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Initial Public Offerings on the UK when-issued market

Abstract

We examine the determinants of an IPO firm's decision to trade on a when-issued market and find that better quality firms are more likely to trade on this market. Our 'what-if' analysis shows that for companies that choose to have when-issued trading, the actual offer price is almost 26% higher than it would have been had these firms chosen not to trade on this market. We interpret this higher offer price as a 'rent' that investors pay to acquire shares of such companies. We also show that the informational accuracy of the UK when-issued market is better than that of continental European when-issued markets.

Key words: IPOs, when-issued market, grey market, rent, retail investors, London Stock Exchange

JEL Classification: G12, G32

1. Introduction

Benveniste and Spindt (1989) argue that IPO underwriters pay 'informational rents' to potential investors who provide them with truthful private information about the value of the IPO stock. These rents are paid in the form of allocations of underpriced shares. However, Aussenegg, Pichler and Stomper (2006) show that, in the presence of a when-issued market that takes place simultaneously with the bookbuilding process (the German when-issued market), underwriters do not pay such rents to investors. This is due to investors' private information being revealed to the underwriters through their trades in the when-issued market, as the prices within this market are publicly observable. In this paper, we show that in a when-issued market with a setting fundamentally different to that of Germany, rents *are* paid and interestingly, the direction of payment is contrary to that predicted by Benveniste and Spindt (1989). In the UK when-issued market, it is the investors who pay rents to the underwriters of issuing firms. These rents are in the form of higher offer prices that investors pay to acquire shares of companies that choose to trade on the when-issued market.

A when-issued market is a market in which trading in an IPO company's shares commences a few days prior to the security's official admission to the stock exchange.[1] While the Securities and Exchange Commission (SEC) effectively prohibits such a market for IPOs in the US, many European countries have an active when-issued market (Cornelli, Goldreich and Ljungqvist 2006). Surprisingly, despite the larger size of the 'Main Market' of the London Stock Exchange (LSE) relative to other European markets, there is no in-depth study that focuses on the when-issued trading on the LSE.[2] Though it is not mandatory, there

[1]The when-issued market is also referred to as the grey market or conditional trading. In what follows, we use these terms interchangeably.

[2]Most of the literature on IPO when-issued markets focuses on Germany. For example, Löffler et al. (2005) find that German grey market quotes are highly informative and good indicators of the first trading day's closing price. Aussenegg et al. (2006) find that when-issued trading in Germany reveals relevant information for the pricing of IPOs and that, once when-issued trading begins, bookbuilding is no longer a source of information for doing so. Dorn (2009) finds that retail buyers pay a hefty premium in the German when-issued market relative to the immediate aftermarket. For a sample of IPOs drawn from 12 European when-issued markets, Cornelli et

has been a substantial increase in the number of companies choosing to trade on the LSE's when-issued market. In the mid to late 1990s, less than 20% of the IPOs chose to trade on the LSE's when-issued market. However, since the early 2000s, almost 70% have opted to trade on this market.

For a sample of LSE IPOs from 1996 to June 2017, we first focus on a firm's decision to trade on the when-issued market. We investigate which types of firms are likely to choose to deal in such a market. Our results suggest that good quality firms are likely to do so. In particular, firms that are larger, less risky, have higher future growth opportunities and are underwritten by reputable underwriters are more likely to opt for trading on the when-issued market.

One of the most important aspects of the IPO process is the issuer's decision regarding the setting of an appropriate offer price. Using a 'what-if' analysis, we investigate whether or not the decision of an IPO firm to have a when-issued market is related to the pricing of its shares. We find that firms that choose to trade on the when-issued market offer their shares at a higher offer price. More specifically, for companies that trade on the when-issued market, the actual average offer price is about 26% higher than it would have been had these firms chosen not to have a when-issued market. This evidence is robust when IPOs that choose to trade on the when-issued market are matched with those that don't. We interpret this higher offer price as a 'rent' that investors pay to the issuing firm in order to acquire its shares. We argue that there are two potential reasons for investors' willingness to pay this rent. First, investors perceive when-issued trading firms to be better quality IPOs and are willing to pay a premium for these firms.[3] Second, when-issued trading has informational

al. (2006) find that high when-issued market prices are a very good predictor of the first trading day's price. However, most of the observations (75%) in their sample come from Germany. Less than 5% of their sample relates to the UK's when-issued market.

[3] This is consistent with our earlier results, which show that firms choosing to trade on the when-issued market are larger, carry lower risk, have higher future growth opportunities and are underwritten by reputable underwriters.

value for investors in that it offers them an opportunity to observe price discovery prior to the commencement of the unconditional/aftermarket trading.

Our analysis of the pricing of IPOs that do not go to the when-issued market shows that their offer prices would have been substantially higher (44.6%) than their actual offer prices had they decided to trade on the when-issued market.[4] This result further shows that in the UK setting, the decision to trade on the when-issued market results in a higher offer price. This is in contrast to the SEC's argument, according to which a when-issued market for IPOs is not permitted in the US because it would lead to lower offer prices.[5]

Apart from higher offer prices, there are other benefits of trading in the when-issued market. For example, firms that choose to do so have higher trading volumes than firms that do not. This result holds after controlling for company-specific factors and market conditions. Another benefit is that the prices in the when-issued market tend to be unbiased predictors of the closing price on the first day of unconditional trading.

The remainder of this paper is organised as follows: In Section 2 we discuss our research questions. In Section 3 we provide a detailed discussion of the UK's when-issued market and compare it to the when-issued markets of continental Europe. In Section 4 we provide details of our data and methodology while in Section 5 we present our results. Section 6 concludes.

2. Research questions

The focus of our paper is to seek answers to three important questions relating to the use of the when-issued market by firms conducting an IPO. First, what types of firms choose to trade in the when-issued market? Second, does the decision to do so have any impact on

[4]For some of the IPOs that do not use the when-issued market, it could be that they apply to trade on the market but their applications are turned down by the LSE. We discuss this in greater detail in Section 3. Our request for anonymised information on failed when-issued market applications was turned down by the UK regulator.
[5] Paragraph II.F of the Securities and Exchange Act Release No. 38067 (20 December 1996).

the setting of the offer price? Third, are there any benefits for firms that decide to trade on the when-issued market? We discuss these research questions in greater detail below.

Firms conducting an IPO on the LSE can choose whether or not to trade on the when-issued market. Our first research question relates to the types of firms which are likely to choose to trade in such a market. The LSE prescribes certain minimum requirements for IPO companies to be allowed to trade on the when-issued market. One of the requirements is for the security to be sufficiently liquid, taking into consideration the size of the issue. Another requirement is that there should be sufficient demand for the security during the period of when-issued dealing. While the LSE does not precisely define 'sufficient liquidity' or 'sufficient demand', it is reasonable to expect that large, better quality firms will opt for trading in a when-issued market.

Our second research question relates to the impact (if any) of the decision to trade on the when-issued market on the pricing of the IPO. When-issued trading in the UK has two important characteristics. First, the decision to have a when-issued market precedes the setting of the offer price. Second, when-issued trading provides benefits to investors in terms of price discovery before the start of the secondary trading and an earlier opportunity to enter or exit IPO investment. We are interested in analysing whether firms that plan when-issued trading extract a 'rent' from their new investors for providing these benefits to them. This rent could be in the form of a higher offer price. If this is indeed the case, we should observe higher offer prices for IPO companies that have when-issued markets than would have been observed had these companies not had conditional trading.

