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Johann Burgstaller

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Johannes Kepler University of Linz
Department of Economics
Altenberger Strasse 69
A-4040 Linz - Auhof, Austria
www.econ.jku.at

johann.burgstaller@jku.at
phone +43 (0)70 2468 - 8706, - 28706 (fax)

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Johann Burgstaller *
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Abstract: This paper examines the issuance of share capital via the Vienna Stock Exchange between 1985 and 2004. Evidence is supplied concerning the aggregate factors that explain the time-series variation in both the numbers of and proceeds from initial public offerings (IPOs) and seasoned equity offerings (SEOs). Results indicate that there is no cyclical sensitivity of issues, but that firms successfully time their offerings to take advantage of high stock market valuations and the associated low cost of equity capital. Corporate indebtedness and interest rates are significant determinants of SEOs in statistical and economic terms. The proceeds from IPOs, rather than funds raised by firms that are already listed, are used to finance subsequent investment.

Keywords: Initial public offerings, seasoned equity offerings, corporate finance, capital structure, share issuance, going public, capital demand, stock market, cost of capital.

JEL classification: G18, G32

*Johannes Kepler University, Department of Economics, Altenberger Str. 69, A-4040 Linz, Austria. Phone: +43 70 2468 8706, Fax: +43 70 2468 28706, E-mail: johann.burgstaller@jku.at.
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1 Introduction

Firms in Austria (and in many other European countries) rely heavily on debt financing. This causes their equity base to be relatively low. Nevertheless, there were about 400 domestic initial public offerings (IPOs) or seasoned equity offerings (SEOs)[1] on the Vienna Stock Exchange between 1985 and 2004. Even if we disregard the small number of large IPOs, the level of funds raised through the stock market still fluctuates considerably. It is the objective of this paper to examine share issuance patterns and associated aspects of the corporate financing culture in Austria.

It is true that corporate capital structure affects the stability of the economy. However, this is not the sole issue to be considered. The literature on the widely debated nexus between financial development and growth[2] deals with, among others, the question of whether allocative distortions may arise due to a badly developed stock market.

The answer is not only of academic interest. Many policy makers also presume a rather large and well-functioning stock market to be a prerequisite for the economy to maintain growth, employment and international competitiveness. Share issues are seen as the optimal and most efficient way of providing capital for companies and policy therefore has been aiming at the advancement of the financial system. Specifically, the intention declared by the current Austrian government is to develop the Austrian stock market through measures aimed at achieving more demand (more stock ownership) as well as more supply (more issuing activity) of shares. Additionally, the relative importance of equity financing may grow in view of the New Basel Capital Accord (Basel II) and shares will play a more prominent role for the funding of future retirement provisions.

The largest part of the literature on share issuance deals with large stock markets, especially with the U.S. market. The comparatively minute size of the Austrian stock market can be seen from market capitalization relative to nominal GDP (at the end of 2003) as being only 19.33 %.[3] The reasons for the limited usage of shares as financing and investment instruments are manifold and shall not be addressed in this paper. However, "the importance of the stock exchange as a supplier of corporate finance in Austria is not significantly lower than in other countries with bank-based financial structures, especially Germany and Italy" (see Waschiczek and Fritzer, 2000).

[1] SEO is the prevailing term used for seasoned public offerings. This term should be clearly distinguished from private equity offerings (PEOs), whereby equity is not issued via the stock market.
[2] Recent papers on the subject include e.g. Levine (2002) and Carlin and Mayer (2003).
[3] See the appendix (section C) for further key data regarding the Austrian stock market.

In the empirical part of this paper, quarterly data on the acquisition of share capital by Austrian companies will be used to identify factors explaining the time-series variation in aggregate IPO and SEO numbers (volumes) and the proceeds raised in this way. The intention is to explore whether the share issuing behaviour on such a small stock market is determined by the same real and financial factors as those on more mature markets in the rest of Europe and the USA. With the applied time series models we account for the often neglected possibility of the series being non-stationary and we use count data regressions with volume figures on share issuance activity.

Our results indicate that neither cyclical variations in capital demand nor changes in the costs of debt financing can explain the fluctuations in Austrian initial public offerings. In contrast, investor optimism is relevant and firms seem to be timing their share issues in order to take advantage of high aggregate share prices. The decision to conduct seasoned offerings is influenced by the level of interest rates and corporate debt. While SEOs seem to serve as a means to reduce leverage, proceeds from going public rather are used to finance subsequent investment.

Section 2 gives a review of the relevant empirical literature on the topic and formulates the hypotheses to be tested. Sections 3 and 4 describe the data and the methods used. The empirical results are discussed in section 5. Finally, section 6 concludes.

2 Literature review and hypotheses

Relative to the number of papers about underpricing and underperformance of newly issued shares (e.g. Lowry and Schwert, 2003, or Ritter and Welch, 2002), the empirical literature on when and why companies go public is scarce. Cross-sectional data (for Italian firms) was used by Pagano, Panetta and Zingales (1996, 1998) or Jindra (2000), who analyzed the SEO decision of listed U.S. firms. A pooled cross-section of selected European countries was employed by Rydqvist and Högholm (1995), Breinlinger and Glogova (2002) examine a panel of six European countries. Surveys of chief financial officers (CFOs) about capital structure issues are also of interest. For the USA, a prominent example is Graham and Harvey (2001). Drobetz, Pensa and Wöhle (2004) use a similar questionnaire to survey CFOs of listed German, Swiss and Austrian companies.

Nevertheless time series data is investigated in most cases, see e.g. Loughran, Ritter and Rydqvist (1994) who report time series regressions for 15 countries, Lowry (2003), Rees (1997, UK data), Rydqvist and Högholm (1995, when exploring results for Sweden

in more detail), Baker and Wurgler (2000), Pástor and Veronesi (2003) and Choe, Masulis and Nanda (1993). Estimated models as well as the data frequency differ across these time series studies, but the measures of IPO and SEO activity also vary considerably. The dependent variable mostly consists of volumes (numbers of firms undertaking an IPO or SEO), with market values of funds raised seldom appearing. On the other hand, Baker and Wurgler (2000) analyze the share of equity issues in total equity and debt issues, Choe et al. (1993) use a similar measure, which is calculated from micro data of already listed U.S. firms. The most important explanatory variables (GDP or GDP growth, stock price levels or stock returns) are not uniformly measured either. All this has to be considered in the following remarks. Sometimes the terms "IPO/SEO activity" and "equity issuance" are used in order to allow greater simplicity and fluency.

