ESSAYS IN CORPORATE FINANCE

by

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ABSTRACT

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This dissertation consists of two essays on corporate finance. In the first essay we test the pecking order theory by examining how firms finance maturing long-term debt. This allows us to accomplish three goals: resolve the issues of debt capacity and the endogeneity of financing deficit; examine the role of internal financing; and generate evidence regarding the order in which different sources of financing are used. We determine that firms use internal funds before they issue new debt to refinance maturing long-term debt. Firms with more cash on hand are less likely to issue new debt to refinance. On average, each marginal dollar of maturing long-term debt is fully financed with the issuance of new debt.

In the second essay, we study characteristics of Specified Purpose Acquisition Companies (SPACs) and examine the performance of their securities over time. We find that SPACs represent a fairly unique way to raise capital, The incentives of their founders, underwriters, and investors are interdependent and successful business combinations generally result in significant returns to founders. We also show that different SPAC securities generate different reactions in response to the announcement

news regarding their corporate status. While holders of all three securities realize abnormal returns on the announcement day, the strongest reaction is observed among the investors holding warrants, while common stock holders tend to react very mildly.

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Table of Contents

List of Tables

Essay 1: Corporate Financing of Maturing Long-Term Debt

Essay 2: Specified Purpose Acquisition Companies

List of Figures

Essay 1: Corporate Financing of Maturing Long-Term Debt

Essay 1: Specified Purpose Acquisition Companies

ESSAY 1

Corporate Financing of Maturing Long-Term Debt

1. Introduction

Although the pecking order theory has long been one of the primary contenders to being the provider of the most accurate description of corporate financing behavior, direct empirical tests of its predictions have become a subject of intense effort only recently.[1] Shyam-Sunder and Myers (1999) (thereafter, SSM) use regressions of debt financing on financing deficit to test the pecking order theory on a sample of 157 large US public firms with continuous data covering 1971-1989 time period. Based on the finding that 70-80 percent of financing deficit is covered with debt issuance, they conclude that the pecking order theory provides good first order approximation of corporate financing behavior.

Chirinko and Singh (2000), however, argue that the regression of debt financing on financial deficit is unable to identify the order in which funds from various sources are used. Furthermore, the approach cannot properly address situations in which firms have to issue high percentage of equity, for example, due to limited debt capacity.

Frank and Goyal (2003) examine the robustness of SSM findings by estimating SSM-style regressions on a broader sample of publicly trading firms covering a longer time period. They find that the proportion of debt in total financing is much lower in this

[1] Donaldson (1961) observes that firms finance their investment opportunities in a certain order: first internal fund, then external debt, and external equity in the end. Myers and Majluf (1984) provide theoretical foundation for this financing hierarchy, known as the pecking order theory, based on existence of information asymmetry between managers and outside investors.

broader sample and that it further declines after 1990. They further find that the pecking order theory does especially poor job in explaining the financing behavior of small firms. This finding is puzzling as small firms are likely to be subject to a higher degree of information asymmetry and, thus, should be more likely to follow the pecking order.[2] Lemmon and Zender (2007) offer an explanation for the "puzzle" by arguing that small firms are unable to issue additional debt because of their limited debt capacity.[3]

Leary and Roberts (2007), on the other hand, argue that the pecking order theory not only is unable to explain corporate financing behavior as a whole, but also fails to explain corporate financing choices of firms considered by the literature as good candidates for pecking order behavior. Specifically, the pecking order theory does not perform well in explaining how firms that face information asymmetry but are not constrained by debt capacity finance their investment opportunities.

In this paper, we test the pecking order theory by examining how firms finance maturing long-term debt. Our focus on the financing of maturing debt has certain advantages and resolves some of the issues from the previous literature. First, debt capacity is much less of an issue due to the fact that maturing debt frees up capacity for new debt issuance. Second, maturing debt is an ex-ante measure of financing needs that can be satisfied from internal funds as well as external debt and equity. As such, it allows us not only to test whether firms follow the pecking order when they choose between external debt and external equity, but also to contrast external financing to internal

[2] Fama and French (2002) confirm that the pecking order theory cannot explain financing patterns of small growth firms. In contrast, Bharath, Pasquariello, and Wu (2006) and Gomes and Phillips (2007) find that fraction of debt used to cover financing deficit increases with the extent of information asymmetry. Bharath et al. (2006) use market proxies of information asymmetry, whereas Gomes and Phillips (2007) use analyst forecast dispersion and earnings surprises as measures of information asymmetry.

[3] The idea that debt capacity can constrain a firm's ability to borrow and lead to violations of the pecking order of financing is discussed in Donaldson (1961), Myers (1984), Shyam-Sunder and Myers (1999), but is not explicitly tested.

financing. Third, the timing and the amount of maturing of debt are exogenous with respect to the form of financing, which allows a cleaner interpretation of the results. Finally, the exogeneity of maturing debt allows us to identify the order in which firms tap different sources of funds by examining the relation between the amount of maturing debt and the form of financing used.

Some of the previous studies consider maturing debt in their analyses. Shyam-Sunder and Myers (1999) include current maturity long-term debt in their financing deficit measure. Frank and Goyal (2003) also consider current maturity long-term debt but argue for its exclusion from financing deficit. Unlike these studies, however, we not only consider current maturity long-term debt as the only exogenous component of financing deficit but also include it in our measure of net debt issued. Our rationale for this is simple. The timing and the amount of current maturity long-term debt are determined by the decisions made prior to the current year. The only decision being made at the time of maturity is how to finance the amount due. Therefore, a decision, for example, to refinance 100% of the maturing debt with new debt should be considered a decision to issue debt just like a decision to finance it with new equity is considered an equity issue.

Using a sample of public firms from 1970-2006 period, we first estimate SSM-style regressions of debt financing on financial deficit. Overall, in our sample, more than forty percent of financing deficit is financed with debt issuance. Furthermore, the fraction of internal shortfall of funds financed with debt issuance is higher prior to 1990, but declines afterward. In addition, we find that the importance of debt issuance is higher for

larger firms and for firms with credit ratings. These results confirm the findings of earlier studies and provide baseline set of results to which our main results are compared.

The introduction of current maturity long-term debt instead of financing deficit in SSM-style regressions significantly improves the performance of the pecking order model. In the overall sample, we find that each marginal dollar of maturing long-term debt is fully financed with new debt issuance, consistent with the pecking order prediction that firms prefer debt to equity issuance. Furthermore, debt issuance remains highly important in subsamples based on time period, size, and existence of rating. Even more importantly, the observed differences across subsamples are consistent with the predictions of the pecking order theory. In particular, the proportion of new debt used to refinance maturing debt is higher for smaller firms and for firms without credit ratings. These patterns are opposite to the patterns for financing deficit reported in the earlier literature.

The pecking order theory not only predicts that firms prefer debt to equity issuance, but also that they would first use internal funds to pay off maturing debt and only after that would turn to debt. In other words, small amounts of maturing debt should be financed with cash. Firms should start issuing new debt only after the amount of maturing debt exceeds the firm's ability to pay it off from internal funds.

Our findings confirm these predictions. We find that an average firm finances its maturing debt with internal funds first. As the amount of maturing debt increases, each additional dollar of maturing debt becomes fully financed with new debt issuance. These findings are stronger for firms that are more likely to be subject to a greater degree of

information asymmetry as well as for firms with more cash on hand, consistent with the pecking order theory.

Although maturing debt releases capacity for new debt issuance, cross-sectional variation in the incremental debt capacity induces variation in how different firms finance their maturing debt. Specifically, we find that the fraction of new debt used to refinance the marginal dollar of maturing debt declines with the extent to which the firm is close to its debt capacity. However, we also find that, regardless of their spare debt capacity, firms always prefer internal funds to external debt.

The pecking order theory also predicts that firms would never issue equity if they could instead use internal funds. This implies that the results of regressions of total external financing on maturing debt should be similar to the results we obtained for regressions of debt issuance. However, this hypothesis is rejected in our data.

These results suggest that firms may be issuing equity out of the pecking order. To gain additional insight into how new debt and equity issues are used to finance maturing debt, we examine plots of the amounts of debt and equity issued against the amounts of maturing debt. While we observe a distinct positive relation between the amount of maturing debt and the amount of new debt issued, there is no discernable relation between maturing debt and equity issuance. Furthermore, the vast majority of equity issues, both large and small, are concentrated at low levels of maturing debt, suggesting that equity issues are primarily used to finance other, e.g., investment, needs and not to refinance maturing debt. Given our focus on the latter, whether these equity issues violate the pecking order is beyond the scope of the current paper. Indeed, Leary and Roberts (2007) focus on how firms finance their investment needs and find that the

pecking order theory does not perform well in predicting corporate financing decisions of these firms.

To summarize, we find that firms follow the pecking order of financing when they refinance the current maturity long-term debt. These firms first use the accumulated cash, then issue new long-term debt to pay off their maturing debt. External equity does not play a significant role in refinancing of maturing debt.

The rest of the paper is organized as follows. In section 2, we describe the data and define the variables. In section 3, the regression models are explained and the main results are presented. Ordering tests are in section 4. Section 5 considers the effects of debt capacity. Section 6 summarizes our findings.

2. Sample and variables

We start with all firms available on Compustat for the period from 1970 to 2006. The coverage of flow of funds statements, which we need for our analyses, starts in 1971. An additional year (1970) is used as our financing variables are scaled by total assets from the end of the previous year.[4] To take into consideration outliers and possibly misreported data, all scaled variables are trimmed at one percent on both tails of the distribution.[5] We exclude financial firms (SIC 6000-6999), firms with book values of assets or sales less than one million dollars, and observations with missing values of relevant variables. In addition, since the primary focus of this study is on how firms refinance their maturing debt, we limit ourselves to firms with nonzero values of

[4] Total assets is Compustat data 6.
[5] We do not trim censored variables on the censored side.

maturing debt.[6] Our final sample consists of 113,768 firm-year observations covering corporate financing activity in 1971-2006.

Several variables, such as financing deficit, play an important role in the pecking order tests of Shyam-Sunder and Myers (1999). Using SSM definitions and notation, the financing deficit is defined as follows.

$$DEFt = DIVt + Xt + \Delta Wt - Ct + Rt, \quad (1)$$

where, *DEFt* is financing deficit, *DIVt* measures cash dividends, *Xt* denotes capital expenditures, ΔWt is change in net working capital, *Ct* is cash flow after interest and taxes, and *Rt* is the portion of outstanding long-term debt that matures during year *t*.

As noted in Frank and Goyal (2003), the requirement that sources and uses of funds balance each other implies the following accounting cash flow identity:

$$DIVt + Xt + \Delta Wt - Ct = NEISt + NDISt. \quad (2)$$

In (2), *NEISt* is net amount of equity issued and *NDISt* is net amount of long-term debt issued during year *t*.[7] Taking into account (2), equation (1) can be rewritten as

$$DEFt = NEISt + (NDISt + Rt) = NEISt + NDISRt. \quad (3)$$

In (3), *NDISRt* is net amount of long-term debt issued during year *t* including long-term debt used to refinance the portion of outstanding long-term debt that matures in year *t*.[8]

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[6] Eighty percent of our sample firms have nonzero current maturity long-term debt.

[7] Net equity issued is defined as equity issued (data 108) minus equity repurchased (data 115). Net debt issued is defined as long-term debt issuance (data 111) minus long-term debt reduction (data 114). For observations with format code 1, long-term debt reduction data item in Compustat includes reclassification of long-term debt that becomes due within one year as short-term debt. We restore the consistency of the definition of long-term debt reduction by adding debt due in one year (data 44) to long-term debt reduction (data 114) when format code is 1.

[8] *NDISR* is long-term debt issuance minus long-term debt reduction plus one year lagged value of debt due in one year.

Summary statistics for variables important for our analyses are presented in Table 1. The current maturity long term debt for the average firm in the sample is 3.3% of total assets. This is similar to Frank and Goyal (2003), who report the ratio of maturing long-term debt to be four percent of net assets of an average firm. While the average firm is a net issuer of equity in the amount of 4.5 percent of total assets, most firms do not enter equity markets in any given year at all. The average firm in the sample is a net debt issuer in the amount of 5.2 percent of its total assets. The level of cash for the average firm is 9.6 percent of total assets. The average size of financing deficit is also 9.6 percent of total assets. Around twenty-four percent of the analyzed firms have credit ratings. Almost half of new debt financing raised by a median firm is used to refinance maturing long-term debt, suggesting that it is an important reason for why firms issue new debt.[9]

3. Traditional Pecking Order Theory Tests

3.1. Research design

In our analysis, we estimate two SSM-style regressions of debt issuance on two measures of corporate financing needs. First, we test the relation between financing deficit, *DEF*, and net long-term debt issuance, *NDISR*, using the original SSM regression equation:

$$NDISRit = \alpha + \beta \times DEFit + \varepsilon it. \quad (4)$$

According to the SSM hypothesis, we should expect $\alpha=0$ and $\beta=1$, which would provide support for the pecking order prediction that managers finance shortfalls of internal funds solely with net debt issuance. We estimate this regression on our overall

[9] We report only the median of the ratio of maturing debt to new debt financing as the other statistics are severely affected by extreme observations of this variable.

sample and in various subsamples to confirm that the results of the earlier studies hold in our sample and to generate a baseline set of results to which the results from our second set of tests are compared.

For our main set of tests, we modify regression (4) by replacing the independent variable, financing deficit, with one of its components -- the portion of outstanding long-term debt that matures within year *t*, *R*.[10]

$$DISRit = \alpha + \beta \times Rit + \varepsilon it. \quad (5)$$

The dependent variable in (5) is also modified. The traditional tests of the pecking order theory using regression (4) assume symmetry in pecking order behavior for security issues and repurchases. Positive values of financial deficit, *DEF*, represent a use of funds that is financed by issuing debt (positive *NDISR*), whereas negative values of financial deficit represent a surplus of funds that is used to retire debt (negative *NDISR*). Thus, for both security issues and repurchases, the null hypothesis is that the coefficient on *NDISR* in regression (4) should be one.

Similar to positive financial deficit, maturing debt is expected to be financed with new debt issuance. Unlike financial deficit, maturing debt is strictly a use of funds variable. None of its values imply existence of a surplus of funds that can be used to repurchase additional securities. As a result, regression (5) can be used to test the predictions of the pecking order theory only with respect to security issues but not with respect to security repurchases. Accordingly, the dependent variable, *NDISR*, is transformed from a variable that measures both debt issues and reductions into a measure

[10] One way to look at regression model (5) is as an instrumental variable version of regression model (4) with maturing debt serving as an instrument for financing deficit.

of debt issuance only, *DISR*. Specifically, *DISR* is formed by replacing all negative values of *NDISR* with zeroes, to reflect the fact that there is no debt issuance in these cases and other sources of funds are used to finance maturing debt, *R*.

With the dependent variable, *DISR*, censored at zero, regression equation (5) has to be estimated as a Tobit regression. This model also lends itself as a natural specification for testing the preference for internal funds under the pecking order hypothesis. Specifically, whereas the independent variable, *DEF*, in equation (4) is, by definition, the sum of new debt and equity issued, the independent variable, *R*, in equation (5) is an ex ante measure of funds that are required to refinance maturing debt.

These funds can be generated internally or raised externally in the form of debt or equity. The pecking order theory states that firms prefer internal financing to external financing.

Figure 1 illustrates the implications of pecking order firm behavior on the relation between the amount of maturing debt and debt issuance. Small amounts of maturing debt that can be refinanced internally are paid off with cash with no debt issued. These are the censored observations (to the left of point C), with new debt issuance at zero. Once they exhaust internal sources of funds, firms start issuing new debt. These are the observations to the right of point C, where debt issuance increases with the amount of maturing debt.

