Log (HY market size)	0.247	0.159	-0.231	0.269*	-0.028	-0.314
	(0.220)	(0.267)	(0.224)	(0.140)	(0.219)	(0.252)
Secondary * Log (HY market size)	0.429***	0.480***	0.241**	0.331***	0.306***	0.198***
	(0.042)	(0.057)	(0.087)	(0.042)	(0.073)	(0.032)
Log (Assets)	-0.091	-0.002	-0.277	-0.008	-0.450***	-0.393**
	(0.142)	(0.113)	(0.201)	(0.014)	(0.110)	(0.153)
Average industry sales growth	0.030	-0.028	0.028	-0.052	-0.063	-0.037
	(0.089)	(0.097)	(0.072)	(0.036)	(0.058)	(0.021)
EBT growth	0.028	0.030	-0.110	0.050	0.035	-1.306***
	(0.101)	(0.139)	(0.074)	(0.171)	(0.176)	(0.262)
GDP growth	-0.073	0.099	-0.539	-0.224	0.011	0.523***
	(0.245)	(0.339)	(0.285)	(0.133)	(0.271)	(0.155)
PE buyer reputation	1.268***	1.446*	1.636***	2.175***	2.419***	2.632***
	(0.376)	(0.685)	(0.356)	(0.094)	(0.316)	(0.569)
Constant	3.974	-24.670***	-13.624**	2.987***	-10.812***	-12.006***
	(3.731)	(2.637)	(3.922)	(0.638)	(2.433)	(3.428)
Cluster by Industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	214	214	118	718	718	433
R-squared	0.137	0.104	0.093	0.147	0.169	0.168

Table 12: The effect on pricing using QE

The table shows the results for the regressions (1)-(3) estimating the effect on pricing. The table shows the results for the buyouts between 2010-2018. The dependent variable of (1) is the logarithm of the Deal value of the buyout. For (2) the dependent variable is logarithm of the Deal value of the buyout divided by the target's Sales in the year of the buyout. (3) has as dependent variable the logarithm of the Deal value of the buyout divided by the EBT of the targeted firm in the year of buyout. Log (1+ Change in QE) is the logarithm of 1 + Change in QE and that is the amount of open market operations in year of buyout. Secondary is a dummy variable where one is denoted if the buyout was an SBO and zero otherwise. Log (Assets) are the target's assets in year of the buyout. EBT growth is ratio EBT between one year prior to buyout and year of buyout. Average industry sales growth rate is average growth rate for firms within the same F&F 10 industry. Whereas, GDP growth is the real GDP growth rate in the year of buyout. PE buyer reputation is a dummy variable where one is denoted if the acquirer is a top 50 PEI fund and zero otherwise. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1) Log (Deal value)	(2) Log (Deal value/Sales)	(3) Log (Deal value/EBT)
Log (1+ Change in QE)	-0.086**	-0.171***	0.001
	(0.034)	(0.030)	(0.072)
Secondary * Log (1+ Change in QE)	0.349***	0.372***	0.183***
	(0.046)	(0.068)	(0.044)
Log (Assets)	0.004	-0.438***	-0.388**
	(0.018)	(0.104)	(0.151)
Average industry sales growth	-0.061	-0.075	-0.048**
	(0.034)	(0.056)	(0.018)
EBT growth	0.072	0.112	-1.260***
	(0.184)	(0.182)	(0.247)
GDP growth	-0.159	-0.474**	0.534*
	(0.115)	(0.197)	(0.242)
PE buyer reputation	2.302***	2.484***	2.775***
	(0.105)	(0.268)	(0.559)
Constant	4.010***	-9.722***	-13.380**
	(0.631)	(2.823)	(4.245)
Cluster by industry	Yes	Yes	Yes
Observations	718	718	433
R-squared	0.120	0.166	0.157

4.4. Summary Results

In table 13 the results are summarized. Table 13 shows that hypothesis 1 is only partially accepted by the debt market proxy of HY market size during the first wave. However, during the second wave no indication of the market timing hypothesis is found. Therefore, the first hypothesis is rejected for the second wave.

Regarding hypothesis 2, opposing evidence is found. This indicates that UK's QE programs increased the possibility of exiting through IPO's or strategic sales via interacting with the equity markets. Nonetheless, these results are not robust. Additionally, there is no direct effect found of QE on the probability of a preference for a certain exit choice. Consequently, hypothesis 2 is rejected.