2.1 Aggregate economic activity and equity issuance

The first hypothesis is rather simple, stating that equity issuance is cyclical. Lowry (2003) calls this the "capital demands" hypothesis: the number of IPOs (and SEOs) *ceteris paribus* should increase when private firms have a larger demand for capital. This happens when economic conditions are better and expected growth is higher.

Although Rydqvist and Högholm (1995) state that the variation of IPO activity with business cycles, for example, is a well-known phenomenon from the USA. However, the empirical evidence for this is inconsistent. Rydqvist and Högholm (1995) themselves claim that no correlation of IPO activity with GNP growth is present regarding Sweden and Breinlinger and Glogova (2002) also find that GDP growth has no influence on IPO market values. According to Loughran et al. (1994), future GNP growth is influental (for 5 out of 15 countries examined) and Choe et al. (1993) report that listed U.S. firms issue more seasoned equity relative to debt in expansionary phases of the business cycle. Rees (1997) points out that failing to account for non-stationarity issues (which is the case for many studies also on the equity issuance topic) may bias the tests in favour of rejecting the null hypothesis of no cyclical sensitivity.

2.2 Stock market conditions and equity issuance

The connection between the issuance of shares and recent as well as future developments in stock prices is based on the premise that firms seek to minimize the cost of capital. Therefore, many IPOs and SEOs are launched when share prices are high, when the

costs of going public or issuing seasoned equity are low and firms can then maximize the proceeds from issuing equity. This argument rests on the presumption that investors are sometimes overly optimistic and willing to pay more for firms than they are worth (Lowry, 2003), and that firms are able to time their share issues accordingly. Hence, an additional implication of this "investor sentiment" or "market-timing" hypothesis is the assertion that the stock market is inefficient (Baker and Wurgler, 2000).

Loughran et al. (1994) argue that the correlation between the level of stock prices and IPO volume should be positive because of a positive correlation between good investment opportunities (so that firms are raising external capital) and stock prices. They include future GNP growth to account for these business cycle effects. So they can attribute the positive effect of stock prices they find on IPO volumes to firms successfully timing their offerings in order to take advantage of stock market overvaluations.

In the context of SEOs, the cross-section results of Jindra (2000) suggest that firms are more likely to issue seasoned equity when their shares are overvalued by the market (with respect to managers' private information). This is in line with the results of Graham and Harvey (2001) who find a large percentage of companies to be hesitant in issuing common equity because they feel their stock is undervalued. In contrast, the CFOs of listed German, Swiss and Austrian companies do not seem to attach much importance to the over- or undervaluation of their own stock by the market in financing decisions (see Drobetz et al., 2004). The latter result suggests that recent stock price performance (and therefore the market-timing theory) may not be a decisive factor in explaining the SEO behaviour of firms in German-speaking countries. Other evidence includes e.g. Lowry (2003), who finds that the number of companies going public tends to be higher when stock prices are higher, and Rees (1997) with the result that the stock market index Granger causes IPO proceeds and numbers in the UK.

If previous returns is the measure for recent stock price developments, Breinlinger and Glogova (2002) argue that their relation to IPO and SEO variables should be negative because share issues are undertaken during stock market highs, when stock price returns have already decreased dramatically or even turned negative. However, they actually find a significantly positive, not negative influence of previous returns on the funds raised through IPOs. Rydqvist and Högholm (1995) report a positive contemporaneous relationship between stock returns and IPO volumes for a set of 11 European countries (including Austria). Also according to Pástor and Veronesi (2003), IPO volume is positively related to recent market returns, and followed by low market returns. When, indeed, market timing comes into question, for example, IPO volumes should be helpful in predicting fu-

ture stock returns (Lowry, 2003). So we should also be able to find the reverse causality. Loughran et al. (1994) observe a negative relation in many countries, but coefficients of IPO volume are not significantly different from zero. Baker and Wurgler (2000) detect that firms issue relatively more equity before periods of low stock market returns and conclude that timing is the most probable explanation.

2.3 Profits and equity issuance

Pagano et al. (1996) find that new public firms in Italy are more profitable than their private counterparts before the IPO, but not at the IPO date or later. They suggest that entrepreneurs "time their issues to coincide with unusually high profitability or they may engage in 'window-dressing' of their corporate accounts at the time of the IPO". A temporary surge in profits may be additionally mistaken as being permanent by the market, thereby inducing even more overvaluation. So this may justify adding profits as a control variable when investigating the market-timing hypothesis. That said, it is not supposed that the above arguments carry much weight in the aggregate economy.

Conversely, it could be presumed that more profitable firms should need less external finance. The pecking-order theory of capital structure choice gives an additional insight into why higher profits should be followed by lower share issuance activity. It implies that equity finance through the stock market (external finance in general) is less desirable than internal finance. This is due to the fact that external funds are undervalued because of and in relation to the degree of information asymmetries between management and investors (see e.g. Graham and Harvey, 2001). According to this theory, the issuance of shares comes last in the pecking order of finance alternatives and is undertaken, above all, if recent profits are insufficient to fund new projects and/or firms are unable to raise further debt. Therefore, according to the pecking-order theory equity finance via the stock market might provide a negative signal. However, Graham and Harvey (2001) as well as Drobetz et al. (2004) find little evidence for this.

In contrast, share issuances are often seen as a marketing device (through enhanced company image and publicity, see Röell, 1996). In their surveys of CFOs, both Graham and Harvey (2001) and Drobetz et al. (2004) find no evidence of listed firms issuing equity to give the market a positive signal concerning their prospects. Nevertheless, Pástor and Veronesi (2003) report that IPO waves are followed by high aggregate profitability in the USA. Thus, whether shares are issued just before profits go down or when expected profits go up thus is a question to be resolved empirically.

2.4 Investment, debt and equity issuance

Firms can use the proceeds from going public or issuing seasoned equity either for investment or loan repayment. The argument that shares are issued to maintain a company's target debt-to-equity ratio is put forward by the trade-off theory of capital structure. Therefore, as suggested by Pagano et al. (1998), it would be worthwhile to test whether going public (or conducting an SEO) is appealing in times of high debt (when companies suffer from high leverage). On the other hand, we can ask whether investment rises or debt[4] falls after times of much IPO/SEO activity, although it is not necessary for firms to repay loans for the debt-to-equity ratio to decrease. A contrary argument in the cross-sectional context is that the presence and/or sufficient liquidity in the equity market could be a prerequisite for the raising of further, even non-equity capital (see Röell, 1996, and some considerations about the possible complementary relationship between equity and debt finance in subsection 2.5).