As Figure 1 illustrates, our expectations for the coefficient estimates in regression (5) should be somewhat different from the expectations for the coefficient estimates in regression (4). Specifically, with preference for internal financing (positive C) the coefficient estimate for the intercept, α, in regression (5) should be negative.

We should stress that this identification strategy relies on the exogeneity of the independent variable, *R*, in equation (5).[11] The same strategy cannot be applied to equation (4) to identify the order in which debt and equity are issued. The independent variable in (4), *DEF*, is endogenous, as it is simply the sum of new debt, *DISR*, and new equity issued. If large (small) new issues tend to be of any particular type (debt or equity), then the relation between *DISR* and *DEF* would depend on the magnitude of *DEF*, which could induce the intercept in regression (4) to be non-zero.

Unlike the intercept, the estimate for the coefficient β on maturing long-term debt is expected to be close to one, as in regression (4). Once the firm exhausts its internal funds and turns to new debt, each additional dollar of maturing debt is expected to be financed with a dollar of new debt. Debt capacity is not expected to be a significant constraining factor since additional debt capacity is released by the maturing debt.

Our dataset represents an unbalanced panel of 113,768 firm-year observations. We follow Fama and French (2002) and report in our tables the results obtained by estimating cross-sectional Fama and MacBeth (1973) regressions for each of our 36 sample years and then using the time series of parameter estimates to obtain their means and standard deviations. This procedure addresses concerns that the t-statistics may be affected by correlation across firms within each year. We then apply Newey-West (1987) adjustment to the time-series standard errors and t-statistics to address concerns about time-series correlation in the estimated coefficients.[12] We have also estimated pooled

[11] The amount of long-term debt maturing in the current year is a result of an endogenous maturity choice decision made by the firm at the time the debt was issued. We expect that this choice was affected by the firm's characteristics at the time of issuance. The amount of maturing debt is exogenous, however, with respect to firm characteristics and decisions made at maturity.

[12] We use three lags in calculating Newey-West t-statistics.

cross-section time-series regressions with standard errors adjusted for heteroscedasticity and within-firm and within-year clustering.[13] The conclusions of the paper are not sensitive to these alternative estimation choices. Furthermore, the presented t-statistics are generally more conservative than the unreported alternative estimates.

3.2. Full sample results

Table 2 reports the coefficient estimates for regressions (4) and (5). The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses. We find that around forty three percent of financing deficit is financed by net debt issuance. While that coefficient is not at all close to 1, rejecting the original SSM hypothesis, it is comparable to the coefficient estimates reported by Frank and Goyal (2003). The SSM hypothesis is also rejected for the intercept, which, although economically small, is statistically significantly greater than zero.

What is interesting, are the results from equation (5) regressing debt issuance on the current maturity long-term debt. We find that firms, on average, finance 103.5 percent of their maturing long-term debt with new debt issuance. The coefficient of 1.035 on the maturing long-term debt is not statistically different from one, consistent with the pecking order theory. In addition, the statistically significant negative intercept (-0.016) is also consistent with the pecking order hypothesis that firms start issuing new debt only after internal funds are depleted. Jointly, the estimates of the intercept (-0.016) and the slope (1.035) suggest that, for an average firm, maturing debt in the amount of up to 1.6

[13] Petersen (2008) recommends using firm-level clustered standard errors in corporate finance applications.

percent of total assets is financed with cash, with larger amounts of maturing debt triggering new debt issuance.

3.3. Size-based subsamples

We, next, reestimate our regressions for the subsamples considered in the prior empirical studies of the pecking order theory. Specifically, Frank and Goyal (2003) find that larger firms tend to finance a significantly larger portion of their financing deficit with new debt. This is a puzzling result as it implies that the pecking order theory is a better descriptor of the financing behavior of firms with a lower degree of information asymmetry. Lemmon and Zender (2007) offer an explanation for the "puzzle" by arguing that small firms are unable to issue additional debt because of their limited debt capacity. Since maturing debt frees up capacity for new debt issuance, corporate financing choices are less likely to be driven by debt capacity constraints when firms refinance their maturing debt. Thus, we can test the debt capacity hypothesis by comparing the estimation results of regressions (4) and (5) for subsamples based on firm size.

Each year, we group the sample firms into quartiles based on the dollar value of annual sales. We then pool observations from different years but same size quartiles into four size-based subsamples and estimate regressions (4) and (5) separately for each of these subsamples. The results are presented in Table 3.

The results for regression (4) are similar to the results from the prior literature. The coefficient estimates on financing deficit increase monotonically as we move from the quartile of the smallest firms (0.333) to the quartile containing the largest firms (0.785). These results imply that, compared to the smallest firms, the largest firms use more than twice as much debt when covering their financing deficit.

In contrast, the coefficient estimates on maturing debt (regression (5)) monotonically decline as we move from the quartile of the smallest firms (1.110) to the quartile containing the largest firms (0.889). This pattern is consistent with the predictions of the pecking order theory as firms with a higher degree of information asymmetry (smaller firms) rely more heavily on debt financing than do firms with less information asymmetry.

Another interesting result is the pattern of intercepts in the regression reported in Panel B. The most negative estimate (-0.028) is observed for firms in the smallest size quartile. As we move across size quartiles, the intercepts become progressively less negative, with the intercept for the largest firms (0.000) being statistically indistinguishable from zero. This pattern is consistent with pecking order hypothesis that firms with a higher degree of information asymmetry rely more on internal funds as they incur higher costs of adverse selection when raising external financing.

Overall, the results in panels A and B of Table 3 are consistent with the hypothesis that smaller firms generally operate closer to their debt capacity and, therefore, have to rely on new debt to a lesser degree than do larger firms. Consistent with this hypothesis, the slope coefficient estimates in panels A and B are closer in magnitude for the largest firm quartile, but diverge as we move to smaller firm quartiles. This suggests that the largest firms are relatively unconstrained by debt capacity both when they refinance their maturing debt and when they cover financing deficit in general. Smaller firms, on the other hand, are more constrained by debt capacity with the constraint relaxing when they refinance maturing debt. Hence, the slope coefficient

estimates from regression (5) (Panel B) become increasingly larger relative to the coefficient estimates from regression (4) (Panel A) as we consider smaller firms.

3.4. Credit rating subsamples

In this section, we split our sample into two subsamples based on whether a firm has a credit rating, which we use as a measure of access to public debt markets. Lemmon and Zender (2007) provide an extensive discussion of the reasons why the existence of rated debt should be related to the firm's debt capacity. Specifically, firms with no credit ratings tend to have more volatile cash flows and lower collateral value of assets, and tend to be more informationally opaque to allow access to arms-length debt. These firms also tend to have higher costs of financial distress, which is why they tend to borrow from banks and other financial intermediaries that are efficient at reorganizing distressed firms. As a result, even if these firms do prefer to finance internal shortfalls with debt, some of them may be unable to do so.

Because of concerns about misidentifying firms that have chosen to rely on equity financing despite having the capacity to issue rated debt as debt capacity constrained, Lemmon and Zender (2007) use the predicted probability of having rated debt as their primary indicator. These issues are less of a concern in the current study as we focus on how firms refinance their pre-existing debt when it matures. We, therefore, use an indicator of whether a firm has rated debt and do not generate probabilities of having rated debt.

For this analysis, we use only data starting from 1986, the year Compustat starts its coverage of credit ratings. The results for regression (4) are presented in Table 4, Panel A. The results show that, whereas debt constrained firms finance only 27.3 percent

of their deficit with new debt issuance, their unconstrained counterparts with full access to debt markets finance 81.6 percent of deficit with new debt. These results are consistent with the findings in the earlier literature.

The results for regression (5) are presented in Panel B. Managers of rated firms finance 91.3 percent of their maturing long-term debt with new debt issuance. This number is larger but similar to the proportion of new debt (81.6 percent) they use to cover their financing deficit, consistent with view that these firms are not very constrained in terms of their access to debt markets. In contrast, for unrated firms the difference between the fractions of new debt used to finance the maturing long term debt (107.6 percent) and the fraction of new debt used to cover internal fund shortfall (27.3 percent) is much larger. This suggests that firms with limited access to credit markets may have lower debt capacity, which limits their ability to finance shortfalls of internal funds with additional debt.

The intercept is insignificant in the case of rated firms, suggesting that adverse selection costs are not a major concern for informationally transparent rated firms when they issue debt. In contrast, the intercept is significantly different from zero for unrated firms, suggesting that adverse selection costs incurred in the process of debt issuance are significant in the case of these informationally more opaque firms.

3.5. Subperiod results

Arguing that firms, as well as conditions under which they operate, change over time, Frank and Goyal (2003) conduct separate tests of the pecking order hypothesis for

the SSM (prior to 1990) and the post-SSM (after 1990) periods.[14] We do the same and run regressions (4) and (5) separately for the period from 1971 to 1989 and for the period from 1990 to 2006. Table 5 reports the results.

Consistent with Frank and Goyal (2003), we find that the slope coefficient estimate in regression (4) is higher prior to 1990. As reported in Panel A, during the 1971-1989 time period, firms financed 54.5 percent of their shortfall of internal funds with debt issuance. In contrast, only 27.9 percent of financing deficit is financed with new debt after 1989.[15]

Panel B presents the estimation results for regression (5) for the same two subperiods. The results are quite different from those reported in Panel A. Specifically, firms finance 100.6 percent of their maturing debt with new long-term debt issuance prior to 1990, with the fraction of debt in refinancing of maturing long-term debt slightly rising in the second half of our sample to reach 107.1 percent. One possible explanation for the widely diverging results in Panels A and B could be that firms are operating much closer to their debt capacity in the later period (after 1989). Consistent with this view, the credit rating of an average firm in 1985 is BBB+, whereas the average rating in 2005 is between BBB- and BB+, i.e., 2.5 notches lower.

To summarize, the patterns of how different types of firms fund their financing deficit developed in this paper are consistent with prior literature and offer mixed support for the pecking order theory. Replacing financing deficit with maturing long-term debt in the SSM style regressions significantly strengthens the case for the pecking order theory.

[14] Shyam-Sunder and Myers (1999) study data from the period 1971-1989

[15] Huang and Ritter (2007) also report similar differences between the early and the late parts of their sample.

4. Order of financing

The results in Section II show that the original SSM hypothesis that firms primarily rely on new debt financing is confirmed to a high degree when we focus on how firms refinance their maturing long-term debt. In addition, the negative intercept estimates for regression (5) indicate that firms fund maturing debt first from another source of funds before turning to issuance of new debt. In this section, we test whether the source of funds that precedes new debt is indeed internal cash as predicted by the pecking order theory.

To identify the order of financing, we examine the relation between the amount of cash held by the firm and the intercept in regression (5). Firms with more cash would be able to refinance larger amounts of maturing debt without raising external funds. If firms prefer internal funds to debt financing, then we should observe more negative intercepts for firms with more cash on hand.

Panel A of Table 6 reports the coefficient estimates for regression (5) estimated separately for firms grouped into quartiles based on accumulated cash.[16] The results are consistent with the predictions of the pecking order theory. The intercept estimates are negative for all cash quartiles, albeit insignificantly so for the first two quartiles. More importantly, the intercepts monotonically decline (become more negative) with cash, implying that firms prefer to use cash to refinance maturing debt and start issuing new debt only when the amount of maturing debt becomes too large relative to the cash on hand. For example, the coefficient estimates for firms in the highest quartile imply that an

[16] Cash is defined as cash and short-term investments (data 1) scaled by total assets.

average firm in this quartile uses cash to pay off maturing debt in the amount of up to 4.4 percent of total assets, with higher values of maturing debt triggering new debt issuance.

Because adverse selection costs are higher when issuing equity than when issuing debt, the pecking order theory predicts that internal funds not only precede debt but that they precede external financing in general. To test this hypothesis we reestimate equation (5) with total external financing (debt and equity) as the dependent variable separately for each financial slack quartile. The results presented in Panel B are not consistent with the pecking order theory. None of the intercepts are significantly negative and we observe no monotonic pattern of changes in intercepts as we move from the lowest to the highest cash quartile.

The conflicting results in Table 6 (cash precedes debt financing but does not precede total external financing) suggest that firms may be issuing equity out of the pecking order. To gain additional insight into how new debt and equity issues are used to finance maturing debt, Figure 1 plots the amounts of debt issued against the amounts of maturing debt whereas Figure 2 plots the amounts of equity issued against the amounts of maturing debt. Figure 1 shows that, although there are many debt issues of various sizes at low levels of maturing debt, there is a distinct positive relation between the amount of maturing debt and the amount of new debt issued. In contrast, there is no discernable relation between maturing debt and equity issuance in Figure 2. Combined with the fact that most equity issues, both large and small, are observed at low levels of maturing debt, this suggests that equity issues are primarily used to finance other, e.g., investment, needs and not to refinance maturing debt. This is consistent with the findings in Leary and

Roberts (2007) that firms do not follow the pecking order when they raise funds for their investment projects.

5. Alternative interpretations and further tests

The finding that firms tend to refinance practically all of their maturing debt with new debt issuance has an alternative interpretation. If an average firm is close to its target debt level, then it is not surprising from the point of view of the tradeoff theory that it maintains its target capital structure by simply rolling over its maturing debt. In this section, we examine how measures of deviation from target affect the financing of maturing debt. Because target leverage is not observable, we follow the standard approach in the literature and proxy the target level of leverage with the predicted value from the following regression.

$$LTDit = \beta 0 + \beta 1 \times LTDFit + \beta 2 \times Sizeit + \beta 3 \times MBit + \beta 4 \times Tngit + \beta 5 \times RDit + \beta 6 \times RDDMit + \beta 7 \times Expit + \varepsilon it. \quad (6)$$

In (6), the dependent variable, *LTD*, is the long-term debt ratio.[17] Following earlier research, the set of independent variables consists of firm characteristics believed to proxy for the factors identified by the tradeoff theory as important determinants of the target and includes firm size, asset tangibility *(Tng)*, market-to-book *(MB)*, research and development expenses *(RD)*, and selling expenses *(Exp)*.[18] Because a large number of

[17] Long-term debt ratio is long-term debt (data 9) scaled by assets (data 6).

[18] These variables have been previously considered by Titman and Wessels (1988), Rajan and Zingales (1995), among others. Size is the natural log of sales (data 12), adjusted for inflation. Tangibility is the property, plant, and equipment (data 8) scaled by total assets. R&D is the research and development expense (data 46) scaled by sales. Selling expense is selling, general, and administrative expense (data 189) over sales. Market-to-book is (total assets – book equity + market equity)/total assets. Book equity is the book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Depending on availability, we use the redemption (data 56), liquidation (data 10), or par value (data 130) to estimate the book value of preferred stock. Stockholders' equity is (data 216), if it is available. If not, we measure stockholders' equity as the book

firms with no R&D do not report it, we set missing values for R&D to zero. Since firms that do not report R&D may be different from those that do, we include an indicator variable, *RDDM*, set to one for firms with non-missing R&D. Motivated by the finding in Lemmon, Zender, and Roberts (2008) that firms' future debt ratios are closely related to their initial debt ratios, we also include the firm's initial long-term debt ratio *(LTDF)* as an additional independent variable capturing unobserved between-firm heterogeneity.[19]

We use the estimates from regression (6) to proxy the deviation from target leverage with the difference between the predicted value, *LTD**, and the actual long-term debt ratio, *LTD*.[20] We then examine whether these deviations affect how firms refinance their maturing debt. A significant problem with this approach is that most of the determinants of target leverage used in regression (6) can also be thought of as determinants of debt capacity (Fama and French (2002)).[21] Therefore, one could view the deviation of the firm's debt ratio from the predicted value, *LTD*-LTD*, as a proxy for how close the firm is to its debt capacity. As a result, even if the proportion of maturing debt refinanced with new debt issuance (the slope coefficient in regression (5)) did vary with the distance from the predicted debt ratio, such a finding could imply either that target leverage ratios were important or that firms generally followed the pecking order of financing, but deviated from it when constrained by their debt capacity.[22]

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value of common equity (data 60) plus the par value of preferred stock, or the book value of assets minus total liabilities (data 181).