Our final research question relates to the benefits to the IPO firms of choosing to trade on the when-issued market. Of all the likely benefits, we focus on one: the aftermarket liquidity of shares. We seek to answer the following question: do firms with when-issued trading have higher market liquidity than those that do not? Controlling for the size of the

IPO firm, we compare the volumes on the first day of trading for firms with and without when-issued markets.

3. When-issued dealing on the LSE

The UK has an active when-issued IPO market. According to the LSE, the when-issued market allows investors the ability to trade a new issue ahead of its full listing. It also facilitates price formation ahead of unconditional admission to trading and allows investors the earliest opportunity to agree an entry or exit price of an IPO according to their investment requirements.

Under Rules 1530-1532 of the LSE, when-issued dealing is a 'period of dealing with deferred settlement' (London Stock Exchange, 2012, 2017). All transactions that take place during the when-issued period are conditional on the security being admitted to trading on the stock exchange. The settlement of these transactions will not take place until the listing of the security on the exchange has occurred. If the security is not listed then all the when-issued trades will be void.

The when-issued trading in the UK is an on-exchange activity conducted either under the LSE's electronic order book or off-book, bilaterally between the LSE's member firms. If when-issued transactions are executed off the LSE's order book then they have to be reported to the stock exchange. This allows investors to observe the when-issued prices on the LSE's website.

Companies have to satisfy a number of requirements as a prerequisite for admission to the when-issued market. For example, the requirements state that there must be a fair and orderly market for the securities; the newly issued securities must be sufficiently liquid, taking into account the size of the offer; the settlement must be in electronic form; and there must also be sufficient demand for the security during the when- issued period.

Figure 1 shows the timeline before, during and after the when-issued period on the LSE. The LSE requirements stipulate that a draft application form for the when-issued

dealing and a draft prospectus must be submitted at least ten days prior to the first day of the when-issued trading period. The form for the when-issued trading has to be finalised at least two business days before the trading starts on the when-issued market. The deadline date for subscription to the IPO shares is usually the day before the commencement of the when-issued trading. This is also the date the LSE expects confirmation that the prospectus has been approved by the UK Listing Authority (UKLA). This is the point the LSE informs market participants of the proposed timetable for the when-issued and unconditional trading. These events are shown in Stage 1 of the figure. In the second stage, the IPO firm announces the final offer price and share allocation just before the start (usually the morning of the first day) of trading on the when-issued market. The UK when-issued trading usually lasts for three days, but the LSE has the discretion to consider shorter or longer periods on a case-by-case basis (Stage 3). Once the when-issued trading ends, unconditional trading commences. This is shown in Stage 4 of the figure. The above timeline of when-issued dealing is best explained with the example of the Royal Mail, which carried out an IPO on the 15th of October 2013. The deadline for subscription for shares was the 8th of October. The offer price and allocation details were announced at 7:00am on the 11th of October. When-issued trading in Royal Mail shares began at 8:00am on the same day and carried on for an extra day (until the 14th of October). Unconditional dealing began on the 15th of October.

[FIGURE 1 HERE]

3.1. When-issued dealing in the UK and in other European markets

The UK's institutional setup for when-issued dealing is different from that in other European markets. We primarily focus on the key differences between the UK and German when-issued markets.[6]

[6]This is mainly due to three important reasons: first, Germany has the most active European grey market; second, almost all existing academic literature is focused on German conditional trading; third, the grey markets

Table 1 highlights the main regulatory differences between the UK (LSE) and German (Frankfurt Stock Exchange, FSE) when-issued markets. One major difference between the two when-issued markets is that the former has to follow the LSE's rules, whereas the latter is conducted over the counter, by independent brokers who quote bid-ask spreads.

In the UK, investors can subscribe for the IPO shares up to the last day and, in some cases, up to an hour before conditional trading starts. In contrast, in Germany, investors can subscribe for the IPO shares until the last day of the conditional trading (Aussenegg et al., 2006, Löffler et al., 2005). In addition, in the UK, the final offer price is determined just before the when-issued dealing commences, whereas in Germany it is set on the last day of when-issued dealing.

Another difference between the two markets is related to the actual allocation of the IPO shares. In the UK, investors are notified of their allocation just before the when-issued dealing starts (usually a few hours before the start of trading), whereas in Germany this takes place on the last day of the grey market (Aussenegg et al., 2006, Löffler et al., 2005). This difference between the two markets highlights that investors on the LSE know the number of shares they have been allocated before the start of when-issued trading. In contrast, investors in Germany conduct trades on the grey market in the expectation that they will be allocated some shares. In certain cases, German investors may find themselves as short sellers if they are allocated fewer shares than they have applied for or if no shares are allocated to them. Finally, the two markets differ in the length of the conditional trading period. When-issued trading in the UK usually lasts three days whereas in Germany it lasts five to seven days.

[TABLE 1 HERE]

in other European countries, such as France, Spain, Switzerland and Italy, are similar to that of Germany (Cornelli et al., 2006). In the US, a grey market for IPOs is prohibited (Regulation M, Rule 105).

In addition to the institutional differences between the UK and other European when-issued markets, the two also differ in other important aspects. For example, while the LSE decides on when-issued trading applications on a case-by-case basis, almost every IPO firm in Germany can be admitted to the grey market. Indeed, almost 94% of the German IPOs have a grey market (Aussenegg et al., 2006) whereas at an average, only 44% of the UK IPO firms do so (as shown in Table 2 later). Further, German IPOs can be withdrawn during the when-issued period (Cornelli et al., 2006) whereas, in our sample, we do not have a single withdrawal during the when-issued period.

To summarise, the institutional setup and the characteristics of the when-issued market in the UK are quite different to those of other European markets. Unlike the continental European when-issued markets which help IPO firms in setting their offer price and aid potential investors in deciding if they will apply for shares, the UK when-issued market carries none of these benefits. Why then, an increasing number of UK IPOs are opting to trade in such a market? The UK's when-issued market provides an interesting setup for studying a firm's decision to have a when-issued market and the impact this decision may have on the pricing of its IPO.

4. Data and methodology

We conduct our study on the Main Market of the LSE and the data include all non-financial IPOs that took place during the period from January 1996 to June 2017. We start our analysis from 1996 because, prior to this year, the percentage of IPOs with when-issued markets was very low (less than 5%). It is common practice for IPO studies (Boulton and Campbell, 2016 and Bajo, Chemmanur, Simonyan, and Tehranian, 2016) to exclude firms from the financial sector. Most of the financial sector firms report their assets and liabilities differently as compared to non-financial firms. The process of setting the offer price may also be different for some financial firms relative to non-financial firms. For example, UK investment trust IPOs tend to sell their shares at a fixed offer price of 100 pence per share. Due to these

reasons we have excluded all financial and investment and unit trusts (mutual fund) IPOs from our sample. Furthermore, we exclude IPOs listed on AIM for three reasons. First, regulations on AIM admissions are very different from that of the Main Market. Second, the number of AIM IPOs choosing to trade on the WI market has historically been quite low. Third, underwriting arrangements in the AIM market are quite different from that of the Main Market. For example, AIM IPOs have a nominated advisor (NOMAD) who can also act as an underwriter, whereas there is no such arrangement in the Main Market. We also exclude 78 IPOs that issued Global Depository Receipts, 4 IPOs for which listing documents were not available, 4 IPOs for which stock price data were unavailable and 30 firms that were categorised as IPOs, but were listed on other stock exchanges previously. Our final sample consists of 432 non-financial IPO firms of which 188 have when-issued trading and the remaining 244 do not.