Concerning the effect of debt on share issuance, Graham and Harvey (2001) and Drobetz et al. (2004) find moderate support for companies targeting a specific debt-to-equity ratio. Pagano et al. (1998) can not confirm that high debt increases the probability for an Italian company to go public. For the reverse causality, the results of Pagano et al. (1996) indicate that firms do not go public in order to finance subsequent investment and growth, but to deleverage afterwards. There are similar results for other European countries like e.g. Sweden (see Rydqvist and Högholm, 1995).

2.5 Interest rates and equity issuance

Debt financing costs (and their relation to the costs of issuing equity) may also have an influence on share issue behaviour. Different kinds of interest rates serve to proxy these costs in the empirical literature.

Jovanovic and Rousseau (2004) elucidate on why the relationship between interest rates and IPO proceeds could be non-monotonic. If interest rates are low, investment (and therefore capital raised through IPOs) rises when interest rates rise. This is because the expectation of higher growth in the near future is still present, thereby supporting the positive effect of risen debt financing costs. If interest rates rise and rise, the negative effect on investment dominates and therefore the capital raised through IPOs is reduced.

[4]Due to the unavailability of aggregate data on corporate debt for Austria on a quarterly level, we cannot investigate interrelations of IPO/SEO activity with the corporate debt-to-equity ratio.

Breinlinger and Glogova (2002) use ten-year government bond yields and find no influence on IPO market values. Choe et al. (1993) also find no evidence of a significant interest rate effect on the ratio of seasoned equity to debt issues for listed U.S. firms and Pástor and Veronesi (2003) find no influence on IPO numbers.

In the cross-sectional context (such an effect in the aggregate context is not expected), share (equity) issuance might have an influence on the cost of credit. This is because firms with extended financing options also have increased bargaining power with banks. Credit will become cheaper and more readily available, controlling for profitability and leverage (see Pagano et al., 1998, who find this effect to be significant for some time after Italian firms went public). If companies use the funds raised on the stock market to reduce leverage, credit interest rates may decrease because these firms are consequently safer borrowers. A third explanation is that banks can collect information about listed firms more easily and more information is publicly available (Pagano et al., 1998).

2.6 Savings deposits and equity issuance

The growth of savings deposits is used by Breinlinger and Glogova (2002) as an indicator of monetary assets potentially available for an investment in shares. However, they find that the deposits growth rate is no leading indicator of IPO activity.

3 Data

To investigate the interrelations of share issues with both real and financial variables, the following series enter our analysis: the national accounts measures GDP, gross investment and corporate profits, the stock of credit to private corporations, a broad share price index, the total deposits of domestic non-banks and a secondary market bond return. All but the numbers IPOs and SEOs are real variables.

The period under investigation ranges from the beginning of 1985 to the first quarter of 2004. As a result, we have 77 quarterly observations on all time series (described in more detail in appendix D). Table 1 in appendix B offers descriptive statistics.

The series of primary interest are the funds raised through and the numbers (volumes) of IPOs and SEOs of Austrian companies via the Vienna Stock Exchange, for which Figures 1 to 3 give a graphical impression. Some relatively large values appear with IPO and SEO proceeds, so we will test whether they affect the robustness of our results. A

striking fact regarding the numbers of share issuances (during the sample period there were 152 IPOs and 244 SEOs) is that on average, they were larger before 1995 than afterwards. There are 21 cases (quarters) without IPOs and 15 quarters without SEOs. Neither IPOs nor SEOs took place in 8 quarters. Proceeds from and numbers of share issuances are highly seasonal (something also mentioned by Lowry, 2003, for IPOs in the USA). There are significantly fewer IPOs and SEOs in the first quarter of the year. The more of the year has gone by, the higher are IPO numbers and market values. For SEOs there is more action in the fourth quarter than in the rest of the year, with the second quarter being the runner-up in terms of activity.

It is certainly accepted that companies need not *go public* to obtain new finance, to achieve a strengthening of their equity base or a reduction of leverage. Such goals could also be reached by selling stock directly through a private equity offering (see Ellingsen and Rydqvist, 1997). Hence, the real reasons for going public seem to be benefits like "an informative stock price, a more liquid stock, and increased competition among providers of finance" (Röell, 1996). The market for private risk capital was in fact non-existent before 1996 in Austria, but since then we observe an increasing importance for corporate finance. Raised private equity capital rose steadily until 2000 (177 million Euro in 2002). However, as there is no quarterly data available for Austria, we cannot account for venture capital in this study.

4 Methodological framework

The basic framework for the analysis is a vector autoregression (VAR) which, representing the first stage of the empirical analysis, is used for choosing the dynamic structure (with a limit of a maximum of four lags). For each share issuance variable, one VAR is proposed, with the remaining variables in levels and another with growth rates of them. For the equation system with all variables in levels, two lags were chosen (suggested by the Akaike criterion, the Hannan-Quinn and the Schwarz criterion were actually in favor of 1 lag). When all but the share issuance variables are growth rates, all three criteria suggest one lag.[5]

For obtaining results on Granger causality, the LA-VAR (lag-augmented vector autoregression) method is loosely employed.[6] LA-VARs are suitable to conduct Granger

[5] A more detailed analysis shows that only the credit, investment and profit equations probably would need more lags, partly because of their own dynamics.

[6] We do not estimate and identify cointegrating relations to end up with an error-correction model.

causality tests in models that may or may not contain unit roots (see Yamada and Toda, 1998). This is due to the fact that the usual Wald test statistic (for Granger non-causality) can be applied to test coefficient restrictions based on standard asymptotic theory. In principle, the only thing to do is to augment the VAR with as many lags as one presumes the maximum order of integration of the variables to be (see Toda and Yamamoto, 1995).[7] Testing for Granger (non-)causality then is testing whether all lags of a variable jointly have a coefficient of zero in the particular reduced-form equation. In doing so, the coefficient(s) of the additional lag(s) are ignored.

Therefore the series here are non-differenced and one lag is added to the dynamics suggested by the information criteria as reported above, as we are convinced that none of our variables is integrated of an order higher than one. This is confirmed by the unit root tests suggested by Zivot and Andrews (1992) and Clemente, Montanés and Reyes (1998), which were used to estimate likely breaks in means and trends so that a better description of some variables is made possible.[8] See appendix E (Table 11) for the pulse and shift dummies as well as trend breaks used in estimation. Some of the dummies were also included to get a grip on possible outlying and/or influential observations (according to Cook's distance) as well as for robustness analysis (as mentioned in section 3). A trend and seasonal dummies are used in all estimation procedures.

