# An empirical investigation of Yankee stock offerings

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**Abstract**

This paper examines the operating and investment performance of 100 foreign firms that conduct their initial public offerings (IPOs) in the United States (Yankee stock offerings). The U.S. IPOs are their first public equity issue in any market, including the home market. We find significant improvement in the operating performance subsequent to these U.S. IPO events. Compared to various benchmarks, unlike the significant underperformance of IPOs documented in many countries, these firms show no significant abnormal long-run stock market performance after one, three, or five years of seasoning. The findings are consistent with signaling and selective entry hypotheses.

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## 1. Introduction

There are many studies on international cross-listing, the corporate event of listing on a foreign stock exchange a stock that is already listed on a domestic stock exchange.[1] However, little work has been done on foreign listings without a prior home exchange listing, where firms choose to conduct their initial public offerings (IPOs) on a foreign stock exchange. Motivated by this research gap, in this paper we examine a sample of 100 foreign firms that conduct IPOs in the U.S. (Yankee stock offerings) and such IPOs are their first public equity issue in any market. Specifically, we investigate the operating and stock market performance of these Yankee equity issues.

There have been only two studies that specifically examine Yankee equity issues. Blass and Yafeh (2001) examine Israeli firms' choice of IPO location between Israel and the U.S. They find that high-quality Israeli firms with greater growth potential incur additional costs (in terms of higher first-day underpricing and relinquishing control rights) to conduct their IPOs in the U.S., while less promising firms remain in the home market. The choice of the U.S. as the IPO location serves as a credible signal of firm value and the additional costs are worthwhile for high-quality firms. Our study is different and complements Blass and Yafeh (2001) in the following ways: First, we study Yankee issuers from 26 economies as opposed to just one country. Second, due to data limitation, Blass and Yafeh (2001) only study the revenue growth in the first year after the IPO when they examine the post-IPO performance. Our paper provides a more thorough investigation of both the operating and investment performance. The second relevant study is Bruner, Chaplinsky, and Ramchand (2004),

[1] Karolyi (1998) provides an excellent survey of early research. Recent important work includes Doidge (2004), Doidge, Karolyi, and Stulz (2004), Lang, Lins, and Miller (2003), Lins, Strickland, and Zenner (2005), Pagano, Roell, and Zechner (2002), and Sarkissian and Schill (2004).

which compares the issue costs of Yankee stock offerings with those of domestic U.S. IPOs. They find that, on average, Yankee issuers experience approximately the same issue costs. This occurs because the U.S. market is selective and only foreign firms of superior quality have the opportunity to raise capital in the U.S. Such characteristics as larger size and being established businesses offset the higher risk arising from asymmetric information and country risk for Yankee issuers and enable them to attain the same issue costs as domestic U.S. issuers. Our paper is different and complements Bruner et al. (2004) in the following ways: First, Bruner et al. study issue costs. We investigate the operating and stock market performance. Second, if there is selective entry to the U.S. market as documented by Bruner et al., it would be important to examine how the Yankee issuers perform after their U.S. IPOs. Good after-market performance will be consistent with the argument of selective entry.

In addition to the foreign listing literature, our study is important to the IPO literature. IPO studies usually examine IPOs within the home country and sample firms belonging to a single country. We examine IPO firms from different countries. Most IPO literature is based on firms from just one country because it is difficult to obtain accounting data for firms from different countries and the data may not be comparable due to different accounting principles adopted in different countries. Our sample of international Yankee issuers provides a unique opportunity to investigate the operating performance of IPO firms from different countries. Yankee issuers need to register with the U.S. Securities and Exchange Commission (SEC) in the IPO process and are required to file annual reports with SEC after IPOs. The accounting statements are prepared according to U.S. Generally Accepted Accounting Principles (GAAP) or reconciled to U.S. GAAP. Therefore, we are able to obtain a time series of comparable accounting data before and after their IPO events.

Using a sample of 100 Yankee issuers that conducted IPOs from 1990 through 1999, we find that Yankee issuers' operating performance improves around their U.S. IPO events. Using seven years' accounting data centered on the year of the IPO event, we find that Yankee issuers' profitability and revenues improve significantly following their U.S. IPOs and such improvement is not obtained through debt expansion, which is evidenced by the fact that there is no significant change in their leverage around the U.S. IPOs. The evidence on Yankee issuers' operating performance is consistent with the signaling hypothesis or selective entry hypothesis from previous studies in the foreign listing literature. Cheung and Lee (1995) and Fuerst (1998) propose theoretical models where firms cross-list in stricter regulatory environment to signal their high quality and prospects of high profitability. Pagano, Roell, and Zechner (2002) examine the aggregate trends in foreign listings. They find that high-growth European firms that expand quickly without significant leveraging tend to cross-list in the U.S. rather than within Europe. Doidge, Karolyi, and Stulz (2004) show that foreign firms with valuable growth opportunities cross-list in the U.S. because a U.S. listing reduces controlling shareholders' expropriation and enables the firms to take better advantage of their growth opportunities. Blass and Yafeh (2001) find that high-quality Israeli firms bear additional costs to use IPOs in the U.S. market as a signal to reveal their high quality, while less promising Israeli firms stay in the local market. Bruner et al. (2004) suggest that the U.S. market is selective and only foreign firms of superior quality are able to raise capital in the U.S. market.

Regarding the long-run stock market performance of the Yankee equity issues, using various benchmarks and methods, we find no significant abnormal performance one, three or five years after U.S. IPO events. IPO literature indicates that IPO firms suffer long-run underperformance (see Ritter, 1991, and Ritter and Welch, 2002).

However, the evidence is based on studies that examine IPOs from the same country. Therefore, our finding of no significant abnormal return in the long run is not inconsistent with the existing IPO literature because we study a sample of international IPOs. The finding that Yankee issuers do not suffer poor long-run stock market performance is consistent with the finding of improvement in their operating performance after IPOs.

Our study contributes to both the foreign listing and the IPO literature. It is one of the few papers examining firms that choose to conduct their IPOs in the U.S.

This paper is structured as follows: Section 2 introduces the sample of Yankee stock offerings. Section 3 examines the operating performance around the IPOs. Section 4 studies the long-run stock market performance following IPOs. Concluding remarks are given in Section 5.

## 2. Sample

### *2.1. Sample formation*

We extract from SDC Platinum's Global New Issues Database international (non-U.S.) firms that conduct initial public offerings of their equity in the U.S. and list on one of the three major stock exchanges (NYSE, AMEX, or NASDAQ). This means that no firms with equities already traded in another market prior to the U.S. IPOs are included in the sample. The sample period is from the beginning of 1990 to the end of 1999. We choose this sample period because we need three years' accounting data before and after an IPO event year and it is very difficult to obtain such data for the early 1980s. Of the 353 firms, following Loughran and Ritter (1997) and Bruner et al. (2004), we eliminate 65 firms from the financial and utilities industries. We exclude 143 firms that conduct their IPOs both in the U.S. and simultaneously in other markets because we want to examine the effect of the U.S. IPOs on foreign firms. We

then drop 23 Canadian firms from our sample because previous studies (see Alexander, Eun, and Janakiramanan, 1988) have found significant differences between Canadian and non-Canadian firms' U.S. cross-listings and suggest that the Canadian and U.S. markets are fundamentally integrated. The Multi-Jurisdictional Disclosure System also facilitates the listing of Canadian firms in the U.S. To be included in the final sample, we require that firms have accounting data in Compustat or their corporate filings such as IPO prospectuses and annual reports with SEC be available for at least two years before and after IPOs. Twenty firms are deleted because of a lack of data. Finally, after the removal of two firms that are errors in the database, the sample consists of 100 Yankee equity issuers.