Additionally, hypothesis 3 is accepted in both waves for all three price proxies (deal value, deal value/sales and deal value/EBT), which shows that the prices paid at SBO's are fueled by favorable debt market conditions. Furthermore, hypothesis 4 is also confirmed, it is evident that the UK QE programs led to higher prices at SBO's. Again these results are robust for the three pricing proxies.

Table 13: Results Hypotheses

This table summarizes the outcomes for each respective hypothesis

Hypothesis	(Wave I) 2002-2007	(Wave II) 2010-2018
H1: Exiting through SBO's is more likely when debt market conditions are favorable and less likely when the equity market is hot	Partially Accepted	Rejected
H2: The Quantitative Easing program created an environment in which exiting through SBO's is more likely to happen	-	Rejected
H3: Favorable debt markets increase the prices paid at SBO's	Accepted	Accepted
H4: The Quantitative Easing program increases the prices paid at SBO's	-	Accepted

5. Discussion

5.1. Conclusion

Previous literature finds evidence that capital market conditions partially influence exit decisions for PE investors. This possibly explains the increased popularity of the puzzling phenomenon of secondary buyouts. After the 2008 crisis, the Central Banks of the US, EU, Japan, and the UK introduced Quantitative Easing programs in order to boost the economy. Several research studies addressed that these QE programs have lowered interest rates. However, no study researched the impact of QE on exit decisions for PE funds. Hence, this study is distinctive where, for the first time, the following question is imposed:

What is the effect of Quantitative Easing on Secondary Buyouts?

For this study, a unique sample of UK buyouts is obtained. The UK is worthwhile investigating for several reasons. First, the Bank of England implemented its own QE program. Secondly, firms in the UK are required to report financials. Third, the UK is considered the second-largest buyout market worldwide.

Before examining the effect of QE on SBO's, this study begins with investigating if established proxies for capital market conditions explain exit choices of PE investors during two different periods. This study shows some evidence that exits between 2002 and 2007 can be explained by market timing. This means that favorable debt markets increase the probability of exiting through SBO's and that more favorable equity markets tend to increase the preference of exiting through IPO's or sales to strategic buyers.

This is in line with Wang (2012) and Bonini (2015). However, this is only true for the measurement HY market size and not for alternative measure: leveraged spread. Also, there is an indication of self-selection bias. Therefore, the market timing hypothesis can only partially be accepted for the first wave. Contrary, for the second wave (2010-2018), no indication of the market timing hypothesis is found. Based on this approach, it is likely that other motives such as the market timing hypothesis better explain exit strategies since 2010.

Regarding estimating the effect of QE on the probability of exiting through SBO's, opposing evidence is found. This indicates that the UK's QE programs have increased the possibility of exiting through IPO's or strategic sales via interacting with the equity markets. Nonetheless, these results are not robust. Additionally, there is no direct effect found of QE on the probability of a preference for an exit choice. Consequently, hypothesis 2 must be rejected. The results also indicate that increased liquidity created by UK's QE programs transmitted into the economy, are dissimilar with exits of PE funds.

The results of this study in respect of the second wave imply that neither the market timing hypothesis or QE does motivate the emerge of SBO's during the period 2010-2018. It might be that other factors, such as the collusions motive or increased efficiencies, can better explain SBO exits; however, this research did not investigate this.

Nevertheless, this study shows strong evidence for accepting hypothesis 3, which implies that favorable debt market conditions lead to higher prices in SBOs. The results hold for both waves and for all three proxies. So, this evidence is robust. This finding is consistent with current literature. Similarly, this study finds also strong evidence that QE increases pricing during SBO's. This causes acceptance of hypothesis 4. However, this is only the case for SBO's. For other buyouts is explicitly found that QE lowers prices at other buyouts, which is consistent with the view that especially PE funds use debt to pay higher prices.

Overall, there is some indication that the UK's QE programs negatively influenced the probability of exiting through SBO's. Moreover, there is some evidence that the QE programs fueled favorable equity market conditions, rather than the debt market conditions. The interaction between QE and the equity markets is estimated to decrease the likelihood of an SBO by 9.6%. Nevertheless, this result is not robust. This view opposes the current views on the effects of QE. Besides, the results show no direct impact of QE on the probability of exiting through an SBO.

Nonetheless, regarding pricing, I found strong evidence that the QE programs caused higher pricing in SBO's. This is on par with findings that favorable debt market conditions induce higher deal values in SBO's. That shows that if SBO exits are undertaken, QE fuels the transaction prices.