[19] The initial debt ratio is measured as the firm's chronologically first nonmissing debt ratio available on Compustat. To avoid identity in each firm's initial year, all initial years are dropped from regression (6).

[20] The results of estimation of regression (6) are not reported for brevity. These results are standard and are available upon request.

[21] Indeed, Agca and Mozumdar (2007) use a similar set of variables as determinants of debt capacity.

[22] This is known as the complex version of the pecking order theory (Myers (1984)).

Fortunately, our empirical approach allows us to differentiate between the target leverage and the debt capacity interpretations of *LTD**, as these two hypotheses have different predictions with respect to the intercept in regression (5). Specifically, there is no reason, under the tradeoff theory, to expect firms to exhibit preference for internal financing. This is especially true for firms with debt ratios well below their target level. Whereas a firm with excess leverage (low *LTD*-LTD*) may be inclined to use cash to pay down a portion of its maturing debt, a firm with leverage deficit (high *LTD*-LTD*) should show no such preference. Thus, we would expect the intercept in regression (5) not to be negative, especially, for high *LTD*-LTD* firms. In contrast, under the pecking order theory, firms always prefer internal funds, regardless of their position with respect to the debt capacity.

5.1. Subsamples based on deviation from predicted leverage

We, first, test these hypotheses by estimating regression (5) separately for firms sorted into quartiles on the basis of their estimated deviation from predicted leverage, *LTD*-LTD*. These results are presented in Table 7.[23]

The pattern of intercepts observed across the quartile subsamples is not consistent with the tradeoff hypothesis. Specifically, the intercepts in the first three quartiles of *LTD*-LTD* are very similar and imply that these firms refinance small amounts of maturing debt (up to 1.2-1.4 percent of assets, on average) with internal funds, after which they start issuing new debt. The intercept in the highest *LTD*-LTD* quartile is substantially more negative, implying that these firms use exclusively internal financing

[23] The results are qualitatively similar when we first split the sample in two based on whether *LTD*-LTD* is positive (leverage deficit) or negative (leverage surplus), and then split each subsample in two based on the median values of leverage deficit and leverage surplus, respectively.

when the amount of maturing debt does not exceed about two percent of total assets.[24] Within the tradeoff framework, these would be the most underlevered firms in our sample and, as such, they should be less likely to use internal equity and more likely to issue debt.

The significantly negative intercepts observed across all four subsamples are more consistent with the pecking order theory modified to account for limited debt capacity. Because of adverse selection costs, firms always prefer to finance small amounts of maturing debt with internal funds. Hence, the intercepts are negative regardless of where the firm stands relative to its debt capacity.

The slope coefficient estimates imply that, as the amount of maturing debt becomes too large to be financed internally, firms with little spare debt capacity (low *LTD*-LTD*) start replacing each additional dollar of maturing debt with a dollar of new debt. When firms with more spare debt capacity (high *LTD*-LTD*) start issuing new debt, however, they not only replace each marginal dollar of maturing debt with new debt, but also issue additional debt so that the amount of internal funds used to refinance maturing debt declines with the size of debt due. In effect, these firms replenish their internal financing slack using proceeds from debt issuance. For example, for firms in the fourth quartile, when maturing debt is at two percent of total assets, it is 100 percent internally refinanced. By the time the amount of maturing debt reaches four percent of total assets it becomes 100 percent refinanced with new debt. This type of behavior makes sense if the costs of adverse selection incurred when issuing debt are, to a significant extent, fixed.

[24] Calculated as 0.028 / 1.457 = 0.0192.

5.2. Regression results

To simultaneously take into account the effects of both availability of internal funds and deviation from predicted leverage, *LTD*-LTD*, we estimate an expanded version of regression (5), allowing both the intercept and the slope to vary with accumulated cash as well as with *LTD*-LTD*.

$$DISRit=\alpha\times(\gamma 0+\gamma 1 Cashit+\gamma 2(LTD^{*}it-LTDit))+\beta\times(\delta 0+\delta 1 Cashit+\delta 2(LTD^{*}it-LTDit))\times Rit+\varepsilon it =$$

$$= \alpha 0+\alpha 1 Cashit+\alpha 2(LTD^{*}it-LTDit) + \beta 0 Rit +\beta 1 Cashit\times Rit +\beta 2(LTD^{*}it-LTDit)\times Rit + \varepsilon it. \qquad (7)$$

In (7), *Cashit* and deviation from target leverage, *(LTD*it-LTDit),* are measured at the beginning of period *t*.

Reduced form coefficient (α) estimates for regression (7) are presented in Table 8. The results provide support for the complex version of the pecking order theory with limited debt capacity. The intercept in the regression (-0.004) is insignificantly different from zero and the slope coefficient of *R* (1.037) is insignificantly different from one. These results imply that a firm that has no financial slack and is unconstrained by debt capacity refinances one hundred percent of its maturing debt with new debt issuance.

Consistent with the pecking order theory, the coefficient estimate on cash is significantly negative whereas the coefficient on the interaction term *Cash×R* is insignificant. The negative effect of cash on the intercept implies that the probability of debt issuance declines with the size of the firm's cash position. The insignificant effect of cash on the slope implies that, for firms that issue debt, the proportion of debt in total new financing is unaffected by the firm's cash position. These results are consistent with the hypothesis that firms issue debt only after exhausting internal sources of funds.

Consistent with the debt capacity hypothesis, the interaction effect *(LTD*-LTD)×R* is significantly positive indicating that the proportion of maturing debt that is refinanced with new debt increases with debt capacity, *LTD*-LTD*. The coefficient on *(LTD*-LTD)* itself, however, is insignificant, implying that firms always prefer internal funds over external debt regardless of their position relative to their debt capacity.

To summarize, consistent with the pecking order theory, firms prefer internal funds to debt issuance when they refinance their maturing long-term debt. This relation is unaffected by whether the firm is under- or over-levered. Firms tend to use less new debt to refinance their maturing debt when they are closer to their debt capacity.

6. Conclusions

We test the pecking order theory by examining how firms finance maturing long-term debt. Our results offer support for the predictions of the pecking order theory regarding the use of internal funds and debt financing. Managers first finance their maturing long-term debt with internal funds and then turn to new debt issuance.

These findings are confirmed over different periods of time, across firms of different sizes, with different access to credit markets, and with different levels of internal funds. In contrast to the earlier literature, we find very strong support for the pecking order theory among small high growth firms as well as among debt capacity constrained firms. Our results also show that the fraction of new debt used to refinance the marginal dollar of maturing debt declines with the extent to which the firm is close to its debt capacity. However, regardless of their spare debt capacity, firms always prefer internal funds to external debt.

ESSAY 2:

Specified Purpose Acquisition Companies

1. Introduction

In the year 2007, 67 initial public offerings, or 23% of total IPO market activity, went to the little known Specified Purpose Acquisition Companies (hereafter SPAC). In 2008, 17 out of 50, or 34%, of IPO deals were SPACs.[25] In contrast, in the period between 1998 and 2002 there were no SPAC related IPOs; in 2003, there was only one. Interestingly, in the first half of 2009, there was no SPAC activity in the equity issuance markets at all.

This recent development in capital markets demands a closer examination of SPACs and their characteristics. A SPAC is a clean shell company that acquires public status through the IPO process and is specifically formed to purchase one or more operating businesses over a certain amount of time, usually two years. Proceeds raised through the IPO are placed in escrow accounts and are kept there until SPAC founders are able to close the deal with potential targets. If an appropriate target is not found within the two-year period after the IPO, the SPAC is liquidated and funds from the escrow accounts are returned to investors.

The Securities and Exchange Commission (SEC) classifies SPACs as blank check companies under the 6770 SIC code, and technically defines them as "very small companies" typically involving speculative investments that fall within the SEC's

[25] Ritter (2009) " Some Factoids About the 2008 IPO Market "

definition of “penny stocks” or "microcap stocks.” At the same time, the SEC’s rule 3a-51-1 excludes from the formal definition of “penny stocks” any stock issuer with total net assets valued higher than $5 million after the IPO. Since all SPACs entering capital markets after 2003 raised more than $5 million through their IPO, they are not classified as penny stock blank checks, and they consequently avoid the scrutiny of the SEC rules that apply to penny stocks.[26]

The academic finance literature on SPACs is still in the very early stages of development. Jog and Sun (2007) wrote the first paper that both explains some of the characteristics of SPACs and examines the realized returns to original founders and investors. Their sample includes 62 SPACs over the 2003-2006 time period, and is based on a subsample of 24 companies with available data on SPAC founders with annualized returns of 1900% to them. In a similar subsample that includes 42 SPACs with complete data on SPAC investors, the authors report a negative annual return of 3%. Boyer and Baigent (2008) examine characteristics of 87 SPACs that went public from June 2003 until December 2006 and report that SPACs exhibit less underpricing than regular IPOs. They also report a significant positive relationship between the share price at the issuance and the size of the offering. Flores (2008) also mentions SPACS, comparing reverse mergers with penny stock issuances as an alternative way to go public. He includes 12 SPACS in his sample of 408 reverse mergers. Recently, Lawellen (2008) made an argument that SPACs represent an important entity in the capital markets and that they should be considered a separate asset class. Finally, Jenkinson and Sousa (2009) analyze 58 SPACs that completed mergers showing that half of the deals were value destroying.

[26] As the response to speculative activities in blank check markets during the 1980s, the SEC introduced rule 419-a in 1992 to regulate offerings of blank check companies. Within that legislation, rule 3a-51-1 defines what is considered a blank check and penny stock issuer.

Beyond the academic finance literature, the redevelopment of SPACs in the capital markets has also received much attention in law related literature. Reimer (2007) concludes that SPACs can be considered a beneficial financial innovation, especially due to the constraints that the 2002 Sarbanes-Oxley Act imposed on small firms attempting to raise funds in the public markets. He considers SPACs a substitute to private equity firms. Sjostrom (2008) compares different ways to go public, and finds SPACs to be a viable alternative to traditional IPOs from the perspective of an acquired company because they bring in a cash infusion, share liquidity, and vested-in underwriters.

There is no general agreement on the performance of SPAC securities, their characteristics, data used, or underlying indexes. We provide additional evidence on SPAC activity in the period from 2003 until July 2009. Our analysis shows that securities issued by SPACs react differently when the intention to change their corporate status is announced. While the holders of all three securities realize abnormal returns, the strongest effect is observed among the investors holding warrants; stock holders, on the other hand, tend to react very mildly. In addition to this finding, we demonstrate that the presence of Early Bird Capital as the lead underwriter of the IPO increases the likelihood of a successful merger combination.

This paper is organized as follows: Part I constitutes the introduction in which we define SPACs. Part II provides a short history of the blank check market, as well as a full description of modern SPACs, their sample and characteristics, and important stages in their limited corporate life. Part III examines the characteristics of SPAC stakeholders, namely SPAC founders, SPAC underwriters, and SPAC investors, and sketches their incentives. Part IV examines SPACs' performance at different stages of their corporate

life, while comparing results with SPACs reported in previous studies. Part V offers a conclusion and proposes some further research questions on SPACs.

2. Sample and SPAC description

2.1 History of blank check market

Modern SPACs in the period between 2003 and 2009 represent an innovative way to reestablish blank check markets, which have long existed in similar forms. According to Cowing (1957), blank checks as blind pools were first mentioned in England during the 18th century.[27] Graham and Dodd (1934) explain that blind pools were imported to US capital markets from UK capital markets in the form of so-called "investment trusts" in the early 1920s.[28] More recently, blank checks gained popularity among certain classes of promoters and investors in the US during the 1980s and 1990s. They were mostly penny stock issues with shares listed on OTC markets and with very limited guarantees to initial investors. The lack of regulation and the enforcement of existing rules led to a certain pattern of behavior where blank check promoters frequently took advantage of original investors. Reimer (2007) quotes several SEC hearing reports according to which, by the end of 1980s, fraud and abuse in the penny stock market reached "epidemic proportions."[29] In order to protect capital formation and keep investor confidence intact, Congress passed the Penny Stock Reform Act (1990), which instructed the SEC to adopt rules that govern registration statements filed by blank check companies issuing penny

[27] During England's 18th century South Sea Bubble, an unknown promoter raised money through a stock offering for a "company carrying on an undertaking of great advantage, but nobody is to know what it is."

[28] "The American "investment" trusts functioned as blind speculative pools, administered in many cases by men of reputation and ability who were carried away by the universal madness. These new "creations" played a double role in intensifying the speculative orgy, for they were themselves both active speculators and active media of speculation." Graham and Dodd (1937)

[29] The management team would exercise its warrants in conjunction with the supposed merger with or acquisition of a private company with the hope that the market would respond favorably to such an announcement. Once the stock price jumped, the management team profited by dumping its shares.

stocks. In 1992, the SEC introduced rule 419-a, which established regulation of the blank check market.

Rule 419-a explicitly outlines the behavior of all promoters involved in blank check offerings.[30] It requires blank check companies to keep raised funds in specially established escrow accounts maintained by an insured depository institution until the acquisition is consummated. The rule also determines that acquired businesses must have net assets of at least 80% of the funds deposited in the escrow accounts. The rule prohibits the trading of blank check securities until a merger or acquisition occurs. In addition, blank check companies' founders are required to provide investors with audited quarterly and annual financial statements.

The increased scrutiny of the blank check market by the National Association of Securities Dealers in 1997 led to a revocation of licenses of chief executive officers of GKN Securities Corporation, the main promoter of blank checks.[31] After the event, activities in the blank check market ceased until 2003. In August 2003, the small investment bank Early Bird Capital underwrote the first SPAC in an attempt to reestablish the blank check market. By raising more than $5 million through the IPO and by pricing securities above the minimum price that would classify them as penny stocks, SPAC underwriters and founders avoided the scrutiny of the SEC rules that regulate penny stock markets, and instead became subject to the rules for general companies.

[30] SEC Release 33-6932 summarizes Rule 419-a requirements.
[31] NASD News Release 1997 " From December, 1993 through April, 1996, GKN dominated and controlled the immediate after-market trading in eight securities it underwrote, which resulted in no competitive market. GKN was able to charge excessive markups ranging from six percent to as much as 67 percent over the prevailing market price in more than 1,500 transactions. At least 90 percent of these transactions were fraudulent because the mark-up exceeded 10 percent (a level considered fraudulent)." As a result, the CEO of the company and twenty nine supervisors and brokers were fined and suspended.

From August 2003 until July 2009, 161 SPACs raised capital, and today their securities are listed on all major US stock exchanges.

2.2 Modern SPACs

A. Formation

SPACs are formed by their sponsors with the unique purpose to acquire or merge with other companies using the cash previously raised through the IPO. The process is complicated; in addition to the involvement of SPAC sponsors, it requires the expertise of legal advisors and underwriters in order to comply with the rules imposed by the SEC and by the exchanges on which SPACs list their shares.

The formation of a SPAC is announced by filing an S-1 registration statement form with the SEC. The S-1 form consists of all the important information regarding the SPAC's organization and intentions. It is a very lengthy document that includes a certificate of registration, a registration statement, an underwriting agreement, securities certificates, an escrow agreement, and the auditor's consent. The form provides details about sponsors' professional and academic backgrounds and disclosures to potential public investors regarding the risks involved in the process from the moment of the IPO until the merger. It also informs investors about corporate governance and compliance with the Sarbanes-Oxley Act. In the S-1 form, SPAC sponsors state their compensation levels at all stages of the life of the company.