*2.2. Sample characteristics*

Table 1 presents the characteristics of the sample firms. Panel A shows the distribution of these IPOs across the sample period and across the three U.S. stock exchanges. Except for the early period of 1990 and 1991, when there were only one and two IPOs, respectively, and except for the years of 1996 and 1997, when there were as many as 21 IPOs in each year, the IPOs are distributed evenly across the years, with approximately 10 issues in each year. With respect to the listing location, NASDAQ and NYSE capture most IPOs. The average total assets at the last fiscal year-end before the IPO event are US$177.646 million and our sample firms raise US$51.058 million on average. A median sample firm has total assets of US$19.229 million and raises US$31.6 million from its IPO.

Panel B of Table 1 shows the geographical distribution and legal origins of the Yankee issuers. The sample firms are from 26 countries or districts.[2] Israel, Hong

[2] Eight firms in our sample are domiciled in the Bahamas, Bermuda, Netherland Antilles, and British Virgin Islands. For such firms, the country of incorporation is usually unrelated to the country of operation. As Pulatkonak and Sofianos (1999)

Kong, and the Netherlands are the top three winners. Israel tops the list with 33 U.S. IPOs. Hong Kong and the Netherlands have 10 and 8 U.S. IPOs, respectively. This pattern is consistent with the evidence shown in Blass and Yafeh (2001) that a large number of Israeli firms bypass the Tel Aviv stock exchange and conduct IPOs directly in the U.S. About 61.46% of the sample firms are from emerging markets, while 38.54% are from developed economies. About half of the sample firms are from countries that share a common border, common language, or common culture with the U.S. The legal origin classification is from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). We have legal origin data for 93 firms from 21 countries/districts. Among them, 58 firms, or about 62%, are from common-law countries, while the remaining 35 firms come from civil-law countries.

Table 1 indicates that Yankee equity issuers differ from one another in terms of the timing of their U.S. IPOs, the development stage of their home countries (emerging or developed economies), the ties between their home countries and the U.S. (geographical and cultural closeness), and the legal origins of their home countries. Such diversity in the composition of the sample enables us to conduct subsample analyses based on these sample characteristics.

**3. Operating performance**

Previous studies on foreign listings suggest that a U.S. listing is beneficial to international firms. The benefit may come from the strict investor protection in the U.S. Doidge et al. (2004) document that international firms cross-listed in the U.S. have Tobin's q ratios that are 16.5% higher than those of non-cross-listed firms. The

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point out, this type of arrangement is just used as a flag of convenience. We classify these firms into the real country of operation. We are able to determine the real country of operation from the corporate filings of four firms, but the country of operation was unclear for the remaining four firms (1 in the Bahamas, 2 in Bermuda, and 1 in Netherlands Antilles).

higher valuation for firms cross-listed in the U.S. is attributed to their increased ability to take advantage of growth opportunities since a U.S. listing can effectively reduce controlling shareholders' expropriation. The benefit may also come from increased access to external financing from the world's largest capital market. Pagano et al. (2002) find that a U.S. listing is attractive to European companies that pursue rapid equity-funded expansion. Lins, Strickland, and Zenner (2005) report that the sensitivity of investment to free cash flow decreases significantly following a U.S. listing for firms from emerging markets, which suggests relaxed capital constraint. Other benefits may include a lower cost of capital resulting from an improved information environment after listing in the U.S. (Lang, Lins, and Miller, 2003).

Previous studies also indicate that international firms that choose to list in the U.S. tend to be high-quality firms with growth potential. Cheung and Lee (1995) and Fuerst (1998) present theoretical models where a strict regulatory environment enables foreign firms to credibly signal private information about their future prospects to investors. Since the U.S. has the strictest stock market regulations, international firms that list in the U.S. tend to be firms confident of their future earnings. Consistent with the signaling model, Blass and Yafeh (2001) present empirical evidence that Israeli firms that list in the U.S. are high-quality innovative firms willing to incur additional costs from a U.S. listing to reveal their value and distinguish themselves from those staying at home. Bruner et al. (2004) provide evidence that the U.S. capital market is selective and only international firms of superior quality can have the opportunity to conduct IPOs in the U.S.

A finding of improvement in the operating performance of Yankee issuers following U.S. IPOs will therefore be consistent with the above mentioned studies, which document that high-quality firms tend to list in the U.S. and a U.S. listing is beneficial.

One the other hand, if the operating performance of Yankee issuers is found to be deteriorating following U.S. IPOs, it will be consistent with the "window-dressing" hypothesis (see Teoh, Welch, and Wong, 1998): firms adopt unusually aggressive management of earnings through income-increasing accounting adjustments to paint a rosy picture when they conduct IPOs. After the IPO, the operating performance declines because the inflated earnings can no longer be sustained. However, due to strict accounting rules, investor protection, high visibility, and close monitoring by regulators and investors arising from a U.S. listing, the opportunity for Yankee issuers to conduct window dressing may be quite limited. Therefore, it may not be probable to find declining operating performance.

*3.1. Data and methodology*

It is difficult to obtain comparable pre- and post-IPO accounting data for a multi-national and multi-industry sample like the sample of Yankee issuers. We first extract seven years (centered on the IPO year) accounting data from the Compustat database. However, a lot of data are not available and almost no firm has complete data for the seven years in Compustat. We manually collect the missing data from IPO prospectuses, registration statements filed with SEC, and annual reports. When doing so, we try to ensure that the data that we collect are from financial statements prepared under the same GAAP as the data that we obtain from Compustat. Different accounting rules can produce very different accounting data for the same firm. The same GAAP ensures the comparability of our dataset.

The performance measures and methodology follow those used in the privatization literature to detect performance changes around a privatization event (see Megginson, Nash, and Randenborgh, 1994; Boubakri and Cosset, 1998; D'Souza and Megginson, 1999; Sun and Tong, 2002, 2003; and Wei, Varela, D'Souza, and Hassan, 2003). We

use nonparametric Wilcoxon tests because Barber and Lyon (1996) find that these tests are uniformly more powerful than parametric t-test, regardless of the operating performance measures.

Table 2 presents the operating performance measures. We analyze three categories of measures: profitability, output, and leverage. Traditional profitability measures include conventional accounting ratios such as return on assets, return on equity, and return on sales. We use only return on sales (ROS) because, as Sun and Tong (2003) point out, an initial public offering increases a firm's assets and equity significantly and therefore ROA and ROE will decrease mechanically even if net income stays the same.[3] Following Sun and Tong (2003), we also use level profitability measures. Real net income and real operating cash flow are used as two additional measures of profitability, as operating cash flows are a primary component in net present value calculations used to value a firm and hence are a useful measure of operating performance. For output we analyze real sales. For leverage, conventional measures such as total liability to total assets, total debt to total assets, and long-term debt to equity suffer the same mechanical decline as ROA and ROE around an IPO event. Therefore, we follow Sun and Tong (2003) and take an income view of debt and use the operating cash flow to total debt, which indicates a firm's ability to cover total debt with yearly cash flow, and the operating cash flow to long-term debt to capture the leverage change.

To detect the performance changes around an IPO event, for each sample firm and each performance measure we calculate the mean and median value over three years before the IPO event and three years after the IPO event. For ratios we calculate

[3] Table 1 reports that the median total assets for Yankee issuers is about US$19 million at the last fiscal year end before IPOs. At the first fiscal year end after IPOs, the median more than quadrupled to about US$78 million.

directly, while for level measures, we first normalize each year's observation relative to that of year 0 (i.e., the IPO event year) before calculating the mean and median. The Wilcoxon signed-rank test is used to detect whether there is any significant change in the median values of the performance measures between the pre-IPO and post-IPO period. We also conduct a proportion test to detect whether the proportion of firms that experience an increase in a measure is different from that of firms that experience a decrease.