Information on whether a company has a when-issued market is extracted from the IPO prospectus. The offer price, gross proceeds, market capitalisation, secondary shares sold in the IPO, total assets, date of incorporation, and number of underwriters in the syndicate are also collected from the prospectuses. The stock price data, such as closing, opening, bid and ask daily prices – including the when-issued market period, the IPO daily volume of trading and the levels of the FTSE All-Share Index – are extracted from Datastream.

4.1. When-issued trading and the offer price

An IPO firm's decision to have a when-issued market may not be random and it may also have an effect on the setting of the offer price. It is reasonable to assume that IPO firms may self-select their preferred choices such as trading on the when-issued market or to use a placing to list on the stock market.[7] Therefore, the decision to have conditional trading might

[7] Firms can choose either a 'placing' or a 'public offer' to list on the London Stock Exchange. In a placing, shares are usually not underwritten unlike a public offer and the shares are often offered to institutional and high net worth investors. For further details see Goergen, Khurshed and Mudambi (2006).

be an endogenous choice made by the IPO firm and its underwriter. This is consistent with Li and Prabhala (2007) and Hamilton and Nickelson (2003) who document that firms rarely make decisions that are random. To address the possible endogeneity problem, we use a sample selection model proposed by Dahl (2002). This model extends the classic Heckman (1979) model in two ways: first, it models various choices as opposed to a single choice in the selection equation. Second, the probabilities of these choices are transformed through a polynomial function.

The Dahl (2002) selection model proceeds as follows. Consider the following two equations:

$$R_1 = \mathbf{X}\beta_1 + \mu_1 \qquad (1)$$

$$P_k^* = Z\gamma_k + \eta_k \qquad \text{k=1,2,……m} \qquad (2)$$

Where equation (1) is a linear regression model and equation (2) is a probability (or choice) model. R_1 is the offer price and the variable X contains control variables, industry and year dummies. μ_1 is the disturbance term of the outcome equation and satisfies $E(\mu 1|X,Z)=0$ and $V(\mu 1|X,Z)=\sigma^2$. P^*_k is the probability of observing IPOs that have decided not to use the when-issued market or a placing contract. k is a categorical variable and describes m choices (m=1 for when-issued market, m=2 for placing and m=3 for other listing methods such as public offer). The variable Z contains control variables for the joint probability of trading on the when-issued market and to use a placing. η_k is the residual of the selection model, independently and identically distributed (i.i.d.). The offer price (R_1) is observed only when the IPO firm decides to trade on the when issued-market. This condition is expressed as

$$P_k^* > \underset{K \neq 1}{Max}\left(P_k^*\right) \qquad (3)$$

The conditional probability (P^*_k) is estimated through a multinomial logit using

$$P_j(\text{IPO listing} \mid \text{when - issued, placing, other listing method}) = \frac{\exp(Z\gamma_j)}{\sum_k \exp(Z\gamma_k)} \qquad (4)$$

where P_j is the probability of choosing when-issued market and method j for listing (i.e. placing), which are estimated through a multinomial logit. The correction term for the second stage is transformed probability from stage one using a polynomial approximation:

$$\lambda(P_j) = \lambda(M_j P_j^n) \qquad (5)$$

Where M_j is a dummy variable that equals one for choice j and zero otherwise, n is the degree of the polynomial function for P_j. $\lambda(P_j)$ is a sample correction term, which depends on the probability P_j and is equivalent to the inverse Mills ratio in the Heckman model. The correction function $\lambda()$ is assumed to have the same form for all listing choices. The offer price is estimated using a pooled cross-sectional regression and is given by

$$R_j = X\beta_j + \lambda(P_j) + \zeta_j \qquad j = 1 \qquad (6)$$

Where R_j is the offer price for method j (j=1 for when-issued market and j=2 for other listing choices). $\lambda(P_j)$ is the sample correction term and includes first- and second-order polynomial approximations of the probability of an IPO firm choosing a specific method. Equations 5 and 6 are estimated simultaneously.

The independent variables used in the first stage are mainly drawn from the literature and from the LSE's when-issued dealing requirements. One of these requirements is that there must be sufficient demand for the security within the when-issued market. As a result, we expect riskier companies not to have when-issued market as there may not be sufficient demand for their shares. We include three variables as proxies for the ex-ante uncertainty of the IPO: the money raised from selling existing shares in the IPO as a percentage of the total gross proceeds, the inverse of the offer price and the age of the firm.

In addition, we control for underwriter reputation because, according to the certification hypothesis (Shiller, 1989), investors decide whether to buy the shares of an IPO

based on the quality of the underwriter. As a result, the more reputable the underwriter is, the higher the demand will be for the IPO shares. The Carter and Manaster (1990) measure of underwriter reputation frequently used for US IPOs isn't suitable for the European market (Migliorati and Vismara 2014). We use two different measures of underwriter reputation that are similar in spirit to those suggested by Migliorati and Vismara (2014) and Goergen et al. (2006). The first measure is based on the gross proceeds and the second on the number of IPOs underwritten by the underwriter during the two years before the IPO.

Another of the LSE's when-issued dealing requirements states that the security should be sufficiently liquid, taking into account the size of the issue. We use the total assets of the company in the year before the IPO as a proxy for the size of the issue. Moreover, the when-issued dealing requirements also state that the company's underwriter has to submit draft and final application forms for when-issued dealing at least ten and two business days respectively before the commencement of when-issued trading. In order to capture the market return prior to the start of the when-issued dealing, we calculate the return on the FTSE All-Share Index for the two-month period that ends ten days prior to the first day of trading on the when-issued market. In addition, we calculate the volatility of the FTSE All-Share Index during the two-month period ending *two days* before the first day of trading on the when-issued market. Aussenegg et al. (2006) and Löffler et al. (2005) use similar measures.

We also control for new-economy companies by including a dummy variable that takes the value of 1 if the company belongs to the technology sector and zero otherwise. We have used the likelihood ratio test to examine a variable that has no impact on the choice of trading on when-issued market or placing, but has impact on the offer price. Based on the likelihood ratio test, we find that book to market has no impact on the probability of trading on the when-issued market and placing, but has impact on the offer price. Therefore, we have included book to market in the second stage and not in the first stage model.

Finally, we use a 'what-if' type of analysis to assess the benefits of a when-issued market. This is because we can only observe the offer price for a company with a when-issued market, and not what the price would have been had the same company chosen not to trade on the when-issued market (counterfactual).

4.2. Volume on the first day of trading

In order to examine whether the when-issued market has any effect on the volume on the first day of trading, controlling for size, we run the following OLS regression:

$$Y_i = X_i\beta + \varepsilon_i \qquad (7)$$

Where Y_i is the volume on the first day of trading and is calculated as the total number of shares traded on the first day of unconditional trading divided by outstanding shares, and X_i includes all the independent variables that may affect Y_i. Two of the independent variables are of particular importance. The first is the when-issued dummy that takes a value of one if the company had a when-issued market and zero otherwise. The second is the size of the company, which is captured by the value of the total assets for the year prior to the IPO.

5. Results

5.1. Descriptive statistics

Table 2 reports the distribution of the total number of IPOs and those that had and did not have a when-issued market during 1996-2017. Nearly half (44%) of the IPOs had conditional trading during the sample period. This is much lower than the 94% figure for the German IPOs that have a grey market (Aussenegg et al., 2006) and much higher than the 4.1% figure reported by Cornelli et al. (2006) for their UK sample.[8] The figures reported in Table 2 also show that the use of when-issued trading is more common in recent IPOs than it has been in the past. For example, between 1996 and 2000, no more than 15% of the IPOs

[8] Cornelli et al. (2006) report a much lower figure for two reasons: (1) Their UK sample includes both the Main Market and Alternative Investment Market (AIM) IPOs. Very few AIM IPOs have a when-issued market. (2) Their study covers a period (1997-2002) during which trading on the when-issued market was uncommon.

chose to trade in the when-issued market. Since 2000, the average proportion of IPOs choosing to trade in the when-issued market has increased steadily to about 80%.