Single equations with proceeds from share issues as dependent variables are estimated by OLS, the volume equations by Poisson regression.[9] Estimation is conducted with levels as well as with growth rates of the explanatory variables, and with/without provision for dummies and trend breaks. All equations are reduced forms (no contemporaneous terms appear on the right-hand side) because of the presumed endogenous nature of all variables. The same number of lags is accounted for with all explanatory variables augmented by one additional lag for proper causality testing. Equations with GDP etc. related to previous IPO/SEO variables were estimated by OLS as well.

However, we do not use the reduced-form coefficients (marginal effects) from Granger causality analysis in the evaluation of the economic significance of detected causal effects.

[7]The LA-VAR method involves inefficiency, which may be costly in terms of size and power in finite samples (see Yamada and Toda, 1998), but avoids pretest bias from unit root and cointegration tests, which are known to suffer from low power and are sensitive to the values of nuisance parameters in finite samples (see Toda and Yamamoto, 1995).

[8]The corresponding Stata-modules of Baum (2004a,b) were applied in unit root testing.

[9]Although the variances of the IPO and SEO numbers are higher than the respective means, tests on whether the overdispersion parameter in a negative binomial regression is zero (then the negative binomial reduces to the Poisson regression) indicate that Poisson regression is appropriate. Additionally, there are virtually no differences in results.

To obtain estimates of structural dynamic effects we employ an impulse response analysis based on a VAR estimated by OLS (also for the count variables) or SUR (if the equations contain different deterministic terms).[10] Therefore, also contemporaneous relations have to be specified and, as a consequence, some in-quarter responses of key variables can be included in the assessment of economic significance of the observed effects.

The rather simple and mechanic Cholesky decomposition method is used to obtain structural responses. The applied causal chain concerning the contemporaneous relations is the following. Investment, GDP and profits appear first, then the interest rate, credit, deposits and stock prices or returns. The particular IPO/SEO variable is put last and therefore assumed to be contemporaneously influenced by all other variables and to have no influence on them itself.[11]

Minor deficiencies in the effects that stem from a possibly inadequate structural specification of the model thus can be accepted because only some crude point estimates are desired anyway. It should also be considered that the numbers of IPOs and SEOs are not properly modelled here (no count data regression), so we have an additional reason for not fully accepting the revealed effects.

5 Results

5.1 Granger causality and impulse responses

Results on the factors which indicate subsequent IPO and SEO activity of Austrian companies are to be found in Tables 2 and 3, where there is no entry concerning the own lags of the share issuance variables. Tables 4 and 5 serve to ascertain the developments that take place after changes in IPO/SEO proceeds and numbers. Quoted are p-values of the F-test on whether the lags of a particular variable jointly are zero in the equation of the particular response variable. Results for the aggregates containing both IPOs and

[10] Confidence intervals for the impulse response functions based on the level-VARs should also have good coverage. Ashley and Verbrugge (2004) find that level- and lag-augmented VARs even perform better than VARs in differences and error-correction models in this respect. Adaptations of the Rats example programs MONTEVA2.PRG and MONTESUR.PRG from the Estima-homepage (Estima, 2002, and Estima, 2004) were used to calculate impulse responses and corresponding error bands.

[11] Although the assumption that the share issuance variable should be at the end of the chain seems to be easily justifiable, varying orders were applied for checking the robustness of the results. The national accounts variables could be interchanged and a contemporaneous feedback relation seems to be present between stock prices and credit. The results that are of genuine interest here are not affected by these variations or any other plausible changes in the variable order.

SEOs are presented as well, but we will not pay particular attention to them. Directions of confirmed Granger-causal effects as well as their quantification can be found in Table 6 where only effects from models with the additional deterministic terms are presented to ensure clarity.

In general, the additional consideration of pulse and shift dummies does not lead to considerably different results. This can be seen from a comparison across the different partitions within the tables. The most noticeable change relates to the the significance level of previous stock returns in the IPO proceeds equation. More details referring to this will be provided in the following detailed discussion of the results. Apart from that, only the results for the case with the additional deterministic terms will be discussed.

An initial result is that share issuances of Austrian companies are not cyclical. At the 5 % level, previous levels and growth rates of GDP are not leading any of the IPO and SEO variables.[12] Similar prior findings for other European countries are therefore confirmed in this respect. It would seem that the decision to issue shares on a small stock market, such as the Austrian one, is not driven by capital demand considerations which are related to the aggregate business cycle. Adding leads of GDP or GDP growth (following Loughran et al., 1994) does not change any of the conclusions.

However, Austrian firms are more likely to issue shares when stock prices *ceteris paribus* are higher, as there are then more IPOs and SEOs. The observed concordance with the results from the reviewed literature suggests the influence of stock prices on share issuance activity to be very robust. Only the observation that previously higher stock prices are not leading to higher proceeds from IPOs interferes with the overall scheme of things. Aggregate Austrian data therefore seem to contradict the survey results of Drobetz et al. (2004) on the lack of importance of market-timing in German-speaking countries.

An impulse in the stock price index of 100 points (using the index value at the end of the sample period, this would be a rise of about 15.5 %) predicts an additional 0.8 IPOs (approx.) and one and a half SEOs more over the following year. As, on average over the sample period, 7.9 IPOs and 12.7 SEOs were conducted per year, the effects (the numbers of firms going public and conducting seasoned equity offerings rise by about 10 %) seem noticeable. Of similar importance is the response of SEO proceeds after four

[12]The Granger non-causality of all national accounts variables does not stem from the fact that they are highly correlated with each other and with credit, deposits and interest rates. Several specifications with some or all of these variables dropped but one do not lead to significantly different conclusions concerning the ability of e.g. GDP to predict changes in the IPO and SEO activity of Austrian firms.

quarters which makes up additional 77 million Euro within that time. In comparison, the mean per quarter over the sample period (with the large SEO of the Erste Bank in 2002 not counted) is approximately 104 million Euro. Figure 4 shows the response function of the funds raised through seasoned offerings. The response of IPO proceeds also is shown in the table, though not being statistically significant at the 5 % level. Additional funds of 177 million Euro would be raised over the year following the above-mentioned increase in stock prices. This would also amount to about one quarter's average IPO proceeds, were the 4 data points with extraordinarily high IPO values disregarded.