*3.2. Whole sample results*

*3.2.1. Nonparametric tests*

Table 3 shows the operating performance around IPO events for the sample firms. Median return on sales declines from 0.0322 to -0.0001, though the average ROS increases from -1.8329 over three years before an IPO event to -0.1823 over three years after the IPO event. Although the decline is not significant, it seems contrary to the expectation that the profitability of Yankee issuers should increase. However, ROS depends both on net income and on sales. The decline in ROS may occur even if the net income increases after an IPO when sales increase at a faster rate than net income. Our later analysis of real sales confirms this. The other two measures of profitability demonstrate a substantial increase. Real net income increases from a median (mean) of 0.2995 (0.0160) to 0.7595 (1.0730), and Wilcoxon statistics show that the increase is statistically significant. The proportion test finds that there are significantly more firms experiencing an increase in real net income than those experiencing a decrease. Real operating cash flow also increases from a median (mean) of 0.3551 (2.3770) to 0.7520 (4.4266), and this increase is significant at the 1% level. Proportion tests show that there are more firms experiencing positive real cash flow change than firms experiencing negative change, and the difference is

significant at the 1% level. Given the diversity of our multi-national multi-industry sample, the results from the proportion tests provide reinforcing evidence that Yankee issuers' profitability increases around U.S. IPO events.

With respect to the output change, real sales show substantial growth from a median of 0.5756 before a U.S. IPO to a median of 1.4045 after the U.S. IPO. Wilcoxon tests show that this increase is statistically significant at the 1% level. Out of the 100 sample firms, 91 firms enjoy increases in sales and only 9 suffer decreases in sales, and proportion tests show that this difference is significant at 1%. The evidence indicates that the real output of the sample firms increases significantly around U.S. IPOs.

One may ask whether the profitability and sales growth come at the cost of expanding debt. The operating cash flow to debt ratios indicate that this is not the case. The median increases in the ratio of operating cash flow to total debt and the ratio of operating cash flow to long-term debt are 0.0602 and 0.1307, respectively. These results suggest that there is improvement in Yankee issuers' capability to repay debt, though the improvement is not statistically significant. There is no evidence to suggest that the capability to repay debt worsens around a U.S. IPO event.

The evidence shown in Table 3 indicates that Yankee issuers' operating performance improves around the U.S. IPO events: profitability increases, sales grow, and leverage shows no adverse change. Panel B of Table 1 shows that Israeli firms account for 33% of our sample. One may doubt whether the operating performance improvement shown in Table 3 is mainly driven by performance changes of Israeli firms. To address this concern, we exclude the 33 Israeli firms from the sample and repeat the nonparametric tests on the remaining sample firms. Results remain qualitatively the same.

We also compare the Yankee issuers with domestic firms from their home countries. For each performance measure, we adjust each firm's performance change (After-Before) by subtracting the contemporaneous median performance change of a portfolio of matched firms. Data on matched firms are collected from the Osiris database. The matched firms are publicly traded industrial firms from the same home country and they have the same three-digit SIC codes as the sample firms.[4] If no match is found, we extend our search to firms with the same two-digit and then one-digit SIC codes. The "pseudo" event year for a control firm is set to be the event year of the corresponding sample firm. We require that the control firm have enough data to calculate the performance measure for at least two years before and two years after the event year. This data requirement may bias us against the Yankee issuers.

Table 4 presents the results for adjusted operating performance. We are unable to identify a control for some Yankee issuers. Compared with Table 3, the number of firms excluded varies from 13 for ROS to 36 for RCF. The median change in adjusted ROS becomes positive, though not significant. The median changes in adjusted RNI and RS remain significantly positive. The median change in adjusted RCF remains positive but becomes insignificant. This loss of statistical significance may be due to the substantial decline in the number of observations from 99 to 63. As for the leverage, the two adjusted ratios remain insignificant. The results in Table 4 indicate that the improvement in Yankee issuers' operating performance holds after we adjust for the performance change of comparable firms in their home markets.

*3.2.2. Panel regressions*

[4] We match on 2-digit SIC codes and replicate the tests in Table 4. The results remain qualitatively the same. We also match on both SIC codes and performance during the pre-event "Before" period. However, the number of firms for which we can find a control is too small to conduct a meaningful test.

Firms' operating performance is affected by cycles in the economy and their industries. Yankee issuers may enjoy operating performance improvement around their U.S. IPOs because the general economic condition in their home countries is improving or the industries to which they belong are in a boom during the sample periods. To address this concern, we conduct the following panel regressions, which also serve as robustness checks on the findings from the nonparametric tests:

$$\Pr oxy_{it} = \beta_1 Before_{it} + \beta_2 After_{it} + \beta_3 RGDPGrowth_{it}(and / or RINDGrowth_{it}) + \varepsilon_{it} \quad (1)$$

*Proxy* is the performance measures defined in Table 2. *Before* is a dummy variable that takes the value of 1 if the observation falls within the three years before an IPO event year and equals 0 otherwise. *After* is a dummy variable that takes the value of 1 if the observation falls within the three years after an IPO event year and equals 0 otherwise. *RGDPGrowth*, the proxy for the business cycle effect, is the annual real GDP growth for the sample firms' home countries. We obtain GDP and GDP deflator data for 23 countries or districts from the International Financial Statistics database maintained by the International Monetary Fund.[5] Six firms are excluded because no GDP data is available. $RINDGrowth_{it}$ is the median of two-year real sales growth in year t for all the same-industry firms from the same country as sample firm i. It is used as a proxy for industry growth effect. The two-year real sales growth is calculated as:

$$\text{Re}\, alSalesGrowth_{it} = \frac{SALES_{it}}{SALES_{i,t-1}} \times \frac{GDPDeflator_{i,t-1}}{GDPDeflator_{it}} \quad (2)$$

The same-industry firms from the same home country are identified by matching SIC codes. The data are obtained from Standard and Poor's Global Vantage database. Due

[5]We repeat these tests after deleting all the firms from a domicile nation of flag of convenience without doing any reclassification, and the results remain qualitatively the same.

to the difficulty in obtaining real sales growth data for same-industry firms, there are 54 firms for which we find *RINDGrowth*.

The panel regression results are presented in Table 5. We control for only the general business cycle, only the industry effect, and then both. After taking into consideration the effect of general economic conditions and industry growth, the analysis shows generally the same picture as the results from the nonparametric tests in Table 3. Our focus is on After minus Before, which measures the operating performance change around a U.S. IPO event. All the profitability measures and output measures, including ROS, show increases and these increases are all statistically significant at the 1% level. The two leverage proxies show mixed results: operating cash flow to total debt shows a significant decrease while operating cash flow to long-term debt demonstrates a significant increase. The panel regression evidence in Table 5 corroborates our previous finding of improved operating performance around a U.S. IPO event.

*3.3. Subsample analysis*

The sample statistics shown in Table 1 indicate that Yankee equity issues are different on many dimensions: the IPO year, the listing U.S. exchange, the economic development stage of home countries, the degree to which their home countries are related to the U.S., and their legal origin. Such diversity in the sample firms prompts us to conduct subsample analyses as a further robustness check. We classify the sample firms into two subsamples based on each of the five abovementioned dimensions, which results in 10 subsamples altogether. We perform the same nonparametric tests as we did in Table 3 (for the whole sample) for each of the 10 subsamples and also use the Wilcoxon/Mann-Whitney test to identify whether there is

any significant difference in performance change between each pair of subsamples classified on one of the five dimensions.

The subsamples are detailed as follows:

1. The Early Subsample vs. the Late Subsample. We use the end of 1995 as the dividing line. The rationale behind this classification is that late IPOs may learn from the experience of early IPOs and hence may have better performance.

2. The NYSE Subsample vs. the AMEX-NASDAQ Subsample. We employ this division because one may argue that NYSE-listed firms are of higher quality than firms listed on AMEX or NASDAQ.

3. Emerging Market Subsample vs. Developed Economy Subsample. This pair of subsamples is used to examine whether firms from developed economies are of better quality and achieve greater performance improvement. Following Bruner et al. (2004), we use the country risk rating contained in Panel B of their Table 1, which is from Euromoney data, and use the same cutting point of 86: countries with a risk rating lower than 86 are classified as emerging markets. Bruner et al. (2004) do not provide a risk rating for Taiwan. We classify Taiwan as a developed economy according to the classification of the International Monetary Fund.