[TABLE 2 HERE]

Table 3 reports information on the characteristics of the IPOs that trade on the when-issued market. The table also provides a comparison between IPOs with when-issued market and those without. Panel A shows that the average (median) number of trading days in the when-issued market is 3.57 (3.09). This is above the figure given in the LSE's requirements (London Stock Exchange, 2017), which stipulate that the when-issued dealing period should typically last for three business days. The LSE has the discretion to consider shorter or longer periods. The average return on the first day of when-issued trading is 13.26%.

The volume of trading (shares traded during the when-issued market as a percentage of the outstanding shares) on the first day of when-issued trading is much higher than the average volume of trading during the remaining days of when-issued market (20.65% vs. 3.01%). This suggests that the vast majority of trades take place on the first day of the when-issued market. This is in stark contrast to the low figure of 0.48% reported by Löffler et al. (2005) for the German grey market. One plausible explanation for this difference is that the German grey market is dominated by smaller and younger companies (Cornelli et al., 2006). These companies are generally less liquid than their larger and more established counterparts. It is the latter type of companies that are admitted to the UK's when-issued market.

The bid-ask spread during the when-issued period is very low (about 1.7%). This suggests that the liquidity of the UK IPO when-issued market is very high. This is in stark contrast to the when-issued markets of other European countries, where the bid-ask spread is at least five times higher than that in the UK. For instance, the bid-ask spreads within the grey markets of Germany, France, Spain and Austria are 10.2%, 8.3%, 10.3% and 13.8% respectively (Cornelli et al., 2006). Therefore, the suggestion that institutional investors do

not participate in the grey market because of the high bid-ask spread, may not hold in the context of the UK's when-issued market. Cornelli et al. (2006) report a bid-ask spread of 3% for the LSE. The difference (1.7% vs. 3%) may be entirely due to the fact that their sample also includes AIM IPOs, which are typically smaller firms.

Panel B of Table 3 compares the two groups of IPOs: those that had a when-issued market and those that did not. The figures show that firms with when-issued trading have very different characteristics to those that do not. More specifically, when-issued IPOs are younger (5.86 vs. 7.55 years), less risky (have a lower 'inverse of issue price' value) and of better quality as they sell their shares at higher prices (£3.75 vs. £1.71).[9]

When-issued IPOs are less underpriced, as the mean (median) return on the first day of unconditional trading is 15% (8.41%), whereas the equivalent for IPOs without conditional trading is 18.26% (11.78%). The degree of underpricing for the German grey market IPOs is more than triple than that for our sample, and ranges from 40% to 50% (Aussenegg et al., 2006, Cornelli et al., 2006, Dorn, 2009).

Firms in our when-issued-market sample are much larger (£1234.18 vs. £38.08 million total assets). When-issued-market IPOs are, on average, underwritten by a syndicate of 4.72 investment banks, whereas the IPOs that do not have a when-issued market are underwritten by a syndicate of 1.53 investment banks. This is again different from the German market in which both samples (grey market/no grey market) of IPOs are underwritten by approximately the same number of investment banks (Dorn, 2009). Firms that have conditional trading in the UK pay a higher commission fee to their underwriters (3.47% vs. 2.21%) and are underwritten by more reputable investment banks.

[9] According to Fang (2005), Klein and Leffler (1981), Shapiro (1983) and Allen (1984), higher prices are an indicator of superior quality. The reasoning behind this argument is that, when quality is ex ante unobserved, as is the case for the IPO companies, a higher price guarantees better quality because the present value of future income exceeds the short-term profit that could be made from selling low-quality securities at high prices.

The volume of trading on the first day of unconditional trading for the when-issued IPOs is much lower than that for the sample without a grey market (1.77% vs. 7.45%). This is not surprising given that most of the trading for the when-issued-market IPO sample takes place on the first day of conditional trading (see Panel A). For when-issued market IPOs, the trading volume on the first day of conditional trading (20.65%) is much higher than the trading volume of the first day of unconditional trading for IPOs that do not trade on the when-issued market (7.45%). The results also show that there are significant differences between the means (0.80% vs. 0.49%) and between the medians (0.49% vs. 0.48%) of the trading volumes for the first month of unconditional trading (excluding the first day for both samples), for the samples with and without when-issued markets.

The mean bid-ask spread during the first month of unconditional trading for the when-issued IPOs sample is almost two thirds of that for IPOs without when-issued trading (2.03% vs. 3.24%). This suggests that IPOs with conditional trading are more liquid than those without it. Money raised from the selling of existing shares (*Secondary %*) is similar for IPOs traded on the when-issued market and those that are not.

[TABLE 3 HERE]

5.2. The decision of whether to trade on the when-issued market or not

In order to examine which types of companies choose to trade on the when-issued market, we use a Dahl (2002) selection model. The results are reported in Table 4. Model 1 reports the probability of IPO firms choosing the when-issued market (i.e dependent variable = 1) and Model 2 shows the probability of IPO firms choosing a placing (i.e dependent variable = 2). We use multinomial logit in the selection equation because of a strong possibility that the decisions to trade on when-issued market and/or to use placing are jointly determined. The results in both Models 1&2 show that riskier IPOs, as measured by the

inverse of the issue price and IPOs with larger secondary IPO shares have a negative relationship with the probability of trading on when-issued market (Model 1) and the probability of using a placing (Model 2). These results suggest that the probability of an IPO firm choosing to have a when-issued market or a placing will be lower for riskier IPOs and those with large secondary shares offered at the IPO.

Furthermore, the probability of having a when-issued market or using a placing is also affected by the size of the company (total assets is used as a proxy for size) and the underwriter's reputation. The larger is the company, the higher is the probability of it having when-issued trading or using a placing. Interestingly, the higher the reputation of the underwriters, the more likely it is for the IPO to have a when-issued market. This evidence is robust using alternative proxies for underwriter reputation.

The age of the firm has no impact on the decision to trade on the when-issued market. Similarly, the volatility and the return on the market index (FTSE All-Share Index) prior to the IPO have no influence on a company's decision to trade on the when-issued market or use a placing. Further, the sector of the IPO firm (high-tech vs. non-high-tech) has no impact on these choices.

To summarize, companies that are large, have lower risk and in which insiders sell a lower proportion of their shares in the IPO, are more likely to trade on the when-issued market. IPOs underwritten by reputable underwriters are also more likely to have a when-issued market.

TABLE 4 HERE

5.3. Does the decision to have a when-issued market affect the IPO offer price?

The results shown in Table 4 above are used in the first stage (reduced form) to estimate the first and second order polynomial error correction term. In the second-stage regression, the natural logarithm of one plus the offer price is regressed on the correction terms and the independent variables separately for the two IPO sub-samples: those that had a

when-issued market and those that did not. In Table 5, we report the second-stage regressions results.

The results reported in Table 5 show that IPOs that choose to trade in the when-issued market, and those that do not, are subject to a selection bias. This is reflected in the statistically significant correction terms $\lambda(P_1)$ and $\lambda(P_2)$ for the sub-sample that traded and that did not trade on the when-issued market. However, the evidence of sample selection is stronger for IPOs that did not trade on when-issued market. Further, we find that companies that are large and have low book-to-market ratios (higher growth opportunities) are likely to choose higher offer prices. Younger firms and firms that are underwritten by high reputation underwriters also choose higher offer prices.