The effect of expected (future) GDP growth must be adequately controlled for if the effect of higher stock prices on share issuance should be ascribed to investor sentiment. Although it is perceived that stock prices are not a good leading indicator of the business cycle in Austria, expected economic development can be seen as being proxied by current GDP and investment as well as by the current interest rate.[13] Therefore, market timing seems to be a relevant explanation for increased share issuances. If the costs of going public or issuing seasoned equity are relatively low, firms acquire share capital via the small Austrian stock market also.

On the other hand, one could ask whether timing is optimal with respect to the maximizing of the funds that can be raised. If that is the case, a rise in share issuance activity should be followed by a fall in share prices. As shown in Table 4, only the proceeds from IPOs lead the stock price index, but (as shown in Table 6) positively. Due to a shock in IPO proceeds of 1 billion (approximately the value that appears in the average year), the stock price index is higher in the following year (higher than without the shock), with a peak after two quarters (plus 49 points). As positive price reactions due to the IPO activity may interfere, no exact statement as to optimal timing seems possible.

The relationship with stock returns (Tables 3 and 5) could also deliver an indication as to the precision of market-timing. All IPO- and SEO-related variables are also led by previous returns on the stock market. Responses of share issuance after shrinking stock returns are, apart from the response of the number of SEOs, positive, which does not seem to be in line with the results of e.g. Breinlinger and Glogova (2002) and Pástor and Veronesi (2003). By looking a bit closer it can be established that the effect of an impulse in stock returns (of 1 percentage point) on market values of IPO and SEO proceeds is only momentarily negative (-4.44 for IPOs and -2.42 million Euro for SEOs), and then returns to being positive. Accumulated changes remain negative for a while. This explains the

[13] Also the inclusion of future GDP (growth) in estimations not reported here does not lead to different results and conclusions.

corresponding negative table entries. This indicates that the share issuance activity of Austrian firms rises within a quarter of declining stock returns, but not afterwards.

The evidence is incomplete regarding Austrian companies in their quest to find the optimal time to issue share capital before periods of low stock market returns. It may be observed that only IPO proceeds lead stock returns, though ultimately in a negative fashion (see Table 6). Returns on the stock market are higher for 2 quarters following the shock, but then lower in the subsequent quarters. The effects of stock returns on the number of firms going public are negligible, those to the number of SEOs are positive and of comparable importance as the effects of share price hikes on the share capital acquired through seasoned offerings.

The results of the above paragraphs could either mean that the timing of IPOs is not completely exact - the share issuances are conducted a little too soon, or positive price reactions on the stock market stemming from the increase in IPO proceeds itself obscure the proposed reactions. One additional remark has to be made concerning the Granger causality from stock returns to IPO proceeds, as this is the only relation which seems to be qualitatively affected by the inclusion of additional dummy variables. Privatizations via the stock market took place with three of the influental data points, with all three concerned quarters being characterized by negative stock returns. Therefore, decisions on the IPO dating of formerly state-owned enterprises seem not to have been optimal in every case.

Higher aggregate corporate profits do not predict more IPOs and SEOs in Austria. As a result we can neither confirm that Austrian firms issue shares after times of high profits, nor does it seem to be the case that they use share financing in cases of decreasing internal funds. There is some evidence of IPOs being conducted to signal future prospects as an increase in the number of firms going public is followed by higher aggregate profitability (as found to be the case e.g. in the USA, see Pástor and Veronesi, 2003). The growth rate of aggregate profits is 0.11 percentage points higher two quarters after a unit impulse in the number of IPOs.

Times of high corporate debt are also times of increasing numbers of share issuances. However, only SEOs are led by previous levels of aggregate credit, IPOs are not. The latter result is in line with those of Pagano et al. (1998) for Italian firms. An increasing indebtedness leads more listed firms to conduct seasoned offerings of share capital. For example, if credit rises by 1 billion (1 % of the average stock over the sample period), the effect on the number of SEOs over the following year is 0.8. As quarterly credit growth

rates are often found to be more than 1 %, this may result in very large effects on the number of SEOs. On the other hand, there is no statistically significant effect on credit aggregates following higher share issuance activity. Of course, the latter does not prevent the suggestion that listed Austrian firms are issuing seasoned equity because they target a specific debt-to-equity ratio. The issuance of equity capital itself may be effectual enough for the latter to shrink.

However, the findings for e.g. Italian (see Pagano et al., 1998) or Swedish (see Rydqvist and Högholm, 1995) firms, which are found to use the proceeds from issuing share capital for debt repayment, cannot be backed by corresponding results for Austria, at least not in the aggregate. On the contrary, e.g. IPO proceeds lead the credit stock positively. It would be argued that having shares publicly traded can also increase the availability of debt finance for Austrian firms if the effect were statistically significant.

Other results are also compatible with the observation that Austrian firms have different reasons for going public than enterprises in e.g. Italy or Sweden. There is a positive relationship between the share capital issued through IPOs with the subsequent growth rate of investment as shown in Table 5. Aggregate investment growth is predicted to be 0.7 percentage points higher in two quarters after a one billion Euro shock in IPO proceeds. As the assumed shock is equivalent to the average capital raised through IPOs per year over the sample period, a crude quantification of the effect is calculating 0.7 percent of the average yearly investment expenditures which is 277 million Euro.

Interest rate developments are an insignificant factor in the decision to go public. This is in line with the findings of Breinlinger and Glogova (2002) or Pástor and Veronesi (2003). However, interest rate changes proxying trends in the cost of debt capital affect seasoned share issuance (the numbers as well as the proceeds raised thereby) pointing to important differences to the results for SEOs of U.S. firms in Choe et al. (1993). Interest rate increases seem to have large effects on SEO proceeds as a 1 percentage point rise in the interest rate reduces the funds raised through SEOs by 163 million over the following year. Figure 5 shows graphs of the corresponding responses. The significant peak in the first quarter indicates that in the very short term the effect is positive, which is in favor of the relative cost argument. Over time, which is also apparent in the numbers quoted in Table 6, the instantaneous negative response and some mild posterior reductions in SEO proceeds combine in causing a slightly significant negative effect. So a discount rate effect via expected investment opportunities and profitability seems to dominate over longer horizons. When quantifying the volume effects we find that one quarter's average number of SEOs is washed away over the following year (about 3 seasoned offerings).