5.2. Limitations and Future Research

This study is exposed to several limitations. First the final sample used in this study is considerably small compared to the number of buyouts retrieved. This is partly because, for many firms, the respective financials were missing in the Orbis database. Which implies that I could not take them into the final sample. This is especially the case for the pre-crisis 2008 deals. In which deals there is also an indication of selection bias. It could be that the relatively small sample size possibly biased the results.

Secondly, regarding the construction of some variables, there is a tendency of oversimplification. For instance, the variable EBT growth is constructed by taking the growth of the firm's EBT in the year of the buyout to the EBT one year before the deal. However, profitability can be volatile on a year to year base. Moreover, by using the Fama and French 10 industry classification, all firms are divided within ten industries. Though firms do operate in many more industries. Those generalizations could have led to inaccurate results.

Third, I have chosen to use deals from 2010 onwards for the second period. This I did, because I wanted to ignore the effects of the 2008 financial crisis. Therefore, in this study the buyouts in the years 2008 and 2009 are not taken into account. Consequently, I leave out the impact on the first year of implementation of the UK's QE program. It could be the case that the effect of QE on the SBO's in 2009, differs from the outcomes in the other years.

This study is the very first study, which attempts to link QE with SBO's. The setting of the UK program is used. Future inquiries can focus on trying to find different ways to quantify the effect of the UK's QE programs on SBO's. Besides, as mentioned before, this study did not focus on the first year of implementation. This can also be investigated. This study, therefore, will contribute, in my opinion, to discuss in what way the QE effected SBO's in the UK.

Further research might also focus on investigating the effect of QE on SBO's in other areas where a QE program was implemented, such as the EU, the US, or Japan. Besides, another exciting avenue for future research is to extend analyses on how QE transmits into the economy such as exploring the spillover effects on investments.

Whilst this study mainly focuses on estimating the effect of QE on SBO's, this study also tests if the market timing hypothesis holds for established proxies for capital markets. This study does not provide, however, clear evidence that this motivates SBO's after 2010 in the UK. That is why, more examination of the motivations of the prevalence of SBO's is always compelling. Finally, it is found in the first wave that smaller firms are tendering to exit through SBO's, while in the second wave, larger firms tend to exit through SBO's, further research on this puzzling outcome can also be of added value in explaining SBO's.

Appendix I List of variables

Variable	Description
Average industry sales growth	Average industry sales growth is the average growth rate within the sample of an industry based on the F&F10 industry classification
Change in QE	Change in QE is the amount of open market operations measured in billion £ sterling in year of buyout
Deal value	Deal value of the buyout, in million US $
Deal value/EBT	Deal value of the buyout is divided by EBT of acquired firm in year of exit. Both are in million US $
Deal value/Sales	Deal value of the buyout is divided by Sales of acquired firm in year of exit. Both are in million US $
EBT growth	EBT growth is the growth rate of EBT of the acquired firm between the year of the buyout and one year prior the buyout, in million US $
EBT/Sales	EBT of acquired firm divided by Sales of acquired firm in year of buyout, in a given year
Exit dummy	Exit dummy equals one if exit is SBO, IPO or sale to strategic buyer and zero otherwise
GDP growth	UK's real GDP growth rate in the year the buyout
HY market size	Total amount of UK's high yield volume in the year of buyout, measured in billion US $
Industry IPO	Total amount if IPO issuance within the same industry based on the F&F 10 industry classification in the year of buyout, measured in billion US $
Leveraged spread	Leveraged spread is the average high yield spread in the year of buyout measured in basis points
Log (1+ Change in QE)	Natural logarithm of (1+ Change in QE)
Log (Assets)	Logarithm of assets in million us $ in the year of buyout and one year prior the buyout
Log (Deal value)	Natural logarithm of Deal value
Log (Deal value/EBT)	Natural logarithm of Deal value divided by EBT
Log (Deal value/Sales)	Natural logarithm of Deal value divided by Sales
Log (HY market size)	Natural logarithm of HY market size
Log (Industry IPO)	Natural logarithm of Industry IPO
PE buyer reputation	Dummy variable where one is denoted if the acquirer is a top 50 PEI fund and zero otherwise
SBO dummy	Dummy variable which equals one if exit is an SBO and zero if exit is IPO or sale to strategic buyer
Secondary	Secondary equals one if deal is SBO and zero otherwise
Total QE dummy	Total QE dummy equals one if Change in QE was above mean in year of the buyout and zero if it was below the mean

Appendix II Sample selection

The buyout sample in this study is drawn from Zephyr. I started this study with a total of 14,143 buyouts. However, for some deals, there were multiple entries; for example, per deal there are several deal-subtype tags. The result was 26,495 entries. As a consequence, I had to drop the double entries of various buyouts. In the first place I took out the buyouts of 2008 and 2009, i.e. 2,856 entries, because these buyouts are not used in this study. I wanted to retain one entry per deal, as well as I wanted to keep the most useful entries. I.e. entries which explain most about the type of deal.