TABLE 5 HERE

The results reported in Tables 4 and 5 could be driven by the idiosyncrasies of firms going public in the 1996-2000 period. This is because the distribution of our sample IPOs without a WI market is heavily skewed to the dot com bubble and the bubble run-up period (194 out of 229 IPOs did not trade on the WI market during this period). However, IPOs with a WI market are skewed to the post-2001 period (151 out of 197 IPOs traded on the WI market during this period). We address this issue by partitioning our sample and running our regressions using the post-2001 IPOs sample only. Overall, our results remain qualitatively unchanged.[10]

We use the coefficients in Table 5 to estimate what the offer price would have been had the alternative choice (to have a when-issued market or not) been made. We then compare these forecasts with the actual offer prices. The results are reported in Table 6. For

[10] We are grateful to the referee for suggesting this test. Results are not reported in the paper, but are available from the authors on request.

the IPOs that trade in the when-issued market, the mean actual offer price is £3.75 but would have been 26% lower (£2.765) if the company had decided not to do so. This suggests that the decision to trade in the when-issued market does affect the setting of the offer price. In other words, IPO firms that choose to trade in the when-issued market tend to extract a 'rent' from their investors through higher issue prices.

For the IPOs that did not trade on the when-issued market, the average offer price was £1.71 but would have been £2.473 (44.6% higher) if they had traded on it. This finding sharply contrasts with the US SEC's argument that a grey market may result in lower offer prices. However, this comparison should be interpreted with caution given the difference in institutional settings between the US and UK markets.

TABLE 6 HERE

5.4. Volume on the first day of trading

The results reported in Table 3 show that the volume on the first day of trading for the sample of IPOs that chose to trade in the when-issued market was almost three times that of the sub-sample that did not trade on the when-issued market. In addition, the figures show a significant difference between the size (using total assets) of the firms in the two sub-samples (the when-issued sample firms being far larger than the other). Therefore, one may argue that the difference in the volume of trading could be due to the difference in the average size of the firms in the two samples of IPOs, and consequently that the when-issued market does not have any effect on volume. In order to address this, we run an OLS regression in which the dependent variable is the trading volume (expressed as a percentage of the outstanding shares) on the first day of trading. We control for a number of variables, including the size of the firm (total assets) and a dummy variable taking a value of one for IPOs that traded on the when-issued market and zero otherwise.

The results reported in Table 7 show that the when-issued dummy variable is statistically significant at the 5% level, after controlling for company-specific factors (secondary shares offered in the IPO, the inverse of the offer price, age, size, growth prospects and industry), underwriter reputation and market conditions. The volume on the first day of trading is approximately 10% higher for companies with a when-issued market than for those without. This suggests that the large difference between the trading volumes of the two sub-samples cannot be fully explained just by the difference in the IPO firms' characteristics, market conditions or the underwriter's reputation. Indeed, the when-issued market plays an important role in enhancing the first day's trading volume.

TABLE 7 HERE

5.5. Informational accuracy of the when-issued market

In our final piece of analysis we test the informational accuracy of the UK when-issued market prices following the approach used by Löffler et al. (2005). We compute pricing errors to examine whether conditional trading prices are unbiased predictors of the closing prices on the first day of unconditional trading. Table 8 reports the pricing errors for the whole sample of IPOs with a when-issued market (Panel A), an over/fairly priced sub-sample (Panel B) and an underpriced sub-sample (Panel C). The figures in Panel A show that the mean pricing errors during the when-issued market are much lower than the offer price error. For instance, the mean pricing error on the first day of the when-issued period is just under one percent (0.977%), whereas the mean offer price error is much higher (11.33%) and the difference in means is statistically significant at the 1% level. In addition, the mean pricing errors within the when-issued period fall significantly from the first to the last day of trading (0.977% vs. 0.407%). The pricing error on the last day of the conditional trading period is only 0.407%. This implies that the price on the last day of the when-issued period is

almost equal to that on the first day of unconditional trading. The decline in the pricing error during the when-issued market period demonstrates that pricing accuracy improves as we approach the first day of the unconditional period. This is also true for the overpriced (Panel B) and underpriced (Panel C) IPOs. This improvement in pricing accuracy may be due to two reasons: First, divergence of opinion about the true value of the IPO firms may narrow during the when-issued market period and this should lead to a price convergence. Second, as argued by Löffler et al. (2005), any private information that institutional investors might have would gradually be incorporated into the when-issued prices.

The above results indicate that the when-issued prices are significantly more informative than the IPO offer prices and are good proxies for the closing prices on the first day of unconditional trading. The when-issued errors, offer-price error and standard deviations of the errors for the UK when-issued-market IPOs are much lower than those reported by Löffler et al. (2005) for the German grey-market IPOs. Our findings imply that the informational accuracy of the UK when-issued market is better than that of Germany. One potential explanation for this is that German investors can only observe bid and ask quotes and not the actual when-issued transaction prices as is the case in the UK. This is due to the fact that German offer prices are set on the last day of the grey market whereas in the UK they are finalised just before the start of trading in the when-issued market. This may also explain the fact that investors who buy German IPO shares during the grey-market period and sell them on the first day of unconditional trading would, on average, incur losses as the German grey-market quotes are significantly higher than the first-day unconditional market prices (Löffler et al., 2005, Dorn, 2009). However, this is not the case for the UK when-issued IPOs, whose when-issued prices are, on average, not significantly different from the first-day unconditional market prices.

[TABLE 8 HERE]

As a further test of the accuracy of the when-issued prices, we regress the market prices on the first day of unconditional trading on the prices on the first day of the when-issued market. The results are reported in Table 9 and show that when-issued prices are better proxies for the closing prices on the first day of unconditional trading than the offer prices (Panel A). This evidence is consistent even after splitting the sample into over/fairly priced (Panel B) or underpriced (Panel C) observations. We also test whether the when-issued prices and the offer prices are unbiased estimators of the closing market prices on the first day of unconditional trading (the 'true price') using the Mincer-Zarnowitz test for unbiasedness. We find when-issued prices to be unbiased estimators of the 'true price'. This is in contrast to Löffler et al.'s (2005) results, according to which the first-day price and the midpoint range of the prices across the German grey-market trading period are not unbiased predictors of the closing price on the first day of unconditional trading.

[TABLE 9 HERE]

Overall, the results reported in Tables 8 and 9 suggest that the informational asymmetries that may exist for UK IPO firms during the subscription period can be lowered significantly by opting to trade on the when-issued market. Therefore, any informational disadvantage that uninformed (usually retail) investors may have is substantially reduced through the when-issued market prices. This is consistent with Löffler et al.'s (2005) suggestion that the when-issued market can alleviate the winner's curse problem.

Finally we investigate whether a higher offer price is an outcome of a firm's decision to trade on the grey market or merely a reflection of the firm's characteristics at the time of listing. We use propensity score matching, to match each IPO firm that chooses to trade in grey market with non-grey market IPOs by age, size and secondary proceeds at the time of

listing. Results are reported in Table 10. It is evident from Panel A of the table that grey market IPOs are similar to their matched non-grey market counterparts in terms of age, size and secondary proceeds. Interestingly, the mean (£3.788 vs. £ 2.53) and median (£2.648 vs. 2.137) offer price of the grey market IPOs is higher than those IPOs choosing not to trade on this market (Panel B). This suggests that a higher offer price is driven by the grey market and not merely by the characteristics of the IPO firms. Hence, a decision to trade on the grey market adds value to the offer price of the IPO firms regardless of the firm characteristics at the time of listing

[TABLE 10 HERE]

6. Conclusion

We examine why some UK IPO firms choose to trade on the when-issued market. We focus on (i) the types of IPO firms that are likely to trade on the when-issued market, (ii) whether or not the decision of an IPO firm to have a when-issued market affects the setting of its offer price, and (iii) the benefits of trading on the when-issued market. We find that firms that are larger, less risky, have higher future growth opportunities, are underwritten by reputable underwriters and for which insiders sell a smaller proportion of their shares in the offering are more likely to trade on the when-issued market. The offer price for firms that choose to trade on the when-issued market is on average 26% higher than it would have been had these companies chosen not to trade on it. This suggests that the decision to trade on the when-issued market is related to the setting of the offer price for the issue. The evidence is robust using propensity score matching where when-issued IPOs are matched with their non-grey market counterparts. We interpret this higher offer price as a 'rent' that investors pay to acquire shares of better-quality firms that usually trade on the when-issued market.