Finally, there is weak confirmation that monetary assets in form of sight, time and savings deposits lead the number of seasoned public offerings, a relationship proposed but not confirmed by Breinlinger and Glogova (2002). In growth rate terms, the effect is statistically significant at the 1 % level.

5.2 Robustness analysis of Granger causality results

First, robustness of our results must be evaluated because one could argue that Tobit regressions should be applied in the case of IPO or SEO proceeds making up the dependent variable because of zero values. In case of the count data variables, zero-inflated Poisson (or zero-inflated negative binomial) models would provide an alternative. These regressions were not expected to provide very different results because the zero values with IPO and SEO variables mostly appear in the first quarter of the year. Therefore, they can be described by including the quarterly dummies. Additionally, cases of no IPOs and/or zero SEOs appear at all times and at times of low *and* high values of the explanatory variables.

An additional complification involved with the use of Tobit regression is that the consistency of Tobit estimates hinges crucially on whether the model is well specified. If the errors are not normal and/or the errors are heteroscedastic, Tobit estimates are inconsistent. If one is not sure whether the heteroscedastic Tobit can be modelled properly, estimates may remain hard to interpret and compare to OLS estimates.

However, with Tobit regressions, significance levels of Granger causality tests of stock prices for IPO and SEO proceeds are somewhat lower, with zero-inflated Poisson models for the volume variables in levels those of credit, deposits and the interest rate are somewhat higher. The tests on whether deposit growth leads IPO/SEO volumes also show somewhat higher p-values. However, these differences to OLS and Poisson regression do not seem to be large at all.

As a second experiment, we interchanged the original IPO and SEO proceeds with their nominal values divided by nominal market capitalization at the end of the previous quarter, and the original numbers by their relation to the total number of listed shares at the end of the previous quarter. With the share issuance variables standardized in the described manner, changes concerning Granger causality test results are negligible.

6 Summary, conclusions and outlook

Aggregate factors which are important for the decision to issue share capital on a stock market as small as the Austrian one are explored in this paper. The international evidence on some of the presumed relations can be confirmed, but there also are some important differences concerning the questions of when and why companies go public or conduct a seasoned offering. First, the share issuance activity of Austrian firms is not sensitive to the business cycle. Economic expansions, with the aggregate demand for capital presumed to be higher, do not lead to significantly more IPOs or SEOs. This suits other results for European countries but contrasts with the U.S. evidence (Lowry, 2003, or Choe et al., 1993). The unanimous evidence on the importance of the stock prices level in terms of more-or-less successful timing of share issues is also confirmed.

Austrian IPO firms seem to use a significant part of the proceeds from going public to finance subsequent investment. This is encouraging, as some evidence for other European countries suggests that repaying loans is the main reason to acquire share capital via the stock market. Rising indebtedness rather is a reason for listed Austrian firms to issue seasoned share capital. SEO activity is also influenced by aggregate interest rates.

The relative insignificance of aggregate factors in IPO decisions affects the intention of economic policy to encourage more firms to go public. As expected, creating favorable macroeconomic conditions and encouraging the demand for shares (potentially leading to higher share prices) is simply not enough. The Austrian evidence from 2004 is insightful in this respect. Although stock prices surged in 2004 (the ATX index approximately rose by 57 percent, the WBI index by 49 percent), there was only one new listing (but 20 issues of seasoned equity). A lasting enhancement of the stock market's importance as a source of corporate finance is, if at all, only possible via continued changes in company and tax law, structural improvements in the share market, and through other measures possibly affecting the mentality of potential IPO candidates and shareholders.

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A Figures

Figure 1: Market value of IPOs (top) and number of IPOs (bottom).

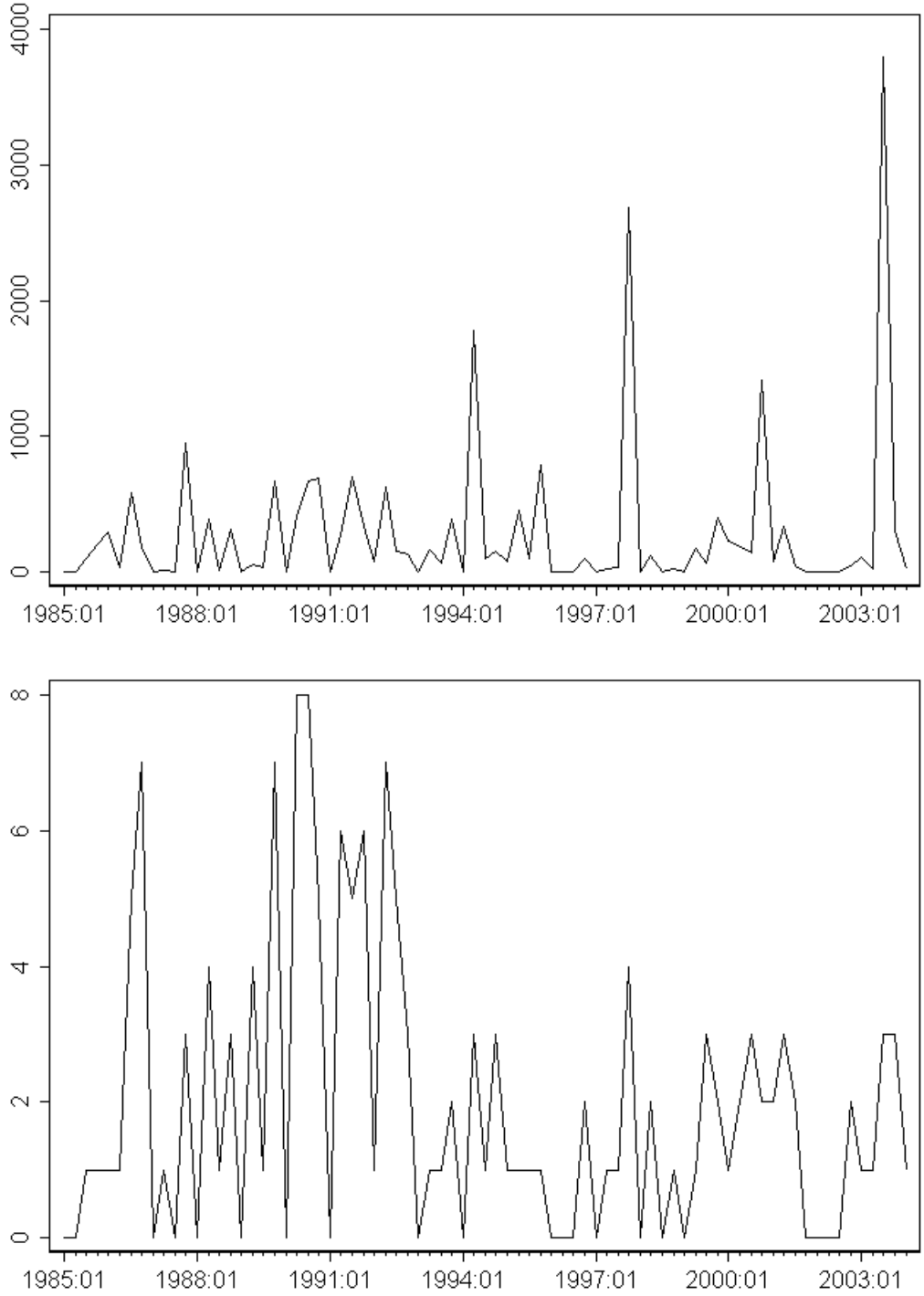


Figure 2: Capital raised by SEOs (top) and number of SEOs (bottom).

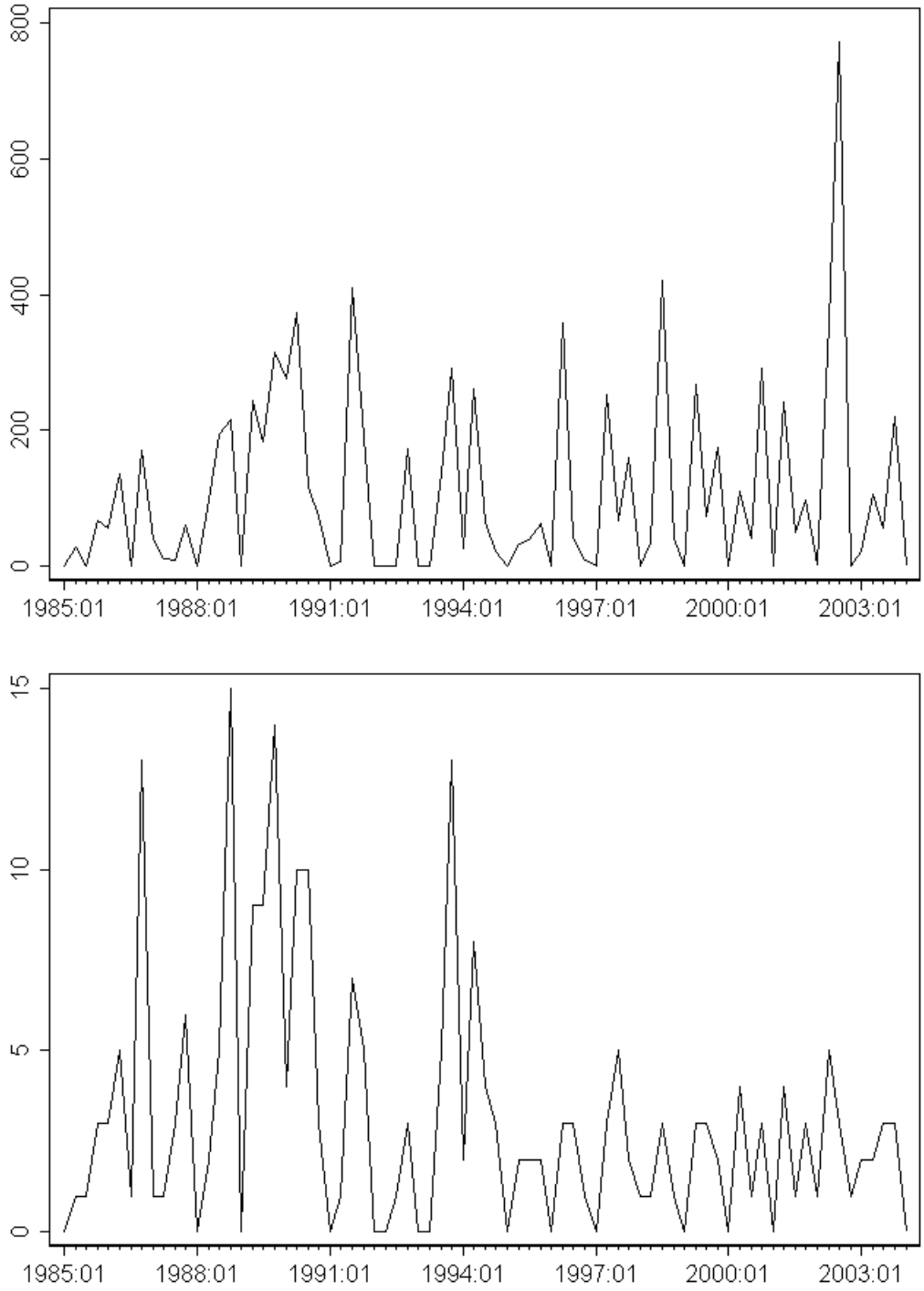


Figure 3: Proceeds from IPOs and SEOs (top) and number of IPOs and SEOs (bottom).

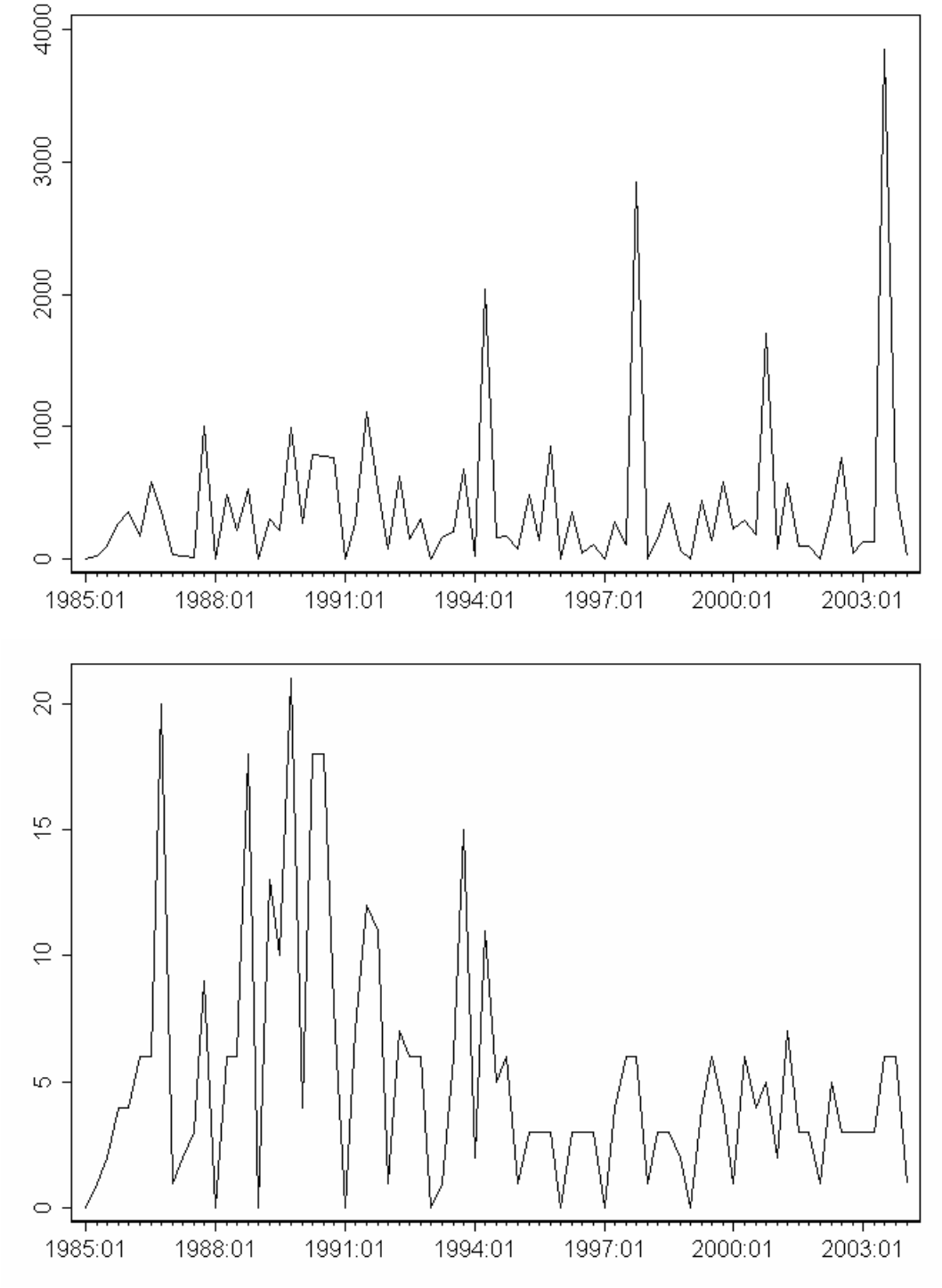
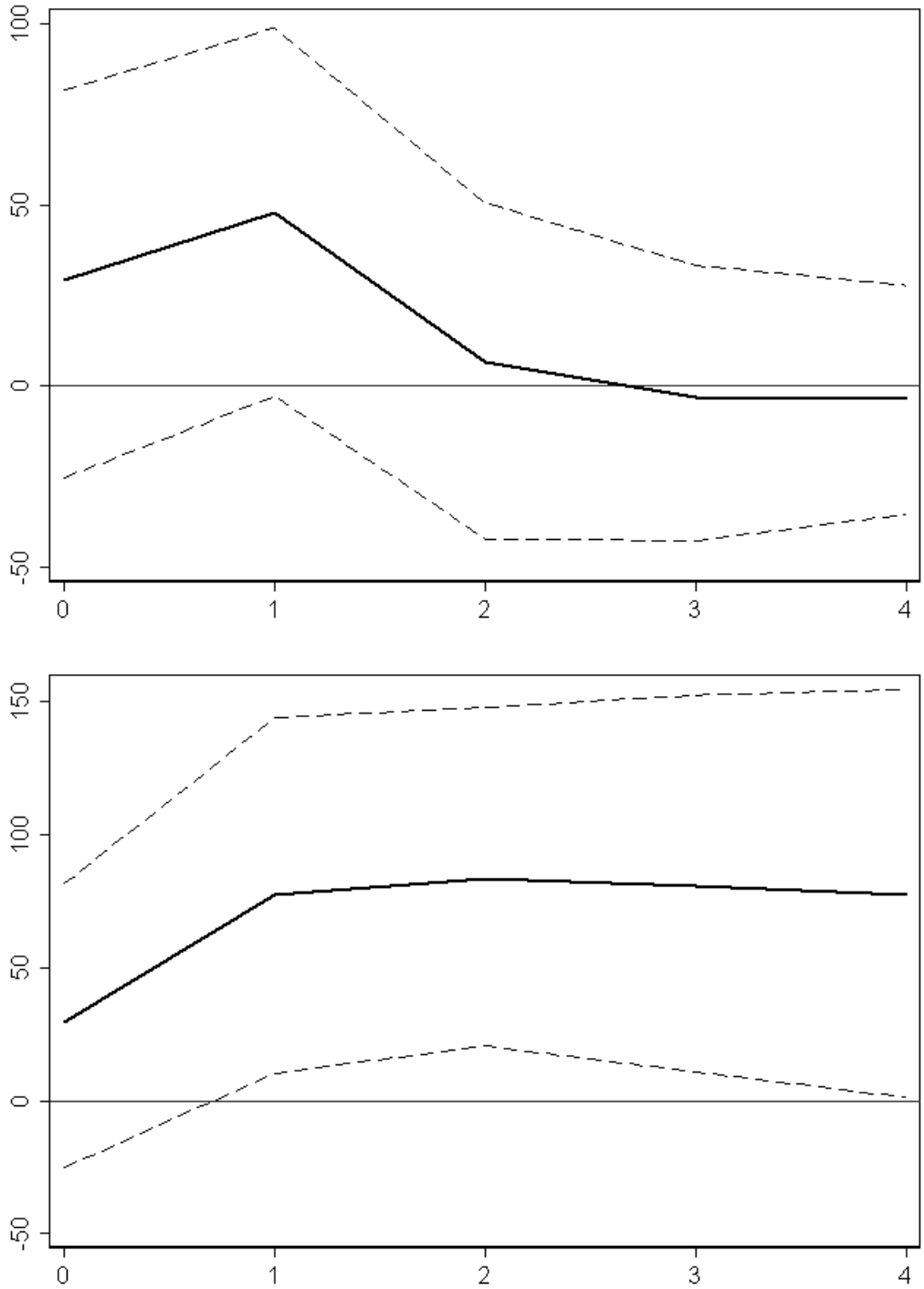