4. More Related Subsample vs. Less Related Subsample. This classification is also based on Bruner et al. (2004). We assign firms from countries that share a common border (Mexico), have a common language (the UK, Ireland, and Australia), or have a common culture (the UK, Ireland, Israel, and Australia) with the U.S. into the More-Related Subsample, while the remaining firms are in the Less-Related Subsample. This pair is used to determine whether firms from countries that are more related to the U.S. perform better.

5. Common-law Subsample vs. Civil-law Subsample. We form common-law and civil-law subsamples based on the classification in La Porta et al. (1998). La Porta et al. (1998) examine laws governing the protection of investors in 49 countries. They find that laws differ significantly among countries. Common-law countries generally provide investors considerably better protection than civil-law countries. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002) and Doidge et al. (2004) find that better investor protection limits controlling shareholders' expropriation and increases firms' ability to take better advantage of growth opportunities.

The results of the subsample analyses are shown in Table 6. The results support the previous finding that Yankee issuers' operating performance improves significantly around their U.S. IPOs. Panel A presents the profitability measures. Although sales grow at a faster speed than net income, only four subsamples show a significant decline in median ROS. All the remaining six subsamples' median ROS change is not significantly different from zero. For real net income, five subsamples show a significant increase in medians around their U.S. IPOs and the remaining five show positive but not significant change. With regards to real cash flow, seven of the 10 subsamples show significantly positive median changes and the remaining three experience positive but not significant change. Results in Panel A indicate that the sample firms' profitability increases around their U.S. IPOs. Panel B shows the results for real sales. All of the 10 subsamples enjoy substantial sales growth around their U.S. IPOs and these increases are all statistically significant at the 1% level. Results for leverage in Panel C also echo our earlier findings for the whole sample: no subsample shows any significant change in leverage.

We then examine whether there is any significant difference between each of the five pairs of subsamples. Most subsample comparisons show no significant difference.

The only exception is for real sales: AMEX-NASDAQ subsample firms have higher sales growth than firms listed on the NYSE. Although this difference exists, both subsamples uniformly experience significantly positive sales growth. These results from our subsample comparisons indicate that although Yankee issuers are different from one another on many dimensions, they share one common characteristic: the significant improvement in operating performance around their U.S. IPOs.

**4. Stock market performance**

Having shown that the foreign firms that conduct their initial public offerings in the U.S. experience significant improvement in operating performance, we turn to the issue of their stock market performance: how do Yankee issuers perform in the stock market where they choose as the location of their first entry into the public equity market? The IPO literature documents that the stock of IPO firms show significant long-run underperformance compared to various benchmarks. Using a sample of 1,526 IPOs from 1975 to 1984, Ritter (1991) first documents the anomaly that IPOs show significant underperformance relative to both broad stock market indices and firms matched by industry or market capitalization. Ritter and Welch (2002) conduct an extensive review of the theory and evidence on IPO activity and confirm the existence of IPO long-run underperformance. Therefore, a finding of significantly negative long-run abnormal returns for Yankee equity issues will be consistent with studies on domestic IPOs. However, Yankee stock offerings are different in several important ways. First, most of the studies that find long-run underperformance are based on IPOs conducted within the firms' home markets. Yankee issuers' IPOs are foreign companies' IPOs in the U.S. market. Studies (Cheung and Lee, 1995, Fuerst, 1998, Blass and Yafeh, 2001, Bruner et al., 2004) suggest that these foreign firms tend to be high-quality firms with significant growth potential. Second, Yankee

issuers' debut in the U.S. market is also a stock foreign listing event. Foreign listing literature indicates that international firms gain significant benefits from a public listing in the U.S. Specifically, Doidge et al. (2004) find that international firms that cross-list in the U.S. have higher valuations (in terms of Tobin's q ratio) than non-cross-listed firms from the same country. Third, Yankee issuers show significant profitability improvement and sales growth around their U.S. IPOs. Based on the above-mentioned reasons, if the market is efficient and investors correctly form their expectations, unlike ordinary IPO firms, Yankee issuers may not show any significant long-run abnormal performance subsequent to their U.S. IPOs.

*4.1. Data, methodology, and empirical results*

To examine the long-run stock market performance, we collect stock return data for Yankee equity issues from the CRSP database. We first use a method in Jaffe (1974), which is recommended by Fama (1998). We then run Fama-French three-factor time-series regressions. In the first approach, we use various benchmarks when calculating abnormal returns: the U.S. market index return (S&P 500 Composite), the respective home market index return (Datastream Total Market Index), the equally weighted control portfolio of firms matched on size and book-to-market ratio, and the value-weighted control portfolio of firms matched on size and book-to-market ratio. In the second approach, we use both equally weighted and value-weighted abnormal portfolio returns for Yankee issuers in the regressions. We weight each calendar month equally as well as weighting each month by the number of IPO firms in the monthly rolling portfolios. We use both regular Fama-French factors as well as factors purged of IPO firms. For both approaches, we examine performance over one, three, and five years following an IPO.

*4.1.1. Long-run performance based on Jaffe (1974) approach*

When examining the methodologies used in studies on long-run performance, Fama (1998) shows that the average of monthly abnormal returns (AARs), rather than buy-and-hold abnormal returns (BHARs), should be used to draw formal inferences about long-run returns because BHARs are theoretically and statistically flawed. Therefore, we use average monthly returns. Fama (1998) also points out that many existing models fail to account for cross-correlation of event firm returns during long post-event periods and this failure affects statistical inference. To address this issue, Fama (1998) recommends an approach based on Jaffe (1974), which is the first approach that we use.

The sample period starts from February 1990. The ending month is December 2000, 2002, and 2004 when we examine one year, three years, and five years post-event performance, respectively. The selection of the sample period is consistent with Section 1, because the sample firms conducted their U.S. IPOs from 1990 to 1999. For each calendar month, we calculate the abnormal stock return for each Yankee issuer that conducted its U.S. IPO within the previous one, three, and five years for one year, three years, and five years performance, respectively. The abnormal return is estimated in the following four ways: First, we use S&P 500 composite index return as the benchmark. Second, for each firm we use Datastream total market index return for its home market as the benchmark. Third, for each firm we use the equally weighted return on a portfolio of firms matched on its size and book-to-market ratio (BE/ME) as the benchmark. Fourth, for each firm we use the value-weighted return on a portfolio of firms matched on its size and BE/ME as the benchmark. The matching portfolios are updated every year and are from the 100 portfolios that are intersections of 10 portfolios formed on size and 10 portfolios formed on BE/ME. The

monthly returns on all the matching portfolios are from Kenneth French's website.[6] After we calculate the monthly abnormal stock return for each firm, the average abnormal returns for a calendar month t across sample firms is the abnormal return for the month t on the portfolio of stocks of Yankee issuers that conducted U.S. IPOs in past one, three, or five years. We re-form the portfolio and calculate the abnormal return on this rolling portfolio every month (a portfolio t for month t). According to Fama (1998), "the time series variation of the monthly abnormal return on this portfolio accurately captures the effects of the correlation of returns across event stocks missed by the model for expected returns" (P.295). To account for the heteroskedasticity of the portfolio's abnormal return due to changes through time in the composition of the portfolio, we divide the abnormal return on portfolio t by the computed standard deviation of portfolio abnormal return during month t-60 to month t-1, an estimate of portfolio t's standard deviation. Because we use 60 months data to estimate standard deviation, the test period starts from February 1995 and ends in December 2000, 2002, and 2004, respectively. The average standardized portfolio abnormal return for a test period is the simple average of standardized monthly portfolio abnormal returns within the test period. Once we get the average standardized portfolio abnormal return, we use the t-test to determine whether the long-run abnormal performance is significantly different from zero (see Jaffe, 1974 for the formula of the t-statistic).

The results are presented in Table 7. Panels A, B, and C show the Yankee issuers' stock market performance one, three, and five years after U.S. IPOs, respectively. One year after the IPOs, Yankee issuers outperform all benchmarks. Depending on the benchmark, the average monthly abnormal return varies from 42 to 55 basis points.