Additional benefits of choosing to trade on the UK when-issued market include higher trading volumes and better price accuracy. For companies that trade in the when-issued market, the volume of trading is approximately 10% higher than for companies that do not. The trading prices in the UK when-issued market appear to be more informative for investors than those in continental European grey markets such as Germany's.

Overall, our results suggest that there are tangible benefits of choosing to trade on the UK when-issued market. These benefits accrue to both the issuing firms and their potential investors. More and more IPO firms seem to be recognising these benefits and choosing to trade on this market. IPO investors benefit from trading in such market through acquisition of shares in a better quality firms. All in all, LSE's objectives of providing a when-issued market in the UK are by and large being achieved.

References:

Allen, F. (1984) Reputation and product quality, *Rand Journal of Economics* **15**, 311-327.

Aussenegg, W., Pichler, P. and Stomper, A. (2006) IPO pricing with bookbuilding and a when-issued market, *Journal of Financial and Quantitative Analysis* **41**, 829-862.

Bajo, E., Chemmanur, T. J., Simonyan, K. and Tehranian, H. (2016) Underwriter networks, investor attention, and initial public offerings, *Journal of Financial Economics* **122,** 376-408.

Benveniste, L. M. and Spindt, P. A. (1989) How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics* **24**, 343-361.

Boulton, T. J. and Campbell, T. C. (2016) Managerial confidence and initial public offerings, *Journal of Corporate Finance* **37**, 375-392

Cornelli, F., Goldreich, D. and Ljungqvist, A. (2006) Investor sentiment and pre-IPO markets, *Journal of Finance* **61**, 1187-1216.

Dahl, G. (2002) Mobility and the return to education: Testing a Roy model with multiple markets, *Econometrica*, **70(6)**, 2367-2420.

Dorn, D. (2009) Does sentiment drive the retail demand for IPOs? *Journal of Financial and Quantitative Analysis* **44**, 85-108.

Fang, L. H. (2005) Investment bank reputation and the price and quality of underwriting services, *Journal of Finance* **60**, 2729-2761.

Goergen, M., Khurshed, A. and Mudambi, R. (2006) The strategy of going public: How UK firms choose their listing contracts, *Journal of Business Finance and Accounting* **33**, 79-101.

Hamilton, B. H. and Nickelson, J. A. (2003) Correcting for endogeneity in strategic management research, *Strategic Organisation* **1**, 51-78.

Heckman, J. J. (1979) Sample selection bias as a specification error, *Econometrica* **47**, 153-161.

Klein, B. and Leffler, K. B. (1981) The role of market forces in assuring contractual performance, *Journal of Political Economy* **89**, 615-641.

Li, K. and Prabhala, N. R. (2007) Self-selection models in corporate finance, in: B. Espen Eckbo (ed.), *Handbook of Corporate Finance: Empirical Corporate Finance*, Vol. 1. North-Holland, Amsterdam, pp. 47-62.

Löffler, G., Panther, P. F. and Theissen, E. (2005) Who knows what when? The information content of pre-IPO market prices, *Journal of Financial Intermediation* **14**, 466-484.

London Stock Exchange (2012) Rules of the London Stock Exchange.

London Stock Exchange (2017) When-issued dealing guidance.

Migliorati, K. and Vismara, S. (2014) Ranking Underwriters of European IPOs, *European Financial Management* **20**, 891-925.

Shapiro, C. (1983) Premiums for high quality products as returns to reputations, *Quarterly Journal of Economics* **98**, 659-679.

Shiller R. J. (1989) Initial public offerings: Investor behavior and underpricing, NBER Working Paper 2806.

Figure 1: Timeline of when-issued trading in the UK

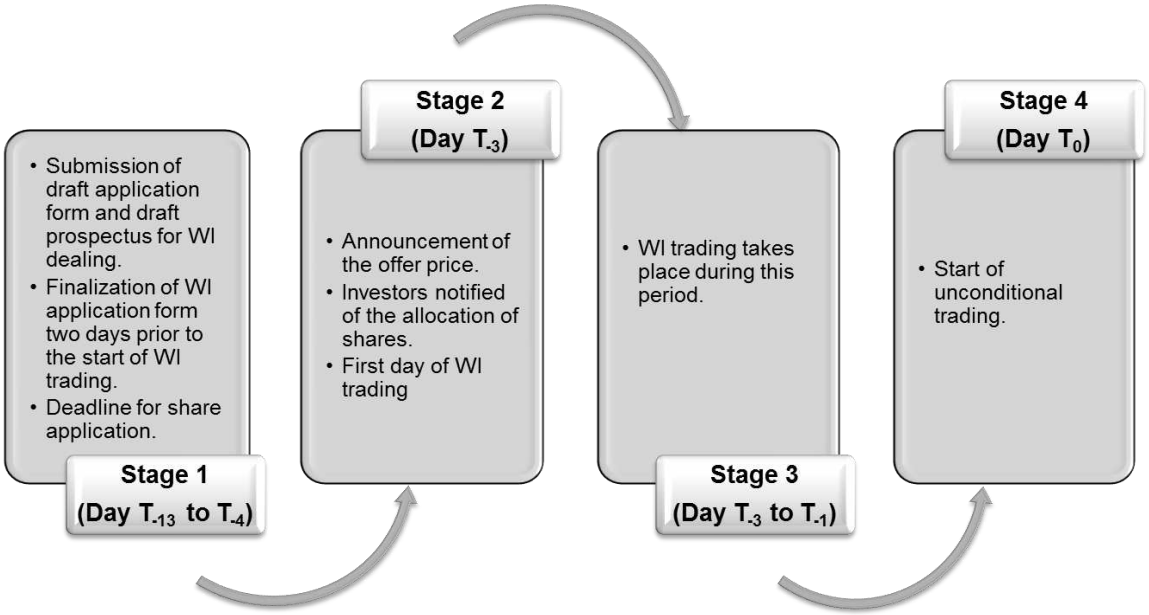

Table 1: Regulatory differences in the when-issued market trading in the UK (LSE) and Germany (FSE)

	LSE	FSE
Conditional trading takes place over-the-counter	No	Yes
End of subscription period	Usually the last day before when-issued trading commences	Usually the last day of the when-issued market
Setting of the offer price	Before when-issued trading commences	Last day of the when-issued market
Allocation of shares	Before when-issued trading commences	Last day of the when-issued market
Commencement of when-issued dealing	After the allocation of shares is complete and the offer price has been announced	Usually when the price range is announced
Number of days conditional dealing lasts	Approximately 3 days	Approximately 5 to 7 days

Table 2: IPOs with and without when-issued (WI) markets

For the period 1996-2017(June), this table shows the split between IPOs that had a when-issued market and those that did not.