Since this study focuses on exits and the type of exit, it was essential for me to create the most straightforward way to distinct between the different exits. More explicitly, to preserve the entries which could explain the best what a kind of exit it was. Therefore, I created a dummy variable called *secondary tag*. If it was about an SBO I used this dummy variable.

Based on this methodology the outcome was 1,557 SBO entries. This very number of 1,557 entries can by divided in the following way: First, 828 entries for SBO's defined if the deal-subtype was labeled as Secondary Buyout. Secondly 140 entries for SBO's if the deal-subtype was labeled as Tertiary Buyout, Quaternary Buyout or Quinary Buyout. These can be treated as an SBO as well because it reflects a transaction where a PE fund buys it from another PE investor. Thirdly, I also included the entries if the deal-subtype was an exit or partial-exit, and the deal was financed with PE as an SBO, which resulted in 514 entries. Last but not least, I manually added 75 other SBO deals, based on the search *SBO* at the deal comments. I only counted it as an SBO if it was clear from the comment that the deal was considered actual as an SBO.

Afterwards, I established an *exit tag variable*. This resulted in 3,049 entries, i.e. if the deal-subtype is an exit and not marked as an SBO. Subsequently, I also added if the variable deal-type contained the wording *Initial public offering;* consequently 121 observations were added. Thereafter an additional exit tag was found through the label *Public Offering* in the variable deal-financing. No extra IPO's were supplemented via the manual search IPO in the deal comments. Hence, 3,171 entries were labeled as an exit. Subsequently, I dropped the duplicates

per deal with a preference for keeping the SBO's and exits. So, in total 12,526 deals remained, consisting of 1,039 SBO's and 2,632 exits out of it.

From all remaining buyouts, the targets' BvDID were used to obtain financials from Orbis (Bureau van Dijk). It is possible to obtain financials of the last ten relative years from the last reported financial statements. Thus, if a company last reported financial statement was in 2016, it is possible to retrieve financials from 2006 till 2016. Via this method, the financials of 9,191 targets were obtained. Some companies report in both consolidated and unconsolidated statements labeled as U2 and C2 in Orbis. For those, I downloaded two datasets (one with U2 and one with C2 preference). Consolidated reporting is preferred; however, it is not known which has better financials coverage around the deal. That made a total of 12,077 observations.

I obtained the total assets, sales, and EBT, personally I found that EBT has a better coverage as EBIT or EBITDA for the sample. After reshaping the financials by Orbis into a panel dataset, 102,770 entries are obtained. Ten entries are dropped, because the BvDID was missing, so 102,760 entries remained.

Using the target's BvDID, I was able to merge the deal year from the Zephyr dataset into the Orbis file, resulting in 102,680 remaining observations. Consequently, it was possible to keep the financials around the buyout. I kept only the observations one-year before the buyout, and in the year of the buyout, therefore 12,577 entries remained. Thereafter, I dropped the observations if either the assets, sales, or EBT were missing, consequently 6,651 items were dropped. Subsequently, I dropped three observations because of sales of less than 10 million US $. No observations were dropped by reason of assets of less than 10 million US $

The next step was to look for those firms reporting both consolidated and unconsolidated, i.e. which has a better coverage at the time of the deal. I have chosen between consolidated and unconsolidated financials in which the firm reported one-year before the buyout. Others were dropped, so 4,927 entries remained. Afterward, I only kept the observations for firms with both observations in the year of buyout, and one year before buyout, as a result 3,950 observations remained.

Then I added the proxies for the debt markets into the Orbis file. These are the high yield market size and leveraged loan spread, as well as the hand-collected QE data from the BoE.

Similarly, I added the proxy for the equity market, collected by size of the IPO market. After merging this information and combining it with the deal data from Zephyr, only 3,308 observations were kept, due to strictness on maintaining the two years of observations per firm. In addition, I dropped 28 entries, for which the 10 Fama & French industry classification was missing.