[6] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Three years after the IPOs, Yankee issuers underperform all benchmarks. The underperformance varies from 28 to 79 basis points a month. After five years of seasoning, Yankee issuers outperform the benchmarks by 51 to 92 basis points a month. However, none of the abnormal returns in Table 7 are statistically significant at any conventional level of significance. These results indicate that Yankee issuers do not show any significant long-run abnormal performance when they are compared to the U.S. market, their home markets, or firms with similar size and book-to-market ratio. We also replicate our tests using 50 months to estimate standard deviations of rolling portfolio returns, and the results remain qualitatively unchanged.

*4.1.2. Long-run performance based on Fama-French three-factor regressions*

In addition to the approach based on Jaffe (1974), we run Fama-French three-factor time-series regressions of monthly rolling portfolio returns on the three factors. The intercept from the regressions indicates the average monthly abnormal performance.

$$r_{pt} - r_{ft} = \alpha + \beta_m RMRF_t + \beta_s SMB_t + \beta_h HML_t + e_{pt}. \quad (3)$$

$RMRF_t$ is the realization of the market risk premium in month t. $SMB_t$ is the difference between the return on a portfolio of small firms and the return on a portfolio of big firms. $HML_t$ is the return on a portfolio of high book-to-market stocks minus the return on a portfolio of low book-to-market stocks. These monthly factors are from Kenneth French's website.[7] Depending on the time horizon, the dependent variable is the monthly return on the rolling portfolio of all Yankee issuers that conducted their IPOs in the previous one, three or five years. Fama (1998) argues that value-weighting this portfolio return more accurately captures the total wealth effect experienced by investors. Loughran and Ritter (2000) argue that value-weighting causes Fama-French regressions to have low power. Taking into

[7] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

consideration the debate, we use both equally (EW) and value-weighted (VW) portfolio returns as dependent variables in the regressions. Loughran and Ritter (2000) also point out another two concerns related to Fama-French regressions. First, the regression should weight event firms equally rather than weight each time period (month) equally. Because events involving larger misevaluations tend to cluster in some periods, weighting firms equally gives more power. Therefore, to address this concern, we run both ordinary least squares (OLS) and weighted least squares (WLS) regressions using weights based on the number of Yankee issuers in the monthly portfolio. Second, the size and book-to-market factors are contaminated and factors purged of recent IPO firms should be used. Using regular (contaminated) factors gives low power. To address this concern, we run regressions using both regular factors and purged factors. The purged factors are from Jay Ritter's website.[8]

Regression results using purged factors are presented in Table 8. Main results from regressions using regular factors are qualitatively similar. Because regressions using purged factors almost always have higher adjusted R-squared, we do not include the results from regressions using regular factors for the sake of brevity and they are available upon request. Panels A, B, and C in Table 8 show Yankee issuers' stock market performance over one, three, and five years following their U.S. IPOs, respectively. During one year after the IPO, Yankee issuers outperform by around 22 to 34 basis points a month, underperform by about 27 to 48 basis points per month three years after the IPO, and again outperform by around 13 to 32 basis points a month five year after the IPO (only the abnormal return estimated by WLS using VW portfolio returns is negative). However, none of the abnormal returns in Table 8 are statistically significant at any conventional level of significance. The results in Table

[8] http://bear.cba.ufl.edu/ritter/ipodata.htm

8 from the regressions using both OLS and WLS and both EW and VW portfolio returns are consistent with the results in Table 7 obtained using Jaffe (1974) approach: no significant long-run abnormal returns are found for Yankee issuers following their U.S. IPO events.

**5. Concluding remarks**

In a scenario of accelerating market integration, a firm can choose either its home stock market or a foreign market as the location for its first public offering and exchange of listing. Although there have been many studies on both IPOs and international listings, firms conducting IPOs in a foreign market are, to a large extent, neglected.

In this paper we try to fill this research gap by examining the operating and investment performance for a sample of foreign firms that choose to conduct their IPOs in the U.S. The focus is on the operating performance change around these IPOs and the long-run stock market performance subsequent to IPOs. Using high-quality accounting data, we detect significant improvement in profitability and a substantial increase in sales without any deterioration of debt-repaying capability from three years before to three years after an IPO. The improvement in the operating performance is robust to country or industry effects. Using various benchmarks and methods, we find no significant abnormal stock market performance over one, three, or five years following Yankee issuers' U.S. IPO events. In contrast, IPO literature finds that firms suffer significantly negative long-run abnormal returns after IPOs in their home countries. The finding that Yankee issuers enjoy a significant improvement in operating performance and do not suffer long-run stock market underperformance is consistent with arguments proposed in Blass and Yafeh (2001) and Bruner et al. (2004): that is, foreign firms choose the U.S. market as their IPO

location to accurately signal their quality and growth potential, and only foreign firms of superior quality in their home counties can afford to choose to raise capital in the U.S.

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Table 1
Sample characteristics
*Panel A.*

| Year | NYSE | AMEX | NASDAQ | Total | TA(-1) | | Issue Size | |
|---|---|---|---|---|---|---|---|---|
| | | | | | mean | median | mean | median |
| 1990 | 1 | 0 | 0 | 1 | 227.140 | 227.140 | 68.400 | 68.400 |
| 1991 | 0 | 0 | 2 | 2 | 7.469 | 7.469 | 34.250 | 34.250 |
| 1992 | 2 | 0 | 8 | 10 | 30.400 | 19.952 | 34.490 | 26.400 |
| 1993 | 5 | 0 | 6 | 11 | 158.650 | 79.118 | 54.373 | 46.000 |
| 1994 | 2 | 0 | 7 | 9 | 59.096 | 21.826 | 32.611 | 35.000 |
| 1995 | 1 | 0 | 8 | 9 | 497.477 | 21.866 | 43.311 | 33.600 |
| 1996 | 4 | 0 | 17 | 21 | 241.934 | 17.877 | 75.719 | 30.800 |
| 1997 | 3 | 1 | 17 | 21 | 235.517 | 19.372 | 52.752 | 22.500 |
| 1998 | 0 | 3 | 5 | 8 | 15.482 | 10.179 | 16.025 | 13.550 |
| 1999 | 0 | 0 | 8 | 8 | 39.235 | 10.840 | 64.563 | 48.500 |
| | | | | | mean for all: | median for all: | mean for all: | median for all: |
| Total | 18 | 4 | 78 | 100 | 177.646 | 19.229 | 51.058 | 31.600 |

Table 1 (*continued*)
*Panel B*

| Country/District | Number | Legal Origin | Country/District | Number | Legal Origin |
|---|---|---|---|---|---|
| Australia | 2 | Common | Israel | 33 | Common |
| Bahamas | 1 | N/A | Italy | 3 | Civil |
| Belgium | 1 | Civil | Jordan | 1 | Civil |
| Bermuda | 2 | N/A | Mexico | 1 | Civil |
| Brazil | 1 | Civil | Netherlands Antilles | 1 | N/A |
| Chile | 3 | Civil | Netherlands | 8 | Civil |
| China | 6 | Civil | Panama | 2 | N/A |
| Cyprus | 1 | N/A | Singapore | 2 | Common |
| Denmark | 1 | Civil | Sweden | 1 | Civil |
| France | 4 | Civil | Switzerland | 1 | Civil |
| Germany | 1 | Civil | Taiwan, China | 2 | Civil |
| Hong Kong, China | 10 | Common | United Kingdom | 8 | Common |
| Indonesia | 1 | Civil | | | |
| Ireland | 3 | Common | Total | 100 | |

This table presents some characteristics of the sample. Panel A shows the number of Yankee issuers' IPOs in the U.S. by year. NYSE, AMEX, and NASDAQ are the number of such IPOs listed on NYSE, AMEX, and NASDAQ, respectively. TA(-1) is the total assets at the last fiscal year end before an IPO in millions of U.S. dollars. Issue Size shows the amount raised by these IPOs. Panel B presents the geographical distribution of the sample firms and their legal origins. Common represents common-law legal origin while Civil denotes civil-law legal origin. The classification of the legal origins is from La Porta et al. (1998).