Once the SEC verifies the S-1 form, the focus of SPAC sponsors or managers turns toward the IPO process. [32] All the important information governing the IPO is recorded in the final prospectus Form B423.

[32] On the average it takes 221 calendar days from the filing of the intention to raise funds until the IPO.

B. IPO event

Typical SPACs conduct an IPO by selling units. Usually, each unit consists of one common share and one warrant to buy a share in the future at a discounted price. [33] The use of cash proceeds raised through the IPO is determined in the registration statements and their amendments. Typically, about 5% of raised cash is used to pay upfront for underwriters' fees, regular administrative and legal expenses, the cost of office space, the cost of registering securities, and employees' monthly salaries. The remaining 95% of the funds are placed in an escrow account opened with an insured depositary institution, where the funds earn a T-bill rate until they are used in an acquisition. [34]

The establishment of an escrow account is very important in this process. First, it demonstrates to potential investors the SPAC's voluntary compliance with SEC rule 419-a, which requires blank check companies to establish an escrow account. Second, an escrow account provides assurance to public investors that a majority of their funds is going to be preserved independently of the success of the business combination.

While the SEC's rule 419-a forbids penny stock companies from trading securities until the merger is consummated, SPAC founders and underwriters offer immediate trading in units after the IPO. The units are, on average, dissolved 45 days after the IPO, and only then can trading of underlying shares and warrants commence. The commencement of separate trading in shares and warrants is conditional on the approval of the underwriter and the filing of the 8-K form with the SEC, which includes an audited balance sheet reflecting the proceeds from the public offering, as well as an

[33] The structure of Units changed over time, and while in the first few years the Unit would usually consist of 1 share and 1 warrant to buy 2 common shares, lately a Unit more often consists of 1 share and 1 warrant to buy 1 share, and sometimes even 3/4 or 1/2 of the warrant.
[34] Federal Deposit Insurance Act defines what represents "insured depositary institution " in section 3 (c)

over-allotment exercise of units by underwriters, if necessary. While warrants are tradable immediately after the approval of the underwriter, they cannot be exercised until the completion of a business combination.

The units of SPACs, along with their shares and warrants, are traded on OTC markets, AMEX/NYSE and NASDAQ.[35] At first, and especially in the 2003–2005 period, SPAC units, shares, and warrants were listed and traded on illiquid OTC markets. In 2005, AMEX decided to allow the listing of SPACs, while imposing on them rules regulating the minimal capital requirements, governance, compliance with Sarbanes Oxley, and the minimum price share. Compliance with listing rules was not sufficient to guarantee the actual listing on the exchange for every SPAC, but AMEX made the decision on an individual basis. In 2008, both NASDAQ and NYSE filed with the SEC to allow SPACs to list their securities. The main listing requirements for SPACs on all exchanges are presented in Appendix II.

C. Exit: Merger or Liquidation

The IPO date represents the first day of the public life of the SPAC. But, unlike for the majority of other existing public corporations, it also determines very precisely the last day of the SPAC's life. Because SPACs are formed with the unique purpose of acquiring or merging with other businesses over a limited period of time, the date of two years after the IPO event on average represents the last day of their public life as an original entity. If SPAC managers are unable to find a business combination in that given time frame, the SPAC is dissolved and existing public investors are entitled to distribute funds from the escrow account proportionate to their share holdings.

[35] On May 23, 2008, NYSE listed Heckman Corporation as its first SPAC.

The two years provided to SPAC promoters to find a proper business combination could be extended for an extra six months, assuming that the SPAC files a letter of intent with the SEC to undertake a merger. Few SPACs in the sample with a focus on business combinations in Asia have extended the allowed time frame any longer due to expected regulatory troubles in China. Goldman Sachs, as the lead underwriter of the Liberty Line SPAC, argued in its public announcement of intentions that the time frame for SPAC sponsors to execute business combinations could impact both the identity of the potential investors in the SPAC and the success of the merger. Goldman Sachs proposed that SPACs should be given a longer time than the usual two years to conduct a business combination.[36] It reasoned that the longer the time period between the IPO and the potential liquidation, the higher the chance to attract long term investors, such as pension and institutional funds.

The time limit for liquidation is also affected by stock exchange listing rules. In the early years, SPAC securities were traded at OTC markets, and consequently at AMEX, but the strict set of rules governing the time limit to liquidate SPAC was not established at that time. In most cases, a limit of 24 months was self-imposed by founders and underwriters. In 2008, two larger exchanges, the NASDAQ and the NYSE, announced plans to list SPACs and extended the time for finding a target to 36 months.

In prospectus forms filed with the SEC, SPAC founders usually specify the industry or country target for their acquisition; however, they are not obliged by any formal rule to abide by this specification. They are required to file regular quarterly and

[36] In order to broaden interest among long term investors, this SPAC was structured to lower the percentage of shares owned by founders (7.5% instead of standard 20%), to lower the number of warrants in each unit, and to lower the underwriter's fee. On May 28, 2008, Goldman Sachs announced that was unable to raise proceeds as planned and dissolved the Liberty Line SPAC.

annual financial statement forms with the SEC and to report any potential changes in their corporate status. Usually SPACs use the 8-K form or the 425 form to announce a business combination and to inform the public about it. In the announcement filing, the SPAC's management explains the structure of the proposed business combination, and specifies the name of the target and the name of the new company if a merger occurs.

As a disclaimer to the announcement form, SPACs inform the shareholders that more details will be provided in the SEC-required joint proxy prospectus. They also state that the consummation of the deal is subject to the approval of the minimum percentage of public shareholders, as predetermined in the IPO prospectus forms filed by the SPAC.

The joint proxy prospectus forms follow the announcement of the business combination. Depending on the nature of the deal, there could be several of these forms, including preliminary information statements and preliminary proxy statements related to merger and acquisition, followed by definitive information or a definitive proxy statement. All of these forms record procedures and events surrounding the merger approval process, and provide full disclosure of the target business. This process can be time consuming since the SEC first reviews preliminary forms and then provides feedback to SPAC management. Only after the SEC approves the final content of the proxy statement forms can SPAC management create a definitive proxy document to send to shareholders.[37]

After the announcement of the merger combination and the approval by the SEC of the definitive proxy statement, the major task for SPAC managers is to obtain the support of shareholders for the proposed business combination on the actual date of the

[37] Based on my conversation with SPAC promoters and underwriters, I conclude that they believe that the time spent by the SEC on reviewing these proxy statements was especially long during first few years of SPAC revival.

vote. All shareholders are entitled to vote on the business combination. In order for the deal to be approved, it cannot be rejected by more than a certain percentage of its investors as determined at the time of the IPO.

In the period between 2003 and 2006, typically the no-vote threshold was set at 20% of shareholders votes. After 2006, that threshold was set on average at 30%. In reality, that means that if more than 20% of shareholders voted against the proposed business combination, the merger process would be suspended and the SPAC liquidated. If the SPAC announces its liquidation, all shareholders are entitled to divide the funds kept in the escrow accounts based on the number of shares they own.

If SPAC shareholders approve a business combination, SPAC managers together with their underwriters and legal counselors file new forms and notify the SEC of the issuance of securities related to the business combination. Finally, the 8-K form demonstrates that the remaining shareholders of the SPAC approved the transaction. That means that all of the funds held in the escrow accounts are released to the SPAC management and become available for use by the newly created company.

2.3 The sample

After the first modern SPAC completed an IPO in August 2003, 263 SPACS registered to issue securities, and until July 1, 2009, 161 of them successfully conducted an IPO raising close to $23 billion in total proceeds. The focus of our study is on 161 SPACs that conducted an IPO. The data for the study is derived from various sources.

The Edgar database is used to collect all relevant statistics on SPACs--from the initial filing of the preliminary prospectus S-1 forms, through the final prospectus 424-B forms and additional 8-K forms, to the 10Q statements filed immediately after the IPO. In

this paper, all of our reported statistics are derived from the aggregation of collected information in those forms and we have all the relevant data for the 161 SPACs that we analyzed.

The data on daily stock returns for 99 companies in the sample was extracted from the CRSP database. For the additional 50 companies, we collected daily prices using Bloomberg and Reuters platforms. We found data on SPAC unit prices and warrant prices from Bloomberg and Reuters, where we collected unit daily data for 111 companies and warrant daily data for 80 companies.[38] Table I shows that out of 161 SPACs, 71 completed a merger by July 2009, 41 are still looking for an appropriate target or have announced a potential business combination, and 49 have been liquidated or have announced liquidation.

3. Stakeholders and their incentives

3.1. Founders

The original SPAC founders are usually former or current executives who come from a variety of industries. In the financial press they are called SPAC sponsors, SPAC managers, or SPAC promoters. The filing forms reveal that SPAC sponsors come from all spheres of life, as well as from different areas across the globe. In some SPACs, managers disclose their involvement in blank check markets before 2003. Recently, some of the SPAC founders are investment companies, hedge funds, and private equity funds, where private equity managers see SPACs as a path to access public capital markets. Very often SPAC founders have previous experience in merger and acquisition activities. In most cases, five individuals are founders of a SPAC.

[38] Daily prices on SPAC securities are becoming more readily available , but the major obstacle is the fact that vendors do not maintain historical unit and warrant data after SPACs either conduct a merger or liquidate

A. Typical investment

SPAC founders usually contribute $25,000 at the moment the shell is formed. In our sample, as shown in Table II, on average their initial investment is $57,000 representing 100% of the SPAC equity. This equity stake represents, on average, 4.16 million shares, costing each SPAC founder approximately $0.0137 per share. A typical SPAC founder discloses in the S-1 form the intention to devote a few hours of work per week to the SPAC and warns future investors of possible conflicts of interest due to involvement in similar competing companies. SPAC founders also inform investors about the high uncertainty of the merger's success. If compensated, the average annual salary of a SPAC founder is $75.000.

B. Typical payoffs for SPAC founders

SPAC founders raise funds by selling 80% of their equity stake through the IPO. The remaining 20% of equity remains with them and becomes more or less a finder's fee in the case of a successful business combination. Besides the initial equity investment, founders commit to buy upfront, on average, 3.75 million warrants at an average price of $0.95. Based on a founder's initial investment, as disclosed in the forms registered with the SEC, we can analyze their potential gains conditional on the successful merger, as shown in Figure I.

Assuming that the share-conversion ratio during the merger is one, we calculate potential gains for SPAC founders in absolute dollar value, depending on changes in the stock price and assuming a post-merger warrants' exercise. On average, SPAC managers contribute $3.619 million to the company, either through initial investment or warrant purchases.

The founders' contribution represents 2.76% of total funds that a SPAC keeps in its escrow accounts. Assuming that the SPAC founders would not buy any additional shares later in the process, a simple calculation shows that any post-merger stock price higher than $1 means a positive return to the SPAC founders.[39] Therefore, the way for managers to achieve a positive return is to find an appropriate target and to successfully close the merger transaction.

In the case where the merger does not materialize for any reason and the SPAC is liquidated, promoters are neither entitled to any return on their initial investment, nor compensated for warrant purchases; consequently, they lose all of their initial investment. The failure to find the proper target could impair the reputation of the SPAC promoters and vice versa. For example, managers of Chardan China, who successfully executed a merger in November 2005, were later able to raise funds for four additional SPACs of which three already found proper business combinations.

3.2 Underwriters

The first modern-era SPAC, which completed an IPO in August 2003, created the underwriter EarlyBirdCapital.[40] The role of the underwriters in the life of SPACs is manifold.

First, underwriters carefully structure offerings of SPAC securities in order to make the SPAC interesting for potential investors. Second, underwriters serve as market-makers for SPAC units, shares and warrants and determine when they can be traded.

[39] The assumption that SPAC founders are not going to buy any additional shares during the process could be questionable due to the so called "yield game" where for some investors it may be rational to opt for SPAC liquidation instead of approving the business combination

[40] The Millstream Acquisition Corporation is the first SPAC that did an IPO in August 2003, and the first one that successfully completed a merger in 2004.

Finally, underwriters provide their proprietary knowledge and serve as advisors to the parties involved.

Out of 161 SPACS that conducted an IPO, all but five followed the same format in structuring their offerings by issuing only one class of units. This remaining five SPACs, having HFCP/Brenner Securities as their lead underwriter, issued two types of units, with two classes of shares and two classes of warrants.[41]

A typical SPAC, as shown in Table II, raises $126.4 million in gross proceeds in its IPO.[42] On average, the underwriter's fee is 7% of the gross proceeds. The fee is divided into 3.94%, which is paid to the underwriters at the moment of the IPO, and 3.06%, which is deferred and paid conditionally on the successful merger. The deferred part of the underwriter's compensation has a motivational role for underwriters, and at the same time, serves as a positive signal to investors. This deferred part of compensation aligns the incentives of the underwriters with the incentives of the SPAC founders, with respect to the final outcome.

Final prospectus forms provide information on the allocation of units to the underwriters involved in the issuance process and on the size of the underwriters' syndicate. Table III provides an overview and lists leading underwriters either by the number of deals in which they were lead underwriters or members of the syndicate or by the average number of units they issued.

According to final prospectus reports, 95 underwriters in total took part in the SPAC unit issuance process. An average the SPAC that issues 14.85 million units is

[41] In the deals underwritten by HCFP, the insiders on average buy only 100 common shares at a total cost of $500. They have also purchased a large number of warrants prior to the completion of the IPO

[42] The amount of 126.4 million represents the proceeds raised in the case the underwriter does not exercise an over-allotment option. Full exercises of an over-allotment option would increase the amount of gross proceeds by 19.9 million on average.

being serviced by a syndicate of 3.64 underwriters. Four of the underwriters, either as lead or co-lead, were involved in more than 25% of all SPACs that successfully conducted an IPO, while one underwriter was involved in 46% of all SPAC IPOs.

A high level of syndication was common between 2003 and 2006. The success of the first SPACs in finding appropriate targets for merger and an increased demand for SPAC securities in the investment community brought large players like Citigroup and Deutsche Bank into the market as underwriters and promoters.

According to our data, Citigroup is the leading underwriter in terms of the total number of SPAC units issued to the public. Panel B shows that five underwriters were lead underwriters and promoters in more than 10% of all SPAC IPOs, with Early Bird Capital being the lead underwriter for 20% of the SPACs.[43] Interestingly, investment banks that were participants in underwriting syndicates in more than 20% of the IPOs were never leading underwriters alone. We conclude that SPAC underwriting is a specialization of few banks and that the average size of an underwriting syndicate is more than four times lower than a typical IPO, as reported in Aggarwal (2000).

3.3. Investors

A. Overall characteristics of investors in SPACs

On average, investors are, as presented in Table II, buyers of a 78.2% equity stake in a SPAC during the IPO. By purchasing SPAC units they provide 97.24% of cash to the SPAC. The remaining 2.76% comes from SPAC sponsors through warrant purchases and initial investments.

Both in registration statements and in the final prospectus, SPAC investors are informed about the management of cash proceeds before the IPO. Around 96% of funds

[43] EarlyBirdCapital considers SPACs as their trademark

raised through the IPO are placed in an escrow account with a well-established financial institution.

The funds in escrow serve as a downside benchmark for all potential public investors in the SPAC and assure them if a proper merger is not found, then about 96% of the invested funds would be returned. Depending on the SPAC's management decision, the interest earned on the funds in an escrow account can be used as the working capital for the acquisition of related expenses.