The next step was to differentiate between different types of exits. There were 195 SBO's, 46 IPO's, 329 exits, and 41 partial exits left in the total dataset. Consequently, I manually assigned the exit and partial exits based on the deal comments- and rationale. I differentiated between four types of exits, i.e.

- SBO's: only if there was clearly stated that it was a secondary buyout, or that a PE fund buys it from another PE Fund.
- Secondary management buyouts: only if it was clearly stated that it was concerned a secondary management buyout
- Strategic buyer exits: only if it was clearly stated that there was a strategic rationale or that a firm in the same industry acquired the firm
- Other exits: if it none of the three previous ones

The SBO's and SMBO were perceived as SBO's and were added to the deal-subtype *Secondary Buyouts*: 55 deals, which were 110 entries since each deal contains two entries. Besides, I created a deal-subtype called *Strategic Buyer* exit, which contains 203 deals, so 406 entries. In addition, there were 225 entries labeled as other exit.

Last but not least, I checked if each entry of the deal contained the same deal-subtype, two observations were dropped. That brought me to the final sample containing 3,278 entries of 1,639 buyouts. All the non exits buyouts are treated as a general buyout, explicitly used for the Heckman Selection model.

In respect of some variables, I made several adjustments as well. Firstly, for logarithms are taken for the following variables: Assets, HY market size, Industry IPO volume. Second, I constructed the variables: average industry sales growth, EBT growth, EBT/ sales, QE growth. Third, the variables: leveraged loan spread, EBT growth, EBT/ sales, and average industry sales growth, are winsorized at a 1% level. Fourth, I normalized the EBT growth and EBT/

sales. Fifth, I constructed the deal multiples and the logarithm of these deal multiples. Last, I took the logarithm of the variable change in QE, buy taking the logarithm of (1+change in QE), so I did not lose any observations by taking the logarithm of a negative number.

Appendix III Robustness Check QE

The effect on the probability of SBO's 2010-2018 using Change in QE and Industry IPO Volume

The table shows the results from probit regressions estimating the effect on the probability of SBO's and the Heckman selection model. In the probit models (1) to (3) the SBO dummy equals one if the buyout is a secondary buyout and zero if the buyout is an IPO or a sale to a strategic buyer. Change in QE is the amount of open market operations in year of buyout. Log (Industry IPO) is the logarithm of UK's IPO volume in the year of buyout, based on F&F10 industry classification. Log (Assets) are the target assets in year of the buyout. EBT growth is the growth rate of EBT of the targeted firm between the year of the buyout and one year prior the buyout. Average industry sales growth rate is the average growth rate for firms within the same F&F 10 industry. For the Heckman selection model which is seen in (4) and (5), (4) predicts the first stage which is the probability of exiting, through either an SBO, IPO or strategic sale. (5) is stage two of the Heckman selection model and predicts the probability of an SBO. Log Assets and EBT/Sales in (4) are both measured one-year prior buyout. The coefficient of rho is the correction for the selection bias. A significant rho would indicate a selection bias. All regressions are reported in robust standard errors clustered by industry and denoted in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Probit			Heckman selection	
	(1)	(2)	(3)	(4)	(5)
	SBO dummy	SBO dummy	SBO dummy	Exit dummy	SBO dummy
Change in QE	-0.001	-0.001	0.005		0.004
	(0.001)	(0.001)	(0.005)		(0.005)
Log (Industry IPO)		0.015	0.038		0.035
		(0.046)	(0.048)		(0.041)
Change in QE * Log (Industry IPO)			-0.001		-0.001
			(0.001)		(0.001)
Log (Assets)	0.131***	0.131***	0.130***		0.117***
	(0.022)	(0.023)	(0.023)		(0.036)
Average industry sales growth	-0.032*	-0.024	-0.024		-0.021
	(0.018)	(0.026)	(0.026)		(0.026)
EBT growth	0.054	0.053	0.055		0.050
	(0.035)	(0.039)	(0.039)		(0.047)
Log (Assets 1-year prior buyout)				0.012	
				(0.018)	
EBT/Sales 1-year prior buyout				-0.114	
				(0.078)	
Rho				-0.523	
				(0.662)	
Constant	-3.233***	-3.372***	-3.538***	-0.832*	-2.648*
	(0.617)	(0.661)	(0.619)	(0.467)	(1.352)
Cluster by industry	Yes	Yes	Yes	Yes	Yes
	0.020	0.020	0.021		
Observations	402	402	402	1,341	1,341

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