Table 2
Performance measurement

| Category | Measures |
|---|---|
| Profitability | Return on Sales =Net Income/Sales |
| | Real Net Income=Net Income/U.S. GDP deflator |
| | Real Cash Flow=Net Operating Cash Flow/U.S. GDP deflator |
| Output | Real Sales=Sales/U.S. GDP deflator |
| Leverage | Net Operating Cash Flow/Total Debt |
| | Net Operating Cash Flow/Long Term Debt |

This table shows the three categories of operating performance examined and the corresponding measures employed for each category. The ratios are calculated using nominal data. Real net income, real cash flow, and real sales are nominal data scaled by the corresponding U.S. GDP deflator. Real net income, real cash flow, and real sales for year 0 (the IPO event year) are defined as having an index value of 1, with other years' data being expressed relative to unity in this year.

Table 3
Whole sample operating performance

| Variables | N | Median (Mean) Before | Median (Mean) After | Median (Mean) Change | Wilcoxon Stat. for Dif. in Medians (After-Before) (P-value) | +/- Ratio | Sign Test for Significance of Proportion Change (P-value) |
|---|---|---|---|---|---|---|---|
| Profitability | | | | | | | |
| ROS | 98 | 0.0322<br>(-1.8329) | -0.0001<br>(-0.1823) | -0.0191<br>(1.6505) | 1.641<br>(0.101) | 38/60 | 2.121<br>(0.034) |
| RNI | 100 | 0.2995<br>(0.0160) | 0.7595<br>(1.0730) | 0.4306<br>(1.0570) | 1.948<br>(0.051) | 60/40 | 1.900<br>(0.057) |
| RCF | 99 | 0.3551<br>(2.3770) | 0.7520<br>(4.4266) | 0.3186<br>(2.0496) | 2.989<br>(0.003) | 64/35 | 2.814<br>(0.005) |
| Output | | | | | | | |
| Real Sales | 100 | 0.5756<br>(2.5153) | 1.4045<br>(1.7689) | 0.8158<br>(-0.7464) | 7.834<br>(0.000) | 91/9 | 8.100<br>(0.000) |
| Leverage | | | | | | | |
| Operating Cash Flow /Total Debt | 77 | 0.3266<br>(0.9282) | 0.1758<br>(54.1164) | 0.0602<br>(53.1881) | 0.701<br>(0.484) | 41/36 | 0.456<br>(0.649) |
| Operating Cash Flow /Long-term Debt | 59 | 0.7228<br>(1.5198) | 0.5493<br>(6.2353) | 0.1307<br>(4.7155) | 0.034<br>(0.973) | 30/29 | -0.000<br>(1.000) |

This table shows the results for the whole sample. N is the number of observations. Median (Mean) Before is the median and mean value for average measure values over three years before an IPO. Median (Mean) After is the median and mean value for average measure values over three years after an IPO. Median (Mean) Change is the median and mean value for differences between After and Before IPO averages (After-Before). The Wilcoxon signed rank test is used to detect significant median changes around IPOs. +/- Ratio is the ratio of the number of positive measure changes to that of negative measure changes. The sign test is used to decide whether this ratio is significantly different from 0.5.

Table 4
Whole sample adjusted operating performance

| Variables | N | Median Change (After-Before) | Wilcoxon Statistic (P-value) |
|---|---|---|---|
| Profitability | | | |
| Adjusted ROS | 85 | 0.0038 | 0.013 (0.990) |
| Adjusted RNI | 86 | 0.4114 | 1.774 (0.076) |
| Adjusted RCF | 63 | 0.5285 | 1.585 (0.113) |
| Output | | | |
| Adjusted Real Sales | 86 | 0.4475 | 4.121 (0.000) |
| Leverage | | | |
| Adjusted Operating Cash Flow /Total Debt | 52 | 0.5262 | 1.607 (0.108) |
| Adjusted Operating Cash Flow /Long-term Debt | 44 | 0.0588 | 0.333 (0.740) |

This table shows the adjusted operating performance change for the whole sample. N is the number of observations. Median Change is the median difference between performance changes in a sample firm and the median change in corresponding performance measure for its control firms matched on SIC codes. The control firms are from the same home country as the sample firms. We start with the three-digit SIC code. If no match is found, we extend the search to firms with the same two-digit and then the same one-digit SIC code. The Wilcoxon signed rank test is used to detect significant median changes in adjusted performance measures around IPOs.

Table 5
Panel regression results

| Proxy | Before (-3, -1) | After (+1, +3) | RGDPGrowth | RINDGrowth | Adjusted R-squared | N | After-Before (P-value) |
|---|---|---|---|---|---|---|---|
| Profitability | | | | | | | |
| ROS | -0.1407*** | -0.1073*** | 0.7588*** | | 0.0614 | 638 | 0.0334*** (0.000) |
| ROS | -0.2338*** | -0.0663*** | | 0.0015 | 0.0160 | 356 | 0.1675*** (0.000) |
| ROS | -0.2739*** | -0.0871*** | 3.6399*** | -0.0262*** | 0.0131 | 356 | 0.1868*** (0.000) |
| RNI | -0.5532*** | 0.1656*** | -6.0890*** | | 0.1389 | 644 | 0.7188*** (0.000) |
| RNI | -0.5320*** | 0.3898*** | | -0.2812*** | 0.1366 | 359 | 0.9218*** (0.000) |
| RNI | -0.5090*** | 0.3478*** | -11.7017*** | -0.1049*** | 0.1454 | 359 | 0.8568*** (0.000) |
| RCF | -0.6171*** | 0.0457** | 14.2658*** | | 0.5397 | 638 | 0.6629*** (0.000) |
| RCF | -0.3859*** | $3.68*10^{-5}$ | | -0.1544*** | 0.2469 | 358 | 0.3859*** (0.000) |
| RCF | -0.5399*** | -0.0634*** | 12.4048*** | -0.4077*** | 0.2488 | 358 | 0.4765*** (0.000) |
| Output | | | | | | | |
| Real Sales | -0.3136*** | 0.2407*** | 0.6259*** | | -0.0083 | 645 | 0.5543*** (0.000) |
| Real Sales | -0.3992*** | 0.4256*** | | -0.0871*** | -0.0186 | 360 | 0.8248*** (0.000) |
| Real Sales | -0.4207*** | 0.4287*** | 1.3809*** | -0.0961*** | -0.0221 | 360 | 0.8494*** (0.000) |

Table 5 (*continued*)

| Proxy | Before (-3, -1) | After (+1, +3) | RGDPGrowth | RINDGrowth | Adjusted R-squared | N | After-Before (P-value) |
|---|---|---|---|---|---|---|---|
| Leverage | | | | | | | |
| Operating Cash Flow / Total Debt | -0.2376*** | -0.3927*** | 0.8239*** | | 0.1709 | 527 | -0.1552*** (0.000) |
| Operating Cash Flow /Total Debt | 0.1695*** | -0.3267*** | | 0.4253*** | 0.1677 | 297 | -0.4961*** (0.000) |
| Operating Cash Flow /Total Debt | 0.2325*** | -0.2988*** | -5.8227*** | 0.5697*** | 0.1643 | 297 | -0.5313*** (0.000) |
| Operating Cash Flow /Long-term Debt | 1.5944*** | 4.3162*** | -210.2477*** | | -0.0047 | 451 | 2.7217*** (0.000) |
| Operating Cash Flow /Long-term Debt | -2.0797*** | 3.2222*** | | -11.8448*** | -0.0152 | 254 | 5.3019*** (0.000) |
| Operating Cash Flow /Long-term Debt | -1.6961*** | 5.6592*** | -63.4514*** | -15.0587*** | -0.0165 | 254 | 7.3553*** (0.000) |

This table shows the panel regression results for the whole sample. Proxy is the performance measures, which are the dependent variables. Before is a dummy variable that equals one when the observation is from the three years before sample firms' U.S. IPO year and equals zero otherwise. After is a dummy variable that equals one when the observation is from the three years after sample firms' U.S. IPO year and equals zero otherwise. RGDPGrowth is the annual real GDP growth for the sample firm's home country. RINDGrowth is the median two-year real sales growth of firms from the same country matched on SIC codes. N is the number of observations. The Wald test is used to test whether there is significant difference between Before and After. One, two, or three asterisks stand for significance at the 10%, 5%, or 1% level, respectively.