The establishment of the escrow account is not the only way for public investors to protect themselves against the failure to find a merger target. Investors can get back, on average, 96% of their investment, even if a merger is announced and agreed upon, just by opting for cash conversion of their shares. Between 2003 and2006, if more than 20% of public investors opted for share conversion, the merger would be terminated and SPAC dissolved, with all funds from the escrow accounts returned to public investors. In recent prospectuses, the upper limit on the fraction of converted shares that trigger termination of the merger and dissolution of the SPAC is usually 30-35%, and, in some cases, even 40%. This increase in the percentage of investors necessary to stop a proposed merger is most likely a response by founders of SPACs and underwriters to shareholders' activism.

Investors in a SPAC who own 78.2% of shares while contributing 97.24% of the capital experience share dilution. In addition to dilution due to the discounted price that SPAC founders pay for equity, public investors also might experience dilution due to possible cash conversion by investors who disagree with a proposed merger and want to opt out of the SPAC.

In Figure II, the share dilution is calculated for a typical SPAC in our sample, assuming that warrants have no value and that the underwriter did not exercise over-allotment shares.

On average, across the sample new investors realize a share dilution close to 29.30% if a possible conversion of shares is not accounted for. In the majority of prospectuses, SPAC underwriters and sponsors calculate the maximum share dilution that could be realized if 20% of investors convert their shares. Considering that a conversion of shares would decrease the net tangible book value of the SPAC for 20%, while keeping the number of remaining shares constant, our dilution (2) measure shows that a maximum share dilution of 43.40% for remaining investors is theoretically possible.

After the trading of SPAC securities is established, the primary market investors are able to adjust their holdings in secondary markets based on the expectations of future payoffs. Given that investors purchase units that are later disbundled into shares and options to buy additional shares if a merger occurs, there are many possible strategies for investors during the two-year period before a final decision on a merger is made. For example, investors who believe in the vision of SPAC founders and are committed for a long term, can simply keep their shares and warrants in their portfolios as they anticipate post-merger gains.

B. Incentives of investors in respect to exit

SPAC investors have different strategies to maximize their initial investment. Figure III shows a possible strategy that would make SPAC investors unwilling to proceed with the merger unless they identify value in creating a merger.[44] In recent

[44] The T-bill rate used in figure III to calculate potential yields represents the prevailing rate in 2007 and 2008.

SPAC offerings, it is common that almost 100% of gross proceeds are placed in escrow accounts. This feature enables certain investors to play a so-called "yield game" by immediately selling warrant securities and opting to convert shares into cash at the moment of merger. As shown in Figure III, the investors could realize positive returns of around 7% by applying a similar strategy. Obtained returns to yield players are positively related to the willingness of SPAC managers, underwriters, or third party investors to proceed with the deal. This potential strategy is well known to SPAC promoters and underwriters, who are essentially forced to keep track of the identity of investors, as well as their opinions about proxy voting to approve the merger.[45]

Assuming that the SPAC investor is a leveraged hedge fund with a leverage of 5 to 1 and an initial investment of $160,000 of its own funds, we calculate a potential total return of 78% over the life of the SPAC. The return could be higher if SPAC sponsors are forced to buy shares above trust/per share value in order to secure enough votes to approve the merger.

The uncertainty about merger success caused by the conflicting interests of SPAC founders and investors was the leading reason for changes in the percentage of investors that can veto the merger.[46] In the most recent SPACs that conducted an IPO, the percentage of investors that could veto mergers was as high as 40%.

[45] In an attempt to increase support for the merger, SPAC promoters in their proxy statements before the vote said this: "Prior to exercising conversion rights, shareholders should verify the market price of common stock, as they may receive higher proceeds from the sale of their common stock in the public market than from exercising their conversion rights."

[46] If investors buy shares when they trade below the net asset value, it could be in their best interest to reject the deal. Some investors could be interested only in short term profits, which is not necessarily in the best interest of the SPAC.

4. SPAC performance

In this section, we describe important events in the life of SPACs, such as the IPO, the merger announcement, and the merger itself. In addition, we analyze the performance of the SPAC securities.

4.1 The IPO

A. Filing statistics

In Table III, the characteristics of 161 SPACS that conducted an IPO are presented as they are in the final prospectus forms. On average, at the IPO, SPACs issue 14.85 units at an average price of $7.84.[47] The average gross proceeds before the underwriter's decision to exercise an overallotment option are $126.40 million, out of which $119 million is placed in an escrow account. This represents about 95% of the gross proceeds on average, and does not show any change with respect to the preliminary prospectus. On average, the underwriter's fee is 7% of the gross proceeds; the fee is divided into 3.94% paid at the moment of IPO, and the rest of the 3.06% is deferred and paid conditionally on a successful merger. On average, SPAC managers purchase 3.75 million warrants at a price of $0.95, and place them into an escrow account.

Table I also presents the summary statistics based on information presented in the 423B-3 forms of all 161 SPACs, with the sample divided into two sub-samples. The first sub-sample covers time the period between from January 2003 and April 2006, and the second sub-sample covers the period between April 2006 and July 2009. There are two reasons for doing this. First, it allows us to see the changes in the SPAC structure over

[47] The majority of the units are structured as one share plus one warrant. To buy one additional share, the average unit has one share and one warrant which provides an option to buy 1.28 shares. There are 10 unit offerings in which a warrant is buying less than 1 share in the future date.

time, such as the increase in the average IPO size, the decrease in the number of shares that warrants can buy, and the increase in the deferred compensation to underwriters. Second, it divides the sample at the point where Jog and Sun (2007) completed their observation of the process.

Comparing the two periods, SPAC founders on average offered 106.00% (18.34 vs. 8.90) more units in the later period, and sold units at 22% higher a price (8.40 vs. 6.89), which typically led to a 147% increase in gross proceeds from the first to the second period, and implies an overall stronger interest in the investment community for SPACs. The increase in gross proceeds is accompanied by an increase in the ratio of the proceeds being placed in the escrow accounts from 91.20% in the first period to 98.00% in the second period. This can be explained by the increased amount of commission that underwriters deferred (0.03% of gross proceeds in the first period versus 3.20% in the second period), as well as an increase in the amount of funds that the original SPAC founders invested by buying warrants.

While underwriters' total commission was around 7% in both periods, we can see a decrease in the percentage that underwriters charged immediately after the IPO, from 7.37% of gross proceeds in the first period to 3.20% in the second period, with the remaining compensation being tied to the success of the proposed merger. By comparing two periods, we can see an increased commitment on the side of the SPAC sponsors through the purchase of warrants. On average, in the first period they purchased 1.85 million warrants and in the second period they purchased 4.19 million warrants.

B. Underwriters' option to purchase additional units after the IPO

The first form that SPAC founders file with the SEC after the successful IPO is the 8-K form[48]. In this form, they report what date the IPO deal was consummated as well as information on additional unit purchases by underwriters due to oversubscription. On average, the underwriters are allotted 2.29 million of additional units to distribute. From our sample of 161 SPACs, the underwriters of 110 SPACs used that right and bought an average of 1.80 million additional units, using around 84% of their total allotment. Among the deals in which the overallotment option was used, 65 underwriters exercised that option completely.

Aggarwal (2000) believes that in regular IPOs, underwriters strategically set up their offerings and use a short covering strategy in order to support the share price in the aftermarket. In the case of SPACs, the price support does not drive underwriters' behavior due to the pre-fixed offering price of securities and the low liquidity after the IPO.

4.2 Performance of SPACs at the IPO

A. IPO day

Academic literature on the pricing of securities around IPO events is abundant. The majority of evidence shows that issued shares exhibit above market returns during their first trading day. Ljungqvist (2007) compiles the literature on underpricing and shows that the phenomena could be explained either by asymmetric information models,

[48] Form 8-K reports certain material corporate events on a more current basis, and must be filed with the SEC to announce changes that shareholders must be aware of. Companies usually have 4 days to notify the SEC of the event. From the SEC's point of view as long as SPACS file the 8-k form and audited financial statement which shows that net assets are in the excess of $5 million, they will not be considered as blank checks subject to rule 419.

institutional theory models, or behavioral theories. We believe that none of those explanations are applicable to SPAC offerings. The firmly set structure of the SPACs substantially before the IPO date, the establishment of the escrow accounts where almost all proceeds are placed, in addition to zero uncertainty about the offered unit price, create no incentives for new investors to enter into significant speculations on the first day of trading.

Sun and Jung (2007) calculate underpricing of SPACs at the moment of the IPO using the following formula:

$$\text{Underpricing} = (P_1 - P_0)/ P_0$$

where P_1 represents the closing unit price at the end of the first trading day and P_0 represents the original unit price as announced in the SPACs' prospectuses. In our data consisting of 111 SPACs with information on unit prices, we have first day trading information for 107. We calculate underpricing in the same manner as Sun and Jog (2007). In Panel A of Table IV, we present descriptive statistics of returns. Panel B shows that the overall mean of first-day underpricing is 0.0001%. This is lower than the underpricing reported by Sun and Jog of 0.38%, but the result is highly expected and the relatively high average trading volume of 2.2 million units supports the hypothesis that investors in SPACs have no incentives to diverge from the offering unit price on the first trading day.

B. Performance of SPACs' securities around the announcement of the merger

Previous findings in literature on SPACs' performance around the announcement of merger date are scarce, not uniform, and mostly address the performance of SPACs' common shares. We believe that more insights on merger announcements can be

obtained if we simultaneously analyze the performance of all three types of securities that SPACs issue during the IPO, namely units, common stocks, and warrants. In order to examine the behavior of these securities we form three samples with daily returns for three distinguished SPAC securities.

Results are obtained for abnormal returns based on the market model from Brown and Warner (1985),

$$Rjt = \alpha j + \beta j Rmt + \varepsilon jt$$

where Rjt is the rate of return of the jth SPAC security on the merger announcement day *t*, and Rmt is the rate of return of an equally weighted daily market index on day *t* downloaded from CRSP. Then the abnormal return for the SPAC securities on merger announcement day t is

$$ARjt = Rjt - (\alpha_0 j + \beta_0 j Rmt)$$

where α_0 and β_0 are ordinary least squares estimates of α and β. The parameter estimation period is 50 days prior to the first day of the 11-day event period. In addition to the calculation of abnormal returns around the announcement day, we calculate cumulative abnormal returns up to seven days after the event.

Out of 161 SPACs that successfully conducted an IPO since 2003, we have complete stock price information around the announcement date for 88. The absence of stock price information on the remaining SPACs occurred for the following reasons. Neither CRSP, Bloomberg nor Reuters provided stock price information for the 12 SPACs around the announcement date. In addition, we excluded from the sample five SPACs that were issuing dual shares and pricing them differently. The rest of the SPACs

are not in the sample because either their merger announcement date is after January 2009 or because they did not announce an intent to conduct a merger at all.

In Table V, Panel A we report that abnormal returns on SPACs' common stock on the announcement day is 0.85%. When abnormal returns are calculated over the two-day period, which includes the announcement date and the day after, SPAC common shares exhibit positive abnormal return of 1.2%. We calculate cumulative abnormal returns up to seven days after the announcement and report in Panel B that after the first post-announcement day, returns monotonically decline to 0.047% seven days after the announcement. As expected, the SPAC common shares do not exhibit abnormal performance in the seven day period after the merger announcement. This is primarily due to the fact that SPAC common shareholders can redeem their shares at pro rata value of deposited funds in the escrow accounts independently of the merger outcome, and therefore, they do not have much incentive to bid up the price higher at the announcement date.

In Panel A of Table VI we report abnormal returns around the merger announcement days to unit holders. The data on the unit daily prices comes from Bloomberg and Reuters, and we have complete information for 48 SPACs around the merger announcement date. Since a unit is composed of SPACs' common shares and additional warrants that are exercisable only after successful merger combination, it is interesting to observe the behavior of unit holders around the announcement of a merger. For 48 SPACs that have information on unit prices, an average unit consists of one share and 1.134 warrants.

On the day of the announcement, unit holders experience a 2.42% positive abnormal return. When an abnormal return is calculated for the two-day period, which includes the announcement date and the day after, the abnormal return is 3.43%. When we calculate cumulative abnormal returns for up to seven days after the announcement, we see that the total cumulative return for unit holders is 7.88%. This finding is interesting and, based on a reported lack of significant overperformance of SPAC common shares around the merger announcement, leads us to conclude that unit abnormal returns are largely driven by performance of warrants.

Finally, we examine the behavior of SPAC warrants around the merger announcement date. The data on warrant prices is the hardest to obtain primarily because historical warrant prices are not kept on record once warrants are exercised, and in some cases are not reported at all. Data is easier to obtain for SPACs that conducted their IPO in the last two years. Although we have collected data for daily warrant prices on 80 SPACs from the sample, the data needed to thoroughly estimate returns around the merger announcement date is available for only 24.

Warrant holders experience significant abnormal returns on the day of the announcement and these returns are reported as 11.11% in Panel A of Table VII. Similar performance is observed on the first day after the announcement where we see an additional 4.20% abnormal return. Interestingly, this strong positive reaction lasts only for these two days and on the second day after the announcement, abnormal returns became negative, leading to a cumulative abnormal return of 6.6% seven trading days after the announcement. A positive reaction of warrant prices after the merger announcement is expected.

C. Performance of SPAC securities around the merger

Mergers are the desired final outcome for SPACs. It should be a natural outcome that mergers create value for all the participants. We test behavior of SPAC securities around the merger date and in Table VIII Panel A, we report results for equity performance. We have daily stock returns on and around the merger dates for 48 SPACs that completed mergers. SPAC equity holders experience a negative 3.81% return on the day of merger completion. On any post-merger day, up to seven days after the merger, SPAC equity holders experience a negative abnormal return. Panel A reports the cumulative abnormal return for the seven days after the event as -9.59%. This finding is interesting, but not unexpected since the merger date is determined in advance when the merger is approved by shareholders. It might also be due to premium prices that parties in favor of the merger were paying for shares before the voting day.

In Panel B we present results on abnormal returns for warrants on and around the merger date. Only eight companies have available data. On the merger day, warrant holders earn a 4.76% abnormal return, while the cumulative return for seven days after the merger is 7.36%.

D. Overall Performance of SPAC securities

In Table IX we show the buy and hold performance for three SPAC subsamples based on their merger status. Panel A of Table IX includes SPAC companies that completed a merger. We calculate the buy and hold return for a hypothetical investor who bought one SPAC unit on the IPO date and was holding that unit until the last week of June 2009. There are 66 companies with available data in the first subsample and the average buy and hold unit return for each is -28.69%. SPACs that successfully completed

a merger offered on average 7.33 units for sale at the IPO; their unit consisted of 1.43 warrants and their average size calculated by the dollar amount of IPO proceeds was $98.875 million. This finding is interesting primarily because the first SPAC shareholders initially had the power to veto the merger, and as a result of not exercising this power at that moment, they tended to engage in value-destroying activities.

Panel B of Table IX presents the characteristics of the second subsample, which consists of companies that already announced a merger but currently are in the process of approval. There are 16 companies with available data and on average they exhibit a 9.6% positive buy and hold unit return from the IPO date until the last week of June. On average, these SPACs are larger than SPACs that already completed mergers ($177 million vs. $98 million), have fewer warrants per unit (1.25 vs. 1.43) their units are offered at the higher price at the time of IPO (8.5 vs. 7.33), and they have a higher percentage of gross proceeds deposited into the escrow accounts (98.6% vs. 93.3%). Two potential explanations for why unit investors in this subsample experience positive returns are as follows. First, investors are willing to bid up the price of either shares or warrants, assigning a high probability for value-creating transactions. Second, SPAC founders and underwriters under pressure to complete the merger are buying out original SPAC investors at prices higher than the original value.[49]

In Panel C of Table IX, we calculate buy and hold unit returns for SPACs that conducted an IPO but are still seeking a merger as of the last week of June 2009. The subsample consists of 23 companies that on average raised $233 million at the IPO and whose warrant consists of 0.97 units. As of the last week of June they experienced -

[49] The limited data we have points to the second possibility

8.22% returns. Panels D and E show some characteristics of SPACs that liquidated and the whole sample, respectively.