Period	IPOs with a WI market	IPOs without a WI market	Total	% of IPOs with a WI market
1996 – 2000	35	194	229	15.28
2001– 2005	34	15	49	71.40
2006 – 2010	48	19	67	71.60
2011 – 2017 (June)	71	16	87	81.60
Total	188	244	432	43.51

Table 3: Comparison between IPOs trading on the when-issued (WI) market and those that do not

Panel A reports information for the IPOs that trade on the when-issued (WI) market while Panel B reports information for both groups of firms and for the whole sample. WI stands for when-issued. *WI days* is the number of days for which the WI period lasts. *Ret (1st day WI)* is the return on the first day of the when-issued market and is calculated as (closing price on the 1st day of the WI market – issue price)/issue price). *Vol (1st day WI)* is the volume on the first day of the WI market. *Av. Volume* is the average volume in the WI market, excluding that on the first day of the WI market. *WI bid-ask spd 1* is the percentage bid-ask spread during the WI period and is calculated using the formula (ask price – bid price)/ask price. *WI bid-ask spd 2* is the relative bid-ask spread during the WI period. *Age* is the number of years from incorporation to flotation date. *Inverse of Price* is the inverse of the offer price and is calculated as (1/offer price). *Price (£)* is the issue price in £. *Ret (1st uncond.)* is the return on the first day of unconditional trading and is calculated as (closing price on the 1st day of unconditional trading – issue price)/issue price. *TA(million £)* is the total assets for the year prior to the IPO, expressed in million £. *Size of Syndicate* is the number of banks in the syndicate that underwrites the offer. *Commission (% GP)* is the money paid to the syndicate for selling the IPO shares, expressed as a percentage of the GP. *Reputation 1* and *2* refer to the reputation of the underwriter based on the number of IPOs it advised and the gross proceeds it raised during the two years before the IPO took place, expressed as a percentage of the total number of IPOs advised on and gross proceeds raised in the entire market during these two years. *Volume* is calculated as volume of number of shares traded/outstanding shares. Av.*Vol (20 days)* is the average volume during the 20 days of unconditional trading, excluding that on the first day of unconditional trading. *Average bid-ask spread 1* and *2* refer to the percentage and relative bid-ask spreads respectively during the first month, excluding the first day, of unconditional trading. *Secondary* is the percentage of gross proceeds raised from the selling of existing shares in the IPO and is calculated as gross proceeds from existing shares/total gross proceeds. *Ret FTSE* refers to the return on the FTSE All-Share Index during the two-month period ending ten days before the first day of trading. *Vol FTSE* is the volatility of the FTSE All-Share Index over the two-month period ending two days before the first day of trading. *N* is the number of IPOs. ***, ** and * indicate statistical significance at 1%, 5% and 10% significance levels respectively.

	IPOs with WI Market (N = 188)		IPOs with no WI Market (N = 244)		All IPOs (N = 432)		Difference in Means	Difference in Medians
	Mean	Median	Mean	Median	Mean	Median	p-value	p-value
Panel A								
WI Days	3.57	3.09						
Ret (1st day WI, %)	13.26	6.58						
Vol (1st day WI, %)	20.65	11.42						
Av. Volume (%)	3.01	1.81						
WI bid-ask spd 1 (%)	1.77	1.08						
WI bid-ask spd 2 (%)	1.74	1.12						
Panel B								
Age (years)	5.86	2.21	7.55	3.36	6.77	2.58	0.08*	0.06*
Inverse of Price	0.45	0.46	0.94	0.73	0.80	0.66	0.03**	0.00***
Price (£)	3.75	2.62	1.71	1.48	2.39	1.90	0.00***	0.00***
Ret (1st uncond %)	15.00	8.41	18.26	11.78	16.82	9.50	0.19	0.00***
TA (million £)	1234.18	266.06	38.08	14.45	390.71	27.50	0.00***	0.00***
Size of Syndicate	4.72	4.10	1.53	1.04	2.45	2.17	0.00***	0.00***
Com'sion (% GP)	3.47	3.21	2.21	1.82	2.55	2.44	0.00***	0.00***

Table 3 continues

Reputation 1 (%)	5.64	4.48	2.54	2.35	3.34	2.68	0.00***	0.00***
Reputation 2 (%)	9.01	4.75	3.82	2.02	4.54	0.87	0.00***	0.00***
Volume (%)	1.77	1.02	7.45	6.11	5.64	2.66	0.02**	0.03**
Av. Vol. (20 days, %)	0.80	0.49	0.49	0.48	0.58	0.50	0.00***	0.00***
bid-ask spd 1 (%)	2.03	1.52	3.24	2.70	2.91	2.42	0.00***	0.00***
bid-ask spd 2 (%)	2.04	1.53	3.60	2.61	3.26	2.44	0.03**	0.00***
Secondary (%)	31.72	21.08	37.11	34.44	36.36	33.24	0.23	0.14
Ret FTSE (%)	1.24	1.45	2.30	2.34	1.92	1.92	0.03**	0.04**
Vol FTSE (%)	0.82	0.74	0.80	0.73	0.81	0.74	0.35	0.20

Table 4: First stage multinomial regression.

The dependent variable takes a value of one if the IPO traded in when-issued market, a value of 2 if the IPO is placing and zero otherwise. *Dummy_(Technology)* is a dummy variable that takes a value of one if the IPO is from a technology company and zero otherwise. All other variables are as defined in Table 3. N is the number of observations. Year dummies are included in the regressions but are not reported. We use robust standard errors in our analysis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% significance levels respectively.

	Model 1 (outcome=1)		Model 2 (outcome=2)	
Variables	coeff.	p-value	coeff.	p-value
Intercept	-4.255***	0.000	-4.835***	0.000
Inv_Price	-0.030*	0.096	-0.027*	0.082
TA	0.493**	0.011	0.209**	0.022
Secondary	-0.090*	0.058	-0.562*	0.094
Underwriter_Rep. (GP)	0.057*	0.053	0.023*	0.063
Age	0.175	0.234	0.403	0.538
Ret_(FTSE All-Share Index)	-0.033	0.656	-0.009	0.412
Vol_(FTSE All-Share Index)	0.276	0.772	0.573	0.785
Dummy_(Technology)	0.203	0.665	0.743	0.177
Yearly_Dummies	Yes		Yes	
Pseudo R-square (%)	28%			
N	***432***			

Table 5: Second-stage regression estimates of the offer price.

The dependent variable is the natural logarithm of (1+ offer price). *Book_to_Market* is the book value divided by the market value of equity. $\lambda(P_1)$ and $\lambda(P_2)$ are the first and second order polynomial approximations using the Dahl (2002) method estimated from first stage multinomial regression. *Book_to_Market* is the book value divided by the market value of equity. All other variables are as defined in Table 3. N is the number of observations. Year dummies are included in the regressions but are not reported. We use robust standard errors in our analysis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% significance levels respectively.

	IPOs with when-issued markets		IPOs without when-issued markets	
	coeff.	p-value	coeff.	p-value
Intercept	1.638***	0.001	1.275***	0.000
TA	0.649***	0.000	0.016***	0.099
Book_to_Market	-0.167***	0.001	-0.152***	0.000
Age	-0.208***	0.003	-0.140***	0.000
Dummy_(Technology)	0.552**	0.021	0.027	0.614
Vol_(FTSE All-Share Index)	0.338	0.129	-0.266***	0.000
Underwriter_Rep. (GP)	0.059***	0.004	0.005***	0.000
Secondary	0.284	0.181	0.312***	0.000
$\lambda(P_1)$	-0.380***	0.005	-0.107***	0.000
$\lambda(P_2)$	-0.012	0.989	0.243***	0.000
Yearly_Dummies	Yes		Yes	
R-square (%)	17.5%		13%	
N	***188***		***244***	

Table 6: Comparison between the actual and estimated offer prices

The table compares the average actual offer price (£) with the estimated price had the company chosen the other alternative (to have or not have a when-issued market). ***, ** and * indicate statistical significance at the 1%, 5% and 10% significance levels respectively.