Table 6
Subsample analysis
*Panel A. Profitability*

| Variables | N | Median Before | Median After | Median Change | Wilcoxon Stat. for Dif. in Medians (After-Before) | Wilcoxon/Mann-Whitney Stat. for Dif. In Median Change Between Subsamples | +/- Ratio | Sign Test for Significant Proportion Change |
|---|---|---|---|---|---|---|---|---|
| ROS | | | | | | | | |
| Early | 40 | 0.0506 | 0.0125 | -0.0329 | 2.171** | 1.261 | 13/27 | 2.055** |
| Late | 58 | 0.0129 | -0.0125 | -0.0170 | 0.294 | | 25/33 | 0.919 |
| Amex-Nasd | 80 | 0.0129 | -0.0186 | -0.0182 | 1.130 | 0.353 | 32/48 | 1.677* |
| NYSE | 18 | 0.0563 | 0.0624 | -0.0329 | 1.698* | | 6/12 | 1.179 |
| Developed | 36 | 0.0312 | 0.0219 | -0.0087 | 0.102 | 1.607 | 16/20 | 0.500 |
| Emerging | 59 | 0.0408 | -0.0187 | -0.0337 | 2.344** | | 19/40 | 2.604*** |
| Less Related | 49 | 0.0492 | 0.0352 | -0.0180 | 1.293 | 0.920 | 19/30 | 1.429 |
| More Related | 46 | 0.0070 | -0.1123 | -0.0453 | 1.551 | | 16/30 | 1.917* |
| Common-law | 57 | 0.0237 | -0.0187 | -0.0231 | 1.812* | 0.555 | 20/37 | 2.119** |
| Civil-law | 35 | 0.0408 | 0.0352 | -0.0208 | 0.991 | | 14/21 | 1.014 |
| RNI | | | | | | | | |
| Early | 42 | 0.2688 | 0.6068 | 0.0545 | 0.488 | 1.142 | 22/20 | 0.154 |
| Late | 58 | 0.3621 | 0.9248 | 0.5519 | 1.990** | | 38/20 | 2.232** |
| Amex-Nasd | 82 | 0.2715 | 0.8215 | 0.4407 | 1.988** | 0.902 | 50/32 | 1.877* |
| NYSE | 18 | 0.6126 | 0.6068 | 0.2560 | 0.348 | | 10/8 | 0.236 |
| Developed | 37 | 0.3446 | 0.9953 | 0.4458 | 1.720* | 0.346 | 23/14 | 1.315 |
| Emerging | 59 | 0.2865 | 0.7277 | 0.4154 | 1.317 | | 35/24 | 1.302 |
| Less Related | 49 | 0.5062 | 1.0095 | 0.4778 | 2.218** | 0.432 | 32/17 | 2.000** |
| More Related | 47 | 0.1135 | 0.4403 | 0.0840 | 0.862 | | 26/21 | 0.583 |
| Common-law | 58 | 0.2688 | 0.6925 | 0.2360 | 1.115 | 0.734 | 34/24 | 1.182 |
| Civil-law | 35 | 0.5881 | 1.0854 | 0.4778 | 2.531** | | 23/12 | 1.690* |

Table 6 (*continued*)

| Variables | N | Median Before | Median After | Median Change | Wilcoxon Stat. for Dif. in Medians (After-Before) | Wilcoxon/Mann-Whitney Stat. for Dif. In Median Change Between Subsamples | +/- Ratio | Sign Test for Significant Proportion Change |
|---|---|---|---|---|---|---|---|---|
| RCF | | | | | | | | |
| Early | 41 | 0.2115 | 0.5641 | 0.2775 | 2.009** | 0.238 | 26/15 | 1.562 |
| Late | 58 | 0.4241 | 0.7799 | 0.3959 | 2.199** | | 38/20 | 2.232** |
| Amex-Nasd | 81 | 0.3458 | 0.8078 | 0.6410 | 2.801*** | 0.567 | 53/28 | 2.667*** |
| NYSE | 18 | 0.5037 | 0.6454 | 0.2593 | 1.219 | | 11/7 | 0.707 |
| Developed | 37 | 0.5602 | 1.0748 | 0.3186 | 2.097** | 0.301 | 26/11 | 2.302** |
| Emerging | 58 | 0.2410 | 0.4522 | 0.2224 | 1.688* | | 34/24 | 1.182 |
| Less Related | 49 | 0.5545 | 0.9382 | 0.3068 | 2.477** | 0.540 | 32/17 | 2.000** |
| More Related | 46 | 0.2167 | 0.3728 | 0.3211 | 1.256 | | 28/18 | 1.327 |
| Common-law | 57 | 0.2071 | 0.3886 | 0.2528 | 1.303 | 0.981 | 33/24 | 1.060 |
| Civil-law | 35 | 0.6168 | 1.0850 | 0.3186 | 2.465** | | 25/10 | 2.366** |
| *Panel B. Output* | | | | | | | | |
| RS | | | | | | | | |
| Early | 42 | 0.6030 | 1.3923 | 0.6647 | 5.189*** | 1.121 | 38/4 | 5.092*** |
| Late | 58 | 0.5676 | 1.4175 | 0.9438 | 5.884*** | | 53/5 | 6.171*** |
| Amex-Nasd | 82 | 0.5172 | 1.4337 | 0.9195 | 7.110*** | 2.669*** | 76/6 | 7.620*** |
| NYSE | 18 | 0.7294 | 1.1121 | 0.3601 | 3.266*** | | 15/3 | 2.593*** |
| Developed | 37 | 0.6327 | 1.4028 | 0.6959 | 4.269*** | 0.941 | 32/5 | 4.274*** |
| Emerging | 59 | 0.5239 | 1.4062 | 0.8498 | 6.337*** | | 55/4 | 6.509*** |
| Less Related | 49 | 0.6086 | 1.4028 | 0.8082 | 5.988*** | 0.396 | 46/3 | 6.000*** |
| More Related | 47 | 0.4798 | 1.4062 | 0.8234 | 4.863*** | | 41/6 | 4.959*** |
| Common-law | 58 | 0.5153 | 1.4175 | 0.8336 | 5.714*** | 0.694 | 52/6 | 5.909*** |
| Civil-law | 35 | 0.5974 | 1.4019 | 0.8082 | 4.971*** | | 32/3 | 4.733*** |

Table 6 (*continued*)

| Variables | N | Median Before | Median After | Median Change | Wilcoxon Stat. for Dif. in Medians (After-Before) | Wilcoxon/Mann-Whitney Stat. for Dif. In Median Change Between Subsamples | +/- Ratio | Sign Test for Significant Proportion Change |
|---|---|---|---|---|---|---|---|---|
| *Panel C. Leverage* | | | | | | | | |
| OCF /Total Debt | | | | | | | | |
| Early | 34 | 0.3655 | 0.0647 | -0.0421 | 0.103 | 0.764 | 15/19 | 0.514 |
| Late | 43 | 0.1977 | 0.2550 | 0.1218 | 1.020 | | 26/17 | 1.220 |
| Amex-Nasd | 60 | 0.1546 | 0.2095 | 0.1446 | 0.843 | 0.731 | 34/26 | 0.904 |
| NYSE | 17 | 0.4040 | 0.1547 | -0.0202 | 0.331 | | 7/10 | 0.485 |
| Developed | 33 | 0.3612 | 0.1018 | -0.0017 | 0.482 | 1.000 | 15/18 | 0.348 |
| Emerging | 41 | 0.3266 | 0.3904 | 0.0652 | 0.998 | | 23/18 | 0.625 |
| Less Related | 43 | 0.3840 | 0.1565 | 0.0602 | 1.395 | 1.041 | 24/19 | 0.610 |
| More Related | 31 | 0.1142 | -0.0609 | -0.2123 | 0.598 | | 14/17 | 0.359 |
| Common-law | 41 | 0.1142 | 0.1936 | 0.0225 | 0.026 | 0.171 | 21/20 | 0.000 |
| Civil-law | 31 | 0.3840 | 0.1101 | 0.0392 | 0.500 | | 16/15 | 0.000 |
| OCF /LT Debt | | | | | | | | |
| Early | 25 | 0.7228 | 0.6603 | 0.4096 | 0.431 | 0.575 | 14/11 | 0.400 |
| Late | 34 | 0.5556 | 0.5144 | -0.0199 | 0.359 | | 16/18 | 0.171 |
| Amex-Nasd | 45 | 0.7228 | 0.6130 | 0.2132 | 0.068 | 0.187 | 24/21 | 0.298 |
| NYSE | 14 | 0.7339 | 0.4177 | -0.0273 | 0.063 | | 6/8 | 0.267 |
| Developed | 29 | 0.9753 | 0.5493 | -0.0251 | 0.195 | 0.279 | 14/15 | 0.000 |
| Emerging | 28 | 0.5923 | 0.6367 | 0.0993 | 0.194 | | 14/14 | -0.189 |
| Less Related | 33 | 0.6208 | 0.7518 | 0.3178 | 0.947 | 1.059 | 19/14 | 0.696 |
| More Related | 24 | 3.0968 | -0.0178 | -1.1992 | 0.614 | | 9/15 | 1.021 |
| Common-law | 33 | 1.0504 | 0.2105 | -0.0344 | 0.339 | 0.574 | 15/18 | 0.348 |
| Civil-law | 24 | 0.7062 | 0.6837 | 0.3061 | 0.500 | | | 0.204 |

This table shows the operating performance change for five pairs of subsamples. Panels A, B, and C detail the results for profitability, output, and leverage, respectively. N is the number of observations. Median Before is the median for average measure values over three years before an

IPO. Median After is the median for average measure values over three years after an IPO. Median Change is the median for differences between After and Before IPO averages (After-Before). The Wilcoxon signed rank test is used to detect significant median changes around IPOs. The Wilcoxon/Mann-Whiney test is used to determine whether there is any significant difference between median changes for the two subsamples within each of the five pairs. +/- Ratio is the ratio of the number of positive measure changes to that of negative measure changes. The sign test is used to decide whether this ratio is significantly different from 0.5. One, two, or three asterisks stand for significance at the 10%, 5%, or 1% level, respectively.

Table 7
Stock market performance benchmarked on various control portfolios

| Benchmarks | S&P 500 Composite | DS Home Market Return | EW Control Portfolio of Firms Matched on Size and BE/ME ratio | VW Control Portfolio of Firms Matched on Size and BE/ME ratio |
|---|---|---|---|---|
| *Panel A. 1 year* | | | | |
| Average Abnormal Return | 0.42% | 0.55% | 0.50% | 0.42% |
| T-statistic using Jaffe (1974) method | 0.80 | 1.01 | 1.02 | 0.89 |
| *Panel B. 3 years* | | | | |
| Average Abnormal Return | -0.54% | -0.79% | -0.28% | -0.38% |
| T-statistic using Jaffe (1974) method | -0.46 | -0.54 | 0.00 | -0.18 |
| *Panel C. 5 years* | | | | |
| Average Abnormal Return | 0.72% | 0.51% | 0.92% | 0.88% |
| T-statistic using Jaffe (1974) method | 0.86 | 0.82 | 1.15 | 1.03 |

This tables shows the sample firms' stock market performance relative to the U.S. market (S&P 500 Composite) and their home market (Datastream Total Market Index for the country) and relative to control portfolios of U.S. domestic firms matched on size and book-to-market ratio one, three, or five years subsequent to their U.S. IPOs. The t-test is used to determine whether the average abnormal return is significantly different from zero. T-statistics are calculated using Jaffe's (1974) method.

Table 8
Fama-French three-factor time-series regressions using purged factors

| | (1) EW Portfolio/OLS | (2) EW Portfolio/WLS | (3) VW Portfolio/OLS | (4) VW Portfolio/WLS |
|---|---|---|---|---|
| *Panel A. 1 year (124 observations)* | | | | |
| Intercepts | 0.32 | 0.22 | 0.32 | 0.34 |
| | (0.39) | (0.31) | (0.34) | (0.40) |
| RMRF | 1.30*** | 1.15*** | 1.23*** | 1.19*** |
| | (5.61) | (6.04) | (4.72) | (6.38) |
| SMB | 1.54*** | 1.72*** | 1.49*** | 1.62*** |
| | (4.98) | (6.83) | (4.34) | (7.04) |
| HML | -1.09*** | -0.81** | -1.18*** | -1.00*** |
| | (-3.70) | (-2.35) | (-2.92) | (-4.02) |
| Adjusted $R^2$ | 0.57 | 0.66 | 0.50 | 0.61 |
| *Panel B. 3 years (155 observations)* | | | | |
| Intercepts | -0.39 | -0.27 | -0.34 | -0.48 |
| | (-0.62) | (-0.48) | (-0.53) | (-0.76) |
| RMRF | 1.65*** | 1.18*** | 1.48*** | 1.24*** |
| | (8.48) | (9.04) | (8.12) | (7.67) |
| SMB | 1.02*** | 1.25*** | 1.11*** | 1.33*** |
| | (4.83) | (7.39) | (5.40) | (7.35) |
| HML | -0.51** | -0.62*** | -1.08*** | -0.98*** |
| | (-2.27) | (-3.26) | (-4.31) | (-3.98) |
| Adjusted $R^2$ | 0.57 | 0.72 | 0.60 | 0.74 |
| *Panel C. 5 years (167 observations)* | | | | |
| Intercepts | 0.32 | 0.13 | 0.16 | -0.59 |
| | (0.57) | (0.19) | (0.28) | (-0.97) |
| RMRF | 1.57*** | 1.22*** | 1.39*** | 1.30*** |
| | (8.92) | (9.06) | (9.44) | (10.09) |
| SMB | 1.17*** | 1.19*** | 1.01*** | 1.09*** |
| | (5.54) | (4.67) | (5.32) | (5.36) |
| HML | -0.20 | -0.43* | -0.63*** | -0.65*** |
| | (-0.82) | (-1.94) | (-2.97) | (-3.03) |
| Adjusted $R^2$ | 0.54 | 0.71 | 0.56 | 0.77 |

This table presents the regression results from Fama-French three-factor model: $r_{pt} - r_{ft} = \alpha + \beta_m RMRF_t + \beta_s SMB_t + \beta_h HML_t + e_{pt}$. The dependent variable is the monthly excess returns in percentage over the risk-free return on equally weighted (EW) or value-weighted (VW) portfolio of Yankee issuers that conducted their IPOs within the previous one (Panel A), three (Panel B), or five years (Panel C) in month t. The sample period is from February 1990 through December 2000, 2002, and 2003 for Panels A, B, and C, respectively. The portfolio is updated monthly. $RMRF_t$ is the realization of the market risk premium in month t from Kenneth French's website. $SMB_t$ is the difference between the return on small firms and big firms. $HML_t$ is the return on high book-to-market stocks minus the return on low book-to-market stocks. These two factors are constructed after purging from the universe of stocks all firms that publicly issued equity for cash during the previous 5 years. The purged factors are from Jay Ritter's website. Regressions (1) and (3) in each panel are estimated using ordinary least squares and regressions (2) and (4) are estimated using weighted

least squares with weights based on the number of Yankee issuers in the monthly portfolio. T-statistics are in brackets and calculated using White's (1980) method. One, two, or three asterisks stand for significance at the 10%, 5%, or 1% level, respectively.