4.3 Merger determinants

Although the approval of the merger is fully in the hands of a qualifying percentage of investors during the merger voting process, we try to examine the possibility that additional SPAC characteristics could impact the success of the merger.

By analyzing available data on 161 SPACs that completed an IPO and applying probit estimation procedures, we test the likelihood of the merger success on the set of SPAC characteristics:

Merger success = f (Set of SPACs characteristics)

where SPAC characteristics are the gross amount of IPO proceeds, the number of warrants in unit, the unit price at IPO date, the percentage of funds deposited in the escrow accounts, the underwriter's name, the size of the underwriter's syndicate, and the share dilution.

As reported in Table X, the likelihood of a successful merger for SPACs increases with respect to the unit offer price, number of warrants per unit, and the presence of EarlyBirdCapital (EBCAP) as the lead underwriter. The likelihood of a merger decreases with respect to an increase in the size of the offering and the percentage of funds deposited in escrow accounts.

5. Conclusion:

We examine the characteristics of SPACs and the performance of the securities they issue, namely, units, common stocks and warrants, at important dates of their limited corporate life. Our analysis shows that SPACs have a complex corporate structure in

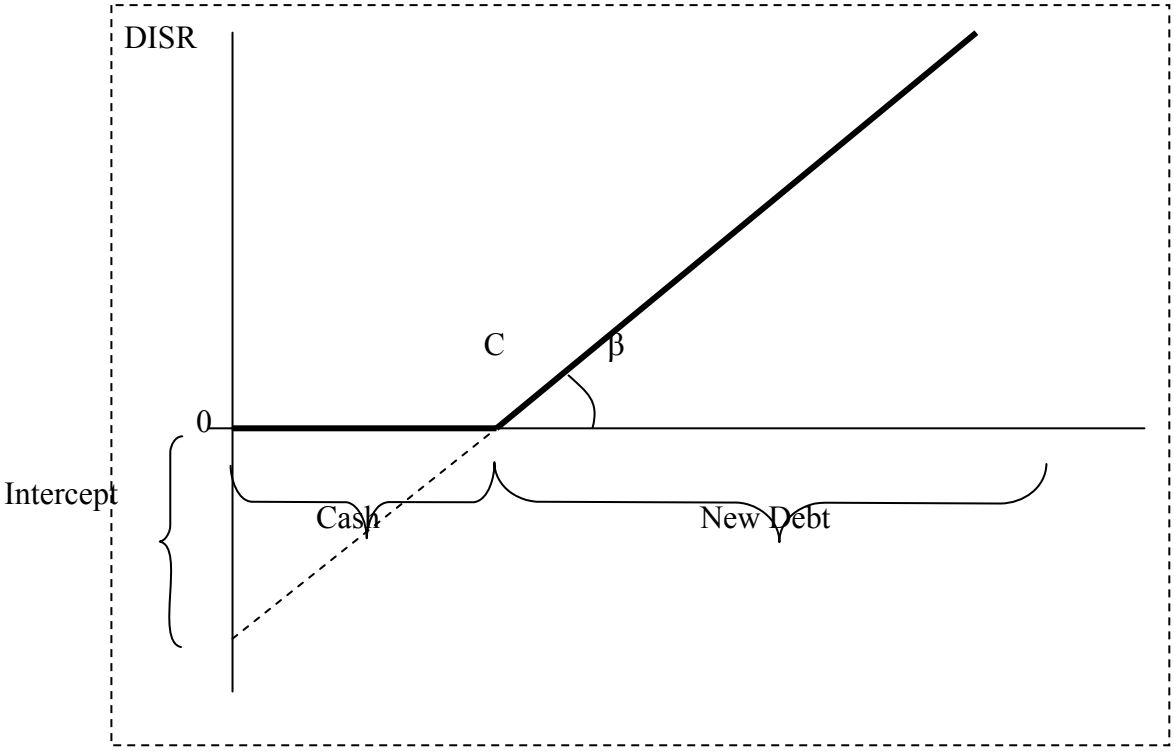
which the incentives of the founders, underwriters, and investors are interdependent and where successful mergers result in significant returns to the founders.

We also show that different SPAC securities do not exhibit similar reactions in response to announcements regarding their corporate status. While holders of all three securities realize positive abnormal returns on the merger announcement day, the strongest reaction is observed among the investors holding warrants, while common stock holders react very mildly. This is an expected outcome bearing in mind the way SPACs were originally structured.

Essay 1

Figure 1. The financing of maturing debt under the pecking order theory

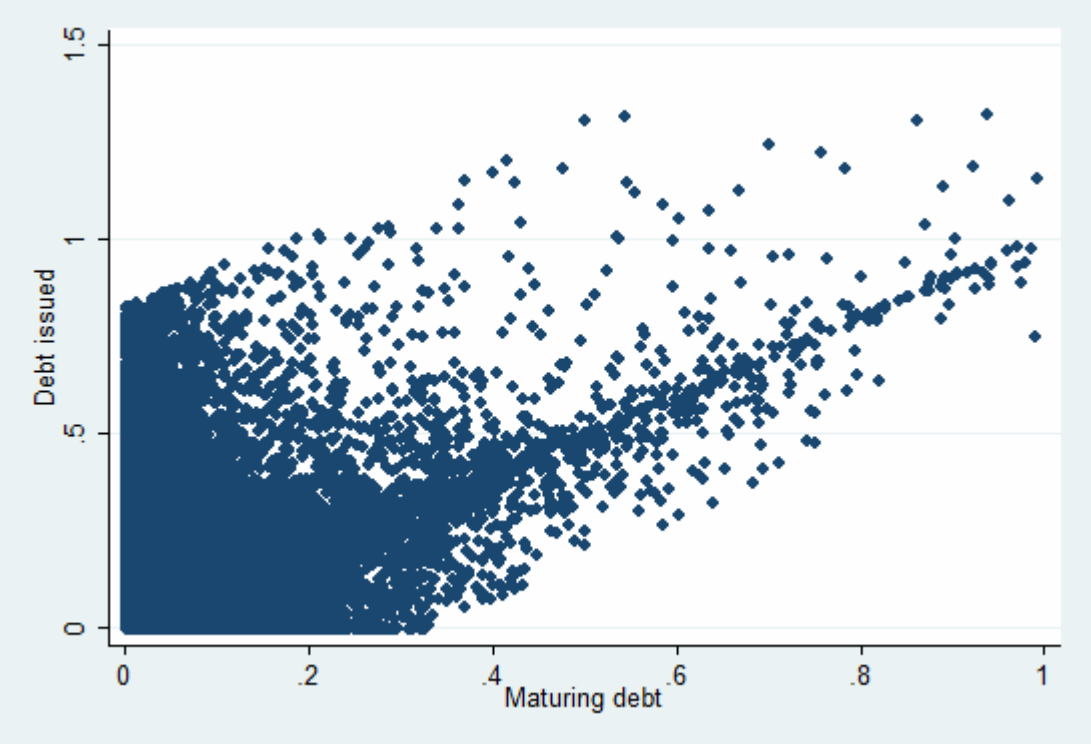
The figure presents the theoretical relationship between the amount of maturing debt, R, and the amount of new long-term debt issued, DISR, under the pecking order theory and in the absence of debt capacity constraints.



Essay 1

Figure 2. The financing of maturing debt

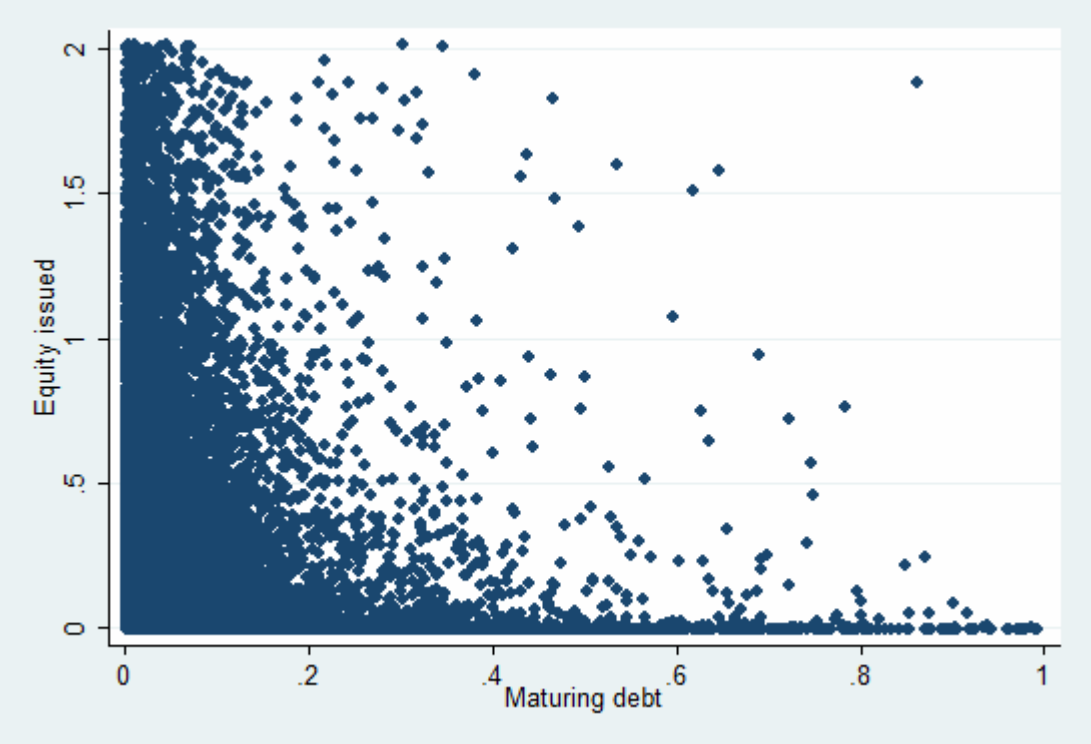
Each dot on this scatter plot represents one observation in our sample, linking the amount of maturing debt and new debt issuance.



Essay 1

Figure 3. The financing of maturing debt

Each dot on this scatter plot represents one observation in our sample, linking the amount of maturing debt and new equity issuance.



Essay 1

Table 1
Sample Statistics

The table presents summary statistics for the sample period from 1971 to 2006. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Net equity issued is equity issued (data108) minus equity repurchased (data115), scaled by lagged total assets. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Financing deficit is the sum of net debt and net equity issued. Cash is cash and short-term investments (data1) scaled by assets. Rated is an indicator set to one for which the firm has a rating (data280). Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively.

Variable	mean	median	min	max
Maturing long-term debt, R	0.033	0.016	0.001	0.993
Net equity issued, NEIS	0.045	0.000	-0.143	2.013
Net long-term debt issued, NDISR	0.052	0.011	-0.323	1.322
Financing deficit, DEF	0.096	0.023	-0.421	3.192
Cash	0.096	0.047	0	0.993
Rated	0.243	0	0	1
Sales (millions of dollars)	1,029	92	1	328,213
Maturing long-term debt / net long-term debt issued		0.489		

Table 2
Pecking order tests

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions of net debt issued estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses. Financing deficit is the sum of net debt and net equity issued. Net equity issued is equity issued (data108) minus equity repurchased (data115), scaled by lagged total assets. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively.

	Net debt issued		Net debt issued	
	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	0.016**	6.3	-0.016**	-3.6
Financing deficit	0.427**	6.2 (-8.4)		
Maturing long-term debt			1.035**	37.9 (1.3)
Pooled R^2	0.326		0.160	
Observations	113,768		113,768	

Essay 1
Table 3
Pecking order tests by firm size quartiles

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions of net debt issued estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses. Financing deficit is the sum of net debt and net equity issued. Net equity issued is equity issued (data108) minus equity repurchased (data115), scaled by lagged total assets. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Quartile 1 (4) contains the quarter of the sample firms that are the smallest (largest) in terms of sales. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively.

	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Panel A.								
Intercept	0.026**	7.1	0.015**	5.3	0.003	1.8	0.004**	3.4
Financing deficit	0.333**	4.2 (-8.5)	0.450**	6.2 (-7.6)	0.701**	17.9 (-7.6)	0.785**	54.3 (-14.9)
Pooled R^2	0.213		0.310		0.622		0.799	
Observations	26,758		27,977		28,547		30,486	
Panel B.								
Intercept	-0.028**	-5.5	-0.025**	-4.6	-0.013**	-2.6	0.000	0.1
Maturing long-term debt	1.110**	27.1 (2.1)	1.043**	39.7 (1.6)	0.996**	42.8 (-0.2)	0.889**	18.5 (-2.3)
Pooled R^2	0.198		0.142		0.118		0.095	
Observations	26,758		27,977		28,547		30,486	

Essay 1

Table 4

Pecking order tests by access to public debt market

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions of net debt issued estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses. Financing deficit is the sum of net debt and net equity issued. Net equity issued is equity issued (data108) minus equity repurchased (data115), scaled by lagged total assets. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively.

	Without credit rating		With credit rating	
	Coeff.	t-stat.	Coeff.	t-stat.
Panel A.				
Intercept	0.023**	9.0	0.005**	2.6
Financing deficit	0.273**	11.2 (-29.8)	0.816**	19.0 (-4.3)
Pooled R^2	0.247		0.798	
Observations	48,897		15,961	
Panel B.				
Intercept	-0.032**	-6.7	-0.006	-1.8
Maturing long-term debt	1.076**	39.1 (2.8)	0.913**	29.3 (-2.8)
Pooled R^2	0.206		0.118	
Observations	48,897		15,961	

Essay 1

Table 5
Pecking order tests by period

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions of net debt issued estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses. Financing deficit is the sum of net debt and net equity issued. Net equity issued is equity issued (data108) minus equity repurchased (data115), scaled by lagged total assets. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively.

	1971-1989		1990-2006	
	Coeff.	t-stat.	Coeff.	t-stat.
Panel A.				
Intercept	0.012**	4.1	0.022**	7.3
Financing deficit	0.545**	5.8 (-4.9)	0.279**	9.2 (-23.9)
Pooled R^2	0.429		0.258	
Observations	65,373		48,395	
Panel B.				
Intercept	-0.007*	-2.0	-0.027**	-5.3
Maturing long-term debt	1.006**	25.0 (0.2)	1.071**	43.5 (2.9)
Pooled R^2	0.107		0.217	
Observations	65,373		48,395	

Essay 1

Table 6

Pecking order tests by cash quartiles

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses. Net equity issued is equity issued (data108) minus equity repurchased (data115), scaled by lagged total assets. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Quartile 1 (4) contains the quarter of the sample firms with the lowest (highest) values of cash (data 1) as a fraction of total assets. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively.

	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Panel A: Net debt issued								
Intercept	-0.001	-0.2	-0.004	-1.0	-0.017**	-4.0	-0.048**	-7.8
Maturing long-term debt	0.994**	24.3 (-0.2)	0.976**	30.9 (-0.8)	1.079**	38.7 (2.8)	1.141**	20.2 (2.5)
Pooled R^2	0.225		0.181		0.145		0.079	
Observations	28,288		28,911		28,079		28,357	
Panel B: Net debt and net equity issued								
Intercept	0.014*	2.4	0.009	1.8	-0.005	-1.1	0.005	0.5
Maturing long-term debt	1.158**	16.9 (2.3)	1.148**	18.2 (2.4)	1.368**	19.6 (5.3)	1.409**	15.4 (4.5)
Pooled R^2	0.126		0.100		0.081		0.034	
Observations	28,288		28,911		28,079		28,357	

Essay 1

Table 7

Pecking order tests by *LTD*-LTD* quartiles

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions of net debt issued estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. *LTD*-LTD* is the difference between the predicted and the actual leverage ratios. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively. The t-statistics for the hypothesis that the slope coefficients in these regressions are equal to one are reported in parentheses.

	LTD-LTD* Quartile 1		*LTD*-LTD* Quartile 2		*LTD*-LTD* Quartile 3		*LTD*-LTD* Quartile 4	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.014*	-2.4	-0.012*	-2.4	-0.016*	-2.9	-0.028**	-6.7
Maturing long-term debt	0.955**	27.2 (-1.3)	1.034**	28.6 (0.9)	1.134**	22.5 (2.7)	1.480**	14.8 (4.8)
Pooled R^2	0.329		0.093		0.047		0.024	
Observations	20,210		20,613		20,587		20,523	

Essay 1
Table 8
Pecking order tests: Regression results

The results in the table are from cross-sectional Fama and MacBeth (1973) regressions of net debt issued estimated separately for each of our 36 sample years (1971-2006). The table reports the means of the time series of cross-sectional coefficient estimates and the associated Newey-West t-statistics. Net debt issued is long-term debt issuance (data 111) minus long-term debt reduction (data 114) plus lagged debt due in one year (data 44), all scaled by lagged total assets. Maturing long-term debt is lagged debt due in one year (data 44) as a fraction of total assets. Cash is cash and short-term investments (data 1) as a fraction of total assets. *LTD*-LTD* is the difference between the predicted and the actual leverage ratios. Pooled R^2 is the R^2 of a pooled time-series cross-section version of the reported regression. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and **, respectively. The t-statistic for the hypothesis that the slope coefficient on maturing debt is equal to one is reported in parentheses.

	Coeff.	t-stat.
Intercept	-0.004	-0.8
Cash	-0.135**	-7.3
LTD-LTD*	0.004	0.3
Maturing long-term debt	1.037**	40.5 (1.5)
Maturing long-term debt × Cash	0.384	1.6
Maturing long-term debt × *(LTD*-LTD)*	0.355*	2.5
Pooled R^2	0.166	
Observations	81,925	

Essay 2
Figure I :The Incentives to SPAC founders

The analysis of potential value attainable to the SPAC founders for the average company in our sample

	Value in $	Value in $ million	Percentage
Offering size (IPO Gross proceeds + over allotment)		131.00	
Sponsors equity investment – (4.16 million shares)		0.057	
Sponsors warrant purchase – 3.75 millions ($0.95)		3.562	
Total capital at risk by managers		3.619	
Managers investment as percentage of offering proceeds			2.76
Warrant exercise price	6.00		
Share conversion ratio	1		

Price of shares ($)	1.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
Number of shares (m)	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16
Value of shares ($mil)	4.16	16.64	20.80	24.96	29.02	32.28	37.44	41.60
Num. of warrants(mil)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Value of warrants(mil)	0	0	0	0	3.75	7.50	11.25	15.00
Total value of securit.	4.16	16.64	20.80	24.96	32.77	40.78	48.69	56.60
Total capital at risk	3.61	3.61	3.61	3.61	3.61	3.61	3.61	3.61
Total return ($ mil)	0.54	13.02	17.18	21.24	29.15	37.16	45.07	52.98
Return on invest. (%)	14.90	359.00	474.00	586.00	805.00	1026.00	126.03	1463.00

Essay 2
Figure II : The Incentives to SPAC investors

The average investments by founders and investors are calculated, as well as the dilution to investors

	Shares purchased		Total investment		Avg. price per share
	Number(m)	Percentage	Value in $	Percentage	In $
SPAC Promoters	4.16	21.00	0.057	0.05	0.013
New investors	14.85	79.00	109.757	99.05	7.84
Total	19.01	100.00	109.814	100.00	0.159

Dilution Calculations:		
	Value in $	Percentage
Public offering price	7.84	
Amnt. of funds in escrow	105.42(mill)	
Total number of shares	19.01 (mill)	
Escrow/number of shares	5.54	
Dilution (1)		29.30
Amnt. when 20% convert	84.33(mill)	
New Escrow/# of shares	4.43	
Dilution (2)		43.34

Essay 2
Figure III : Possible trading strategy

An example of possible trading strategy by investors, assuming that warrants can be sold at the price of $1 in the market anytime before the merger.

Deal Characteristics		Trade by investor	
Unit price ($)	8.00	Unit price	8.00
Number of units sold (mill)	25.00	Warrant sale pr.	1.00
Total proceeds (mill)	200.00	Remaining	7.00
Amount of funds in trust (%)	99.00		
Dollar amount in trust (mill)	198.00		
T-bill interest rate (%)	3.00		
Effective tax rate (%)	30.00		
$ amount in trust after 2yrs	206.43		
Value per share in trust(%)	8.25		
Investors gain (Value per.sh-remaining)	1.25		
Annual return (Investors gain/ Unit pr)	7.50		
Leverage ratio	5.00		
Initial investor's investment ($ thous.)	160.00		
Total investment ($ thous.)	800.00		
Gain per share (Value in trust- remain)	1.25		
Total return over two years (%)	78.00		
Compounding annual return (%)	33.00		

Essay 2
Table I :
Chronological overview of SPAC activity in the 2003-2009 period

Chronological overview of SPAC activity in the 2003-2009 period where their corporate status is presented year by year

Year	Number of SPACs that completed IPO's	Number of SPACs that completed merger	Number of SPACs that liquidated	Number of SPACs seeking for merger
2003	1	0	0	0
2004	12	1	0	0
2005	27	3	0	0
2006	38	11	4	0
2007	66	27	21	20
2008	17	21	27	21
2009	0	8	13	0
Total:	161	71	49	41

Essay 2
Table II:
Characteristics of SPACs as on 423B Forms

The table presents the characteristics of 161 SPACs that conducted the IPO as in their final prospectus forms. Where: Units= number of units issued, Price = price of units at IPO, ST=number of shares, SM=management shares, PO=percentage ownership by investors, GP=Gross Proceeds, NP=Net Proceeds, ESC=value of shares in the escrow account, MI=Management investment in SPAC,UDC=Underwriters compensation, UDDC=Underwriters Deferred compensation, Warr=number of warrants bought by insiders, Wp=price of warrants, UUG=over allotment units granted, Unless noted by * next to variable, all values are in $ millions

Variables	Complete sample			Period 2003-April 2006			Period April 2006- Jul 2009		
Year	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Units (million)	14.85	90.00	0.75	8.90	28.50	0.75	18.34	90.00	2.50
Units price at IPO	7.84	10.00	6.00	6.89	10.00	6.00	8.40	10.00	8.00
ST(total # shares)	19.01	112.50	1.55	11.53	35.62	1.55	23.26	112.5	3.75
SM(# Manag. Sh)	4.16	25.87	0.25	2.62	15.00	0.25	18.20	25.87	0.75
PO(Investor. Sh %)	80.00	81.00	78.70	79.00	82.00	74.00	79.90	81.00	78.90
Gross Proc. ($ mill)	126.40	900.00	9.05	60.46	188.70	6.56	165.90	900.00	16.50
Manag. Investment	0.057	0.005	2.525	0.023	2.00	0.001	0.086	0.02	2.525
ESC	7.84	8.90	3.90	6.36	9.10	4.48	8.60	9.82	5.00
UDC (%)	7.00	20.00	1.00	7.40	20.00	4.00	6.40	9.00	1.00
UDDC(%)	3.06	5.40	0.00	0.03	3.00	0.00	3.80	1.00	5.40
Warrants (# mill.)	3.75	16.00	0.00	1.85	5.00	0.00	4.19	16.00	0.90
Warrant price($)	0.95	1.50	0.00	0.87	1.50	0.00	0.97	1.50	0.45
UUG (#units)	2.29	13.50	0.31	1.38	4.27	0.31	2.79	13.50	0.45

Essay 2
Table III
Underwriters involvement in SPAC deals

The table presents underwriter characteristics over the sample of 161 IPO's in the 2003-2009 period. In the Panel A summary statistics on the number of underwriters per deal and number of units per deal is presented. In Panel B 12 underwriters are ranked by the number of SPAC IPOs in which they were involved.

	#deals	Mean	Min	Max
Panel A:				
Number of SPAC IPOs	161			
Number of underwriters involved		95		
Amount of units issued		14.85	0.75	90
Number of Underwriters per IPO		3.64	1	12

Panel B:

(Leading SPAC underwriters)

	#deals involved	Lead underwriter	Mean (#units)	Max (#units)
Maxim Group	74	19	2.21	22.50
Ladenburg Thalmann	45	17	3.83	16.825
Early Bird Capital	42	31	3.64	7.00
Legend Merchant	40	0	0.37	1.2
Gunn Allen Financial	36	0	0.63	3.75
I-bankers	32	1	0.89	2.00
Morgan Joseph	20	16	6.36	16.02
Citigroup	18	18	24.42	80.00
Broadband	16	3	1.47	4.00
Ramius	14	2	3.45	8.33
Lazard	13	9	6.77	22.74
Deutch Bank	12	10	20.90	36.00

Essay 2
TABLE IV:

Summary statistics and IPO underpricing

In Panel A daily returns data on SPAC securities obtained from CRSP, Bloomberg and Reuters is summarized. In Panel B, underpricing of units is calculated on the day of IPO by formula Underpricing = $(P_1 - P_0)/ P_0$ where P_1 represents closing unit price at the end of the first trading day and P_0 represents the original unit price as announced in the SPACs' prospectuses.

PANEL A:
Returns statistics:

Variable	Number	Mean	Std. Deviation	Minimum	Maximum
CRSP data stocks price	45197	7.065	2.700	0.02	30.80
Returns	45130	-0.0007	0.04	-0.06	1.33
SP500 RET (from CRSP)	45243	-0.00075	0.02	-0.09	0.11
Bloomberg data stocks pr.	27363	5.67	2.54	0.001	15.20
Original Unit offer price	161	7.87	1.54	6.00	10.10
Trading price for units	31495	7.80	2.87	0.0001	45.80
Warrants per units at IPO	161	1.31	0.47	0.50	2.00
Warrants excer.prc at IPO	161	5.90	0.95	4.50	8.00
Trading price of warrants	31767	0.59	0.67	0.00	6.40

PANEL B:

Underpricing at the IPO	Number	Mean	Std. Deviation	Minimum	Maximum
Unit open price 1st day	107	7.966	1.60	5.60	11.05
Unit close price 1st day	107	7.962	1.58	5.77	10.65
Underpricing 1st day	107	0.0001	0.052	-0.231	0.33
Unit Volume 1st day	90	2208047	3086264.84	200	16813700.0

Essay 2
Table V:
Returns for SPACs common stock holders around the merger announcement day

Panel A presents abnormal returns on the announcement day calculated by the market model. In Panel B we extend the observation period by one day until seven days after the announcement and we calculate cumulative returns for each day. Panel C is graphical presentation of the results obtained in Panels A and B.

Panel A: SPAC Stock Returns around the merger announcement date:

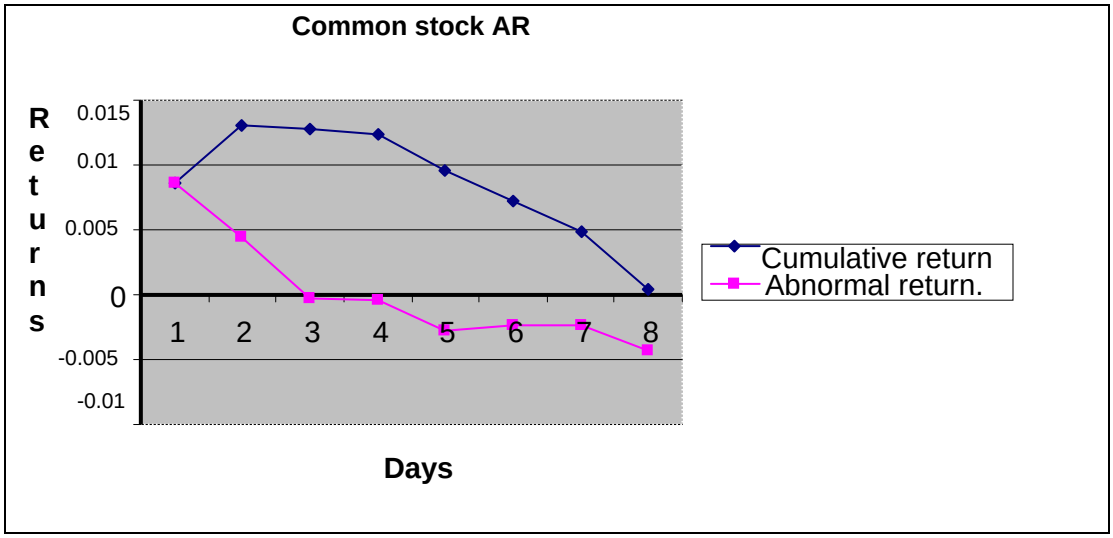
Announcement date stock abnormal returns:

Variable	Mean	Std.Dev	Min	Max
Return	0.0105292	0.0309743	-0.0818182	0.1523178
Alpha	0.0015893	0.0053485	-0.0065305	0.0318480
Beta	0.1491343	1.3783496	-5.5826787	10.8151338
Abnormal return	0.0085756	0.0310120	-0.0770958	0.1521550

Panel B: Cumulative abnormal returns (1,2,3,4,5,6,7 and 10 days after announcement date)

Variable	Mean	Std.Dev	Min	Max
Car 1	0.0130111	0.0526251	-0.0872362	0.3570612
Car 2	0.0127385	0.0609731	-0.2296609	0.3489474
Car 3	0.0123245	0.0679592	-0.2549082	0.4174220
Car 4	0.0096026	0.0722733	-0.3031013	0.3743839
Car 5	0.0072508	0.0739745	-0.3857526	0.3076525
Car 6	0.0048525	0.0757266	-0.4282087	0.2595993
Car 7	0.0004777	0.0920902	-0.5552372	0.3082256
Car 10	-0.0025637	0.1139913	-0.5888435	0.4378687

Panel C: Graphical representation of announcement and cumulative returns:



Essay 2
Table VI:

Returns for SPAC unit holders around the merger announcement day

Panel A presents abnormal returns on the announcement day calculated by the market model. In Panel B we extend the observation period by one day until seven days after the announcement and we calculate cumulative returns for each day. Panel C is a graphical presentation of results obtained in Panels A and B.

Panel A: SPAC Units Returns around the merger announcement date:

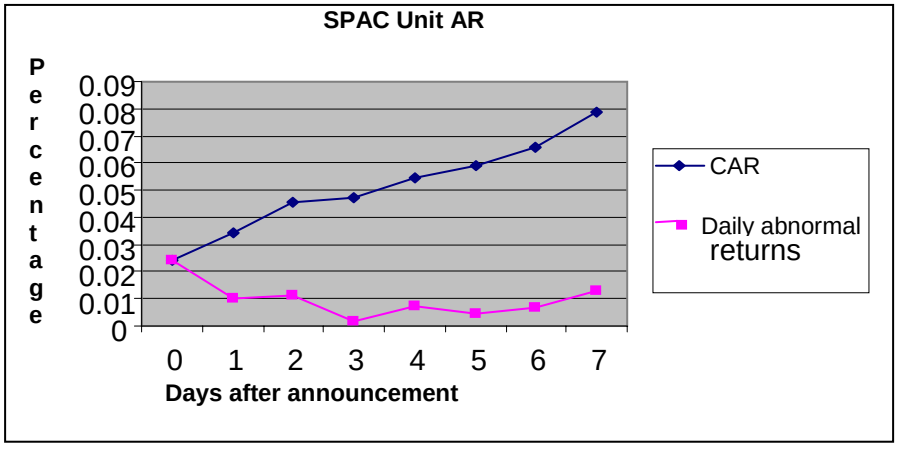
Announcement date unit abnormal returns:

Variable	Mean	Std.Dev	Min	Max
Return	0.0201213	0.0369744	-0.0816062	0.1606154
Alpha	-0.0061846	0.0646209	-0.4519244	0.0202665
Beta	0.2214427	1.4714179	-5.7847016	7.2536888
Abnormal return	0.0242951	0.0584504	-0.0730680	0.3506924

Panel B: Cumulative abnormal returns (1, 2, 3, 4, 5, 6 and 7 days after announcement date)

Variable	Mean	Std.Dev	Min	Max
Car 1	0.0343930	0.1214649	-0.1104080	0.8063082
Car 2	0.0456363	0.2035615	-0.1708533	1.3982602
Car 3	0.0472249	0.2629527	-0.2089938	1.8181650
Car 4	0.0544885	0.3196409	-0.2418225	2.2132872
Car 5	0.0589535	0.3926259	-0.1794673	2.7294429
Car 6	0.0658968	0.4531131	-0.2005421	3.1477479
Car 7	0.0788217	0.5188870	-0.1777621	3.6114892

Panel C: Graphical representation of announcement and cumulative returns to unit holders



Essay 2
Table VII:
Returns for SPAC warrant holders around the merger announcement

Panel A presents abnormal returns on the announcement day calculated by the market model. In Panel B we extend the observation period by one day until seven days after the announcement and we calculate cumulative returns for each day. Panel C is graphical presentation of the results obtained in Panels A and B.

Panel A: SPAC Warrants Returns around the merger announcement date:

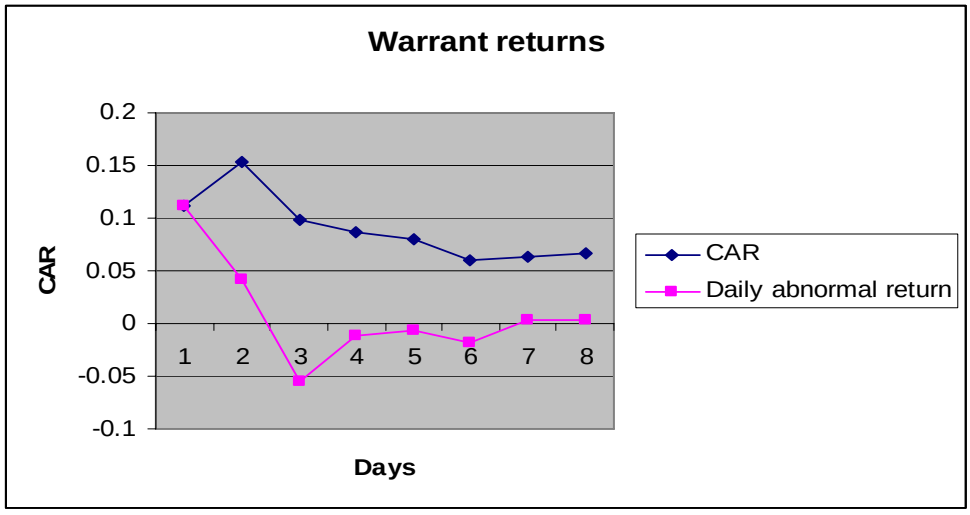
Announcement date unit abnormal returns:

Variable	Mean	Std.Dev	Min	Max	
Return		0.1235652	0.1988161	-0.1304348	0.6721311
Alpha		0.0027198	0.0141125	-0.0151523	0.0553368
Beta		1.5358577	4.1435663	-1.2398772	15.8324139
Abnormal return		0.1119899	0.2025111	-0.1203337	0.6824944

Panel B: Cumulative abnormal returns (1, 2, 3,4,5,6 and 7 days after announcement date)

Variable	Mean	Std.Dev	Min	Max	
Car 1		0.1539946	0.3590699	-0.7523790	0.9322721
Car 2		0.0983182	0.3614209	-0.7523790	0.9258369
Car 3		0.0866005	0.3478715	-0.4115571	0.9321125
Car 4		0.0795737	0.3825961	-0.4882695	0.8281739
Car 5		0.0604376	0.3701326	-0.4652856	0.8281739
Car 6		0.0629939	0.3292217	-0.4698862	0.7278656
Car 7		0.0660083	0.4048455	-0.5371966	0.9335521

Panel C: Graphical representation of returns to warrant holders :



Essay 2
Table VIII:

Performance of SPAC securities around merger date

Panel A presents abnormal returns on the merger day calculated by the market model. Panel B presents abnormal returns for warrant holders on the merger date.

Panel A: SPAC Stock Returns at the date of merger

Merger date stock abnormal returns:

Variable	Mean	Std.Dev	Min	Max
Return	-0.0348308	0.1097691	-0.6919786	0.0603670
Alpha	0.0015059	0.0047870	-0.0055783	0.0309012
Beta	0.2217319	0.3483728	-0.4435740	1.1373777
Abnormal return	-0.0381030	0.1126252	-0.7141556	0.0593627

Cumulative abnormal returns (1, 2, 3,4,5,6 and 7 days after merger date)

Variable	Mean	Std.Dev	Min	Max
Car 1	-0.0535390	0.1336298	-0.7222378	0.1062514
Car 2	-0.0601064	0.1377891	-0.7263495	0.1045851
Car 3	-0.0626848	0.1499950	-0.8128626	0.1146014
Car 4	-0.0639884	0.1341806	-0.7339440	0.1150086
Car 5	-0.0700704	0.1521769	-0.8423757	0.1337219
Car 6	-0.0868577	0.1697321	-0.8993613	0.1267303
Car 7	-0.0959149	0.1899362	-0.9794888	0.1143827

Panel B: Merger date warrant abnormal returns

Merger date unit abnormal returns:

Variable	Mean	Std.Dev	Min	Max
Return	0.0610620	0.0983477	-0.0655738	0.1941392
Alpha	0.0012992	0.0058442	-0.0064705	0.0103035
Beta	0.5931283	0.8500657	-0.5900071	2.0736777
Abnormal return	0.0476056	0.0842983	-0.0601677	0.1413110

Cumulative unit abnormal returns (1, 2, 3,4,5,6 and 7 days after merger date)

Variable	Mean	Std.Dev	Min	Max
Car 1	0.0986542	0.1701561	-0.0774148	0.3532671
Car 2	0.0825682	0.1975507	-0.0724781	0.4477721
Car 3	0.0943907	0.2157216	-0.0724667	0.4496380
Car 4	0.1128411	0.2714822	-0.0609575	0.6142525
Car 5	0.1263310	0.3102446	-0.0726088	0.7603781
Car 6	0.1004079	0.2814196	-0.0805649	0.7101556
Car 7	0.0736834	0.3047707	-0.2464669	0.6741769

Essay 2
Table IX:

Overall performance of SPACs during the 2003-2009 period

Panel A: Buy and hold returns for companies that completed merger:

Variable	Number	Mean	Std. Deviation	Minimum	Maximum
Unit Offer Price	66	7.33	7.33	6.00	10.10
Warrants Per Unit	66	1.46	0.50	1.00	2.00
Warrant exerc. price	66	5.48	0.74	5.00	8.00
Gross proceeds in mill	66	98875.63	106313.11	7878.00	528000.00
Original Unit offer price	66	7.7	1.54	6.00	10.10
Percentage in escrow	66	0.93	0.05	0.85	1.00
StockPrice 06_23_2009	66	2.94	2.42	0.00	8.34
Unit price 06_23_2009	66	4.84	5.55	0.00	25.02
WarrantPrice 06_03_2009	66	0.19	0.45	0.00	2.75
Return on Unit (buy and hold)	66	-0.28	0.91	-1.00	3.17

Panel B: Characteristics and buy and hold unit returns for SPACs that announced a merger

Variable	Number	Mean	Std. Deviation	Minimum	Maximum
Unit Offer Price	16	8.50	1.36	6.00	10.00
Warrants Per Unit	16	1.12	0.34	1.00	2.00
Warrant exerc. price	16	6.04	1.10	4.50	7.50
Gross proceeds in mill	16	177.09	162.14	27.98	552.00
Percentage in escrow	16	0.98	0.01	0.94	1.03
StockPrice 06_23_2009	16	8.10	1.42	5.55	9.79
Unit price 06_23_2009	16	9.37	3.49	5.80	20.28
WarrantPrice 06_03_2009	16	0.27	0.22	0.01	0.65
Return on Unit (buy and hold)	16	0.09	0.32	-0.10	1.02

Panel C: Characteristics and buy and hold unit returns for SPACs that did not announce a merger

Variable	Number	Mean	Std. Deviation	Minimum	Maximum
Unit Offer Price	23	9.21	0.99	8.00	10.00
Warrants Per Unit	23	0.97	0.10	0.50	1.00
Warrant exerc. price	23	6.44	1.01	5.00	7.50
Gross proceeds in mill	23	293.65	286.91	33.91	103.50
Percentage in escrow	23	0.98	0.01	0.96	1.00
StockPrice 06_23_2009	23	8.83	0.98	7.25	9.77
Unit price 06_23_2009	23	8.59	2.12	0.00	10.00
WarrantPrice 06_03_2009	23	0.11	0.07	0.05	0.40
Return on Unit (buy and hold)	23	-0.082	0.20	-1.00	100

Panel D: Characteristics of companies that liquidated

Variable	Number	Mean	Std. Deviation	Minimum	Maximum
Unit Offer Price	49	7.76	1.51	6.00	10.10
Warrants Per Unit	49	1.40	0.49	1.00	2.00
Warrant exerc. price	49	5.76	0.95	4.50	8.00
Gross proceeds in mill	49	105.27	79.35	18.97	414.00
Percentage in escrow	49	0.96	0.03	0.85	1.00

Panel E: Characteristics of SPAC samples with available info at IPO date

Variable	Number	Mean	Std. Deviation	Minimum	Maximum
Unit Offer Price	156	7.85	1.53	6.00	10.10
Warrants Per Unit	156	1.34	0.48	0.50	2.00
Warrant exerc. price	156	5.76	0.94	4.50	8.00
Gross proceeds in mill	156	137.65	160.20	7.87	1035.00
Percentage in escrow	0.957	0.04	0.85	1.03	1.00

Essay 2
Table X:

Merger determinants

Probit estimation results are obtained when hypothesis that *Merger=f(set of SPAC characteristics)* is tested. Here UNDN=number of underwriters in IPO syndicate. EBCAP=EarlyBirdCapital , CITI=Citigroup, Maxim= Maxim group, Gun Allen = Gun Allen

Panel A: Merger outcomes

Analysis of Maximum Likelihood Estimates

Parameter	DF	Std.Estim	Wald.er	Chi-sq	Pr>Chi-sq
Intercept	1	10.57	3.61	8.48	0.03
Unit Price	1	0.28	0.14	3.55	0.05
Warrant Price	1	0.45	0.39	1.31	0.25
Gross proceeds	1	-13.78	3.76	13.4	0.00
UNDN	1	-0.06	0.07	0.81	0.36
EBCAP	1	0.10	0.07	2.06	0.15
CITI	1	-0.02	0.02	1.20	0.27
Maxim	1	-0.10	0.08	1.64	0.19
GunAllen	1	0.13	0.28	0.21	0.64

The Appendix A

Table I: Q&A The description of SPACs

SPAC description and main characteristics: Questions	Answers
What is a SPAC?	SPAC stands for Specified Purpose Acquisition Company.
Does this means it is a company with a special purpose?	Yes. SPACs are formed specifically to acquire or merge with an unknown company over a limited period of time.
How long is that time period?	When SPACs first started it was 18 months after their IPO; then it was 24 months, and most recently it is 36 months.
But why do SPACs go public through an IPO?	Mainly because SPAC founders, besides past executive experience and conviction to have a "vision", before IPO have $0 in assets, as well in equity. Someone has to come up with funds for future merger.
Who are the founders of SPACs?	Executives with expertise in industries in which they are seeking potential targets form mergers. Recently hedge funds, investment funds and private equity also became involved.
How much capital do SPAC founders bring in initially?	It is more a "change" than capital. On average they bring in $57.000, while majority bring only $25.000 in total, and with that money they buy 4.16 millions of shares, paying them $0.013 each.
Is then the rest of the SPAC's capital raised through an IPO?	Yes. Public investors buying ownership of SPACs, provide close to 100% of capital.
What is the ownership percentage of public investors in SPACs, as providers of almost 100% of capital,?	Public investors own 80% of the shares of the SPAC; the remaining 20% stays with SPAC founders.
Are SPACs identified by a different name?	The SEC classifies them as "blank check companies" under SIC Code 6770, and the public terms them that way very often, but SPACs differ from original blank checks in many significant ways.

Table II

Journey from formation to IPO

Questions, steps	Answers, description
What is the S-1 form?	The registration statement form filed with the SEC to issue shares in public offerings. This applies to the majority of companies, but not to "penny stocks" or typical pre-SPAC "blank check companies." All SPACs use this form.
Who prepares S-1 form?	Founders of the SPAC, their legal advisers, and underwriters work together on the form.
What is disclosed in the S-1 form of a typical SPAC?	The S-1 form discloses all of the relevant information in a SPAC's life from IPO to merger. It presents a prospectus summary, financial data summary, description of risk factors, underwriting agreement, legal matters, use of proceeds, dilution, proposed business, dividend policy, management, and a description of securities, etc.
What are the securities issued by the SPACs?	SPACs raise funds in primary markets primarily by selling units. They also sometimes register to issue preferred shares.
What is a Unit?	A unit is a security that consists of one share of common stock and one or two warrants to purchase one more common stock at a discounted price.
Are the Units tradable, and if yes, where?	Yes. As opposed to blank check companies that comply with rule 419-a, SPAC units, shares and warrants start trading soon after the IPO. At first, they were traded on OTC, then AMEX listed them. Recently, NASDAQ and NYSE listed SPACs .
Can warrants be exercised anytime?	Not really. They are usually exercisable later in the business transaction or one year from the date of the completed S-1 form.
What is an escrow account?	In order to assure public investors that their funds will be used for a unique purpose, SPAC founders establish an escrow account and freeze 95% of funds raised during the IPO in the account, until the point of merger or liquidation.
What is the role of underwriters in the SPAC IPO?	The role of underwriters is probably more important than many people realize. They primarily invented the new SPAC structure.

Table III

From IPO to merger

After- IPO events, Questions	Description &Answers
What happens once an IPO is done?	First, underwriters inform SPAC managers that unit trading can begin. Soon after that they report on the trading of shares and warrants.
What is the next step?	The investors freely trade their units, shares and warrants while managers seek the target for the merger combination through different sources
Where can they look for the target?	SPAC managers are free to look for a business merger in any industry, but mostly they rely on their specific knowledge and focus on industries or countries in which they have an edge.
What happens once they find a target?	At the moment they negotiate a potential deal with the target, they make an announcement and inform the investors.
Is the previous step the only thing required prior to the merger?	No. After the announcement the most difficulty challenges begin. First, the majority of investors must be convinced that the deal is going to create value for them. Second, all information about the deal must be checked by the SEC and after the approval mailed to investors.
What percentage of shareholder are necessary to vote for the deal to be approved?	It depends. It is on a case by case basis. At first the SPAC managers need 80% of all shares to support the deal including their own 20%. Today, they need 60% in total, and in some cases even 55%.
What if they have lower support than that?	They cannot go further with the deal. They must dissolve the SPAC and return the majority of the investments to the shareholders.
Does this happen frequently?	In our sample, out of 161 SPACS that conducted an IPO, 49 of them were liquidated or announced liquidation, while 71 successfully merged.. This ratio equals 1:1.44 .
Once a SPAC merges, what happens next?	The new corporation often changes its name, and continues as a new corporate entity, either in the US or elsewhere

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