	Average offer price for the 188 IPOs that had a when-issued market			Average offer price for the 244 IPOs that did not have a when-issued market		
	Actual offer price	Estimated offer price if the company had not had a when-issued market	Difference in Means/Medians (p-value)	Actual offer price	Estimated offer price if the company had had a when-issued market	Difference in Means/Medians (p-value)
Mean	3.75	2.765	0.021**	1.710	2.473	0.011**
Median	2.62	2.122	0.041**	1.48	1.976	0.016**

Table 7: Impact of when-issued market on trading volume

This table reports the results of an OLS regression in which the dependent variable is the volume on the first day of trading and is calculated as (volume on the first day of trading/outstanding shares). All variables are as defined as in Table 3. N is the number of observations. Year dummies are included in the regressions but are not reported. We use robust standard errors in our analysis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% significance levels respectively.

	Dependent Variable: Volume	
	coeff.	p-value
Intercept	0.131**	0.011
Dummy_(WI)	0.097**	0.010
Secondary	0.044	0.169
Inv_Price	0.010***	0.001
Age	-0.023**	0.038
TA	0.002*	0.058
Book_to_Market	-0.011***	0.002
Dummy_(Technology)	0.017	0.609
Underwriter_Rep. (GP)	0.003**	0.023
Return_(FTSE All-Share Index)	0.002	0.540
Volatility_(FTSE All-Share Index)	-0.056	0.227
Yearly_Dummies	Yes	
R-square (%)	17.1%	
N	***432***	

Table 8: Accuracy of the when-issued market prices versus the offer price

This table reports the pricing errors in the when-issued market prices and the offer price relative to the closing price on the first day of unconditional trading. WI stands for when-issued. The errors are calculated based on the following formulas: Error from *first day in the WI* = (closing price on first day of unconditional trading – first-day closing price in the WI)/first-day closing price in the WI. Error from *midpoint day in the WI* = (closing price on the first day of unconditional trading – midpoint-day closing price in the WI)/midpoint-day closing price in the WI. Error from *last day in the WI* = (closing price on the first day of unconditional trading – last-day closing price in the WI)/last-day closing price in the WI. Error from *offer price* = (closing price on the first day of unconditional trading – offer price)/offer price. The difference in means looks at whether each of the mean when-issued price errors is significantly different from the offer price error. All means and standard deviations (Sd) are in percentages. Panel A includes all the IPOs that had when-issued dealing. Panel B includes only those IPOs that had overpricing or a zero return on the first day of unconditional trading. Panel C includes only those IPOs that had underpricing on the first day of unconditional trading. N is the number of IPOs. *, ** and *** indicate statistical significance at 10%, 5% and 1% respectively.

	When-Issued Price Errors			Offer Price Error			Difference in Means
	Mean (%)	p-value	Sd (%)	Mean (%)	p-value	Sd (%)	p-value
Panel A: All IPOs							
First day in the WI	0.977	0.140	7.568				0.00***
Midpoint day in the WI	0.596	0.313	6.153				0.00***
Last day in the WI	0.407	0.307	3.950				0.00***
Offer price				11.33***	0.00	22	
N				188			
Panel B: Overpriced and zero-return IPOs							
First day in the WI	-2.979**	0.022	7.571				0.101
Midpoint day in the WI	-0.874	0.202	4.521				0***
Last day in the WI	-0.950	0.165	3.349				0***
Offer price				-3.39***	0	4.98	
N				57			
Panel C: Underpriced IPOs							
First day in the WI	2.399**	0.000	6.439				0***
Midpoint day in the WI	1.142*	0.094	6.500				0***
Last day in the WI	0.418	0.200	2.755				0***
Offer price				15.25***	0	23.25	
N				131			

Table 9: When-issued market prices as unbiased estimates of the closing price on the first day of unconditional trading

This table reports the results of the Mincer-Zarnowitz test for unbiasedness. We run the following regression: $PCP = a + \beta PWIi + \varepsilon i$. *PCP* is the true price and here is proxied by the closing price on the first day of unconditional trading. *PWIi* refers to each of the when-issued market prices or the offer price. Unbiasedness would lead to $a = 0$ and $\beta = 1$. We use the Wald test for the joint null hypothesis Ho: $a = 0$ and $\beta = 1$ and the p-values are reported in the last column. The p-values for the individual coefficients are reported in parentheses. We make use of robust standard errors. WI stands for when-issued. Panel A includes all the IPOs that had when-issued dealing. Panel B includes only those IPOs that had overpricing or a zero return on the first day of unconditional trading. Panel C includes only those IPOs that had underpricing on the first day of unconditional trading. N is the number of IPOs. ***, ** and * indicate statistical significance at the 1%, 5% and 10% significance levels respectively.

	constant	coeff.	R square	p-value for Ho: constant=0; coeff.=1
Panel A: All IPOs				
First-day price in WI	0.714	1.081***	0.991	0.779
	(0.775)	(0.000)		
Midpoint-day price in WI	0.891	0.899***	0.986	0.853
	(0.697)	(0.000)		
Last-day price in WI	-4.466	1.022***	0.997	0.469
	(0.441)	(0.000)		
Offer price	0.384	1.059***	0.988	0.051**
	(0.772)	(0.000)		
N			188	
Panel B: Overpriced and zero-return IPOs				
First-day price in WI	0.138	1.065***	0.995	0.449
	(0.889)	(0.000)		
Midpoint-day price in WI	0.599	1.029***	0.982	0.585
	(0.661)	(0.000)		
Last-day price in WI	3.025	0.883***	0.985	0.620
	(0.148)	(0.000)		
Offer price	1.301	1.002***	0.985	0.052*
	(0.402)	(0.000)		
N			57	
Panel C: Underpriced IPOs				
First-day price in WI	0.221	1.027***	0.996	0.442
	(0.441)	(0.000)		
Midpoint-day price in WI	0.320	0.898***	0.981	0.230
	(0.355)	(0.000)		
Last-day price in WI	-0.078	1.001***	0.997	0.428
	(0.884)	(0.000)		
Offer price	0.179	0.898***	0.998	0.062*
	(0.492)	(0.000)		
N			131	

Table 10: Propensity score matching

This table shows the results of propensity score matching. Each IPO firm that chooses to trade on the grey market is matched with non-grey market IPOs by age, size and secondary shares offered at the time of IPO. Panel A shows grey market IPOs' characteristics and matched sample, while Panel B shows the offer price for grey market IPOs and that of matched non-grey market IPOs. *Age* is the number of years from incorporation to flotation. *Size* is the total assets of the firm the year prior to the IPO. *Secondary* is the percentage of gross proceeds raised from the selling of existing shares in the IPO and is calculated as gross proceeds from existing shares/total gross proceeds. *Offer price* is the offer price at the time of listing. ***, ** and * indicate statistical significance at the 1%, 5% and 10% significance levels respectively.

Univariate analysis	**Grey Market**		**Matched sample**	
Panel A	*Mean*	*Median*	*Mean*	*Median*
Age	5.606	3.172	4.821	3.063
Size (m)	1256	245	1147	257
Secondary proceeds (%)	22.618	16.661	22.608	17.669
N	91		84	
Panel B				
Offer price	3.788	2.648	2.530**	2.137**
No of obs.	91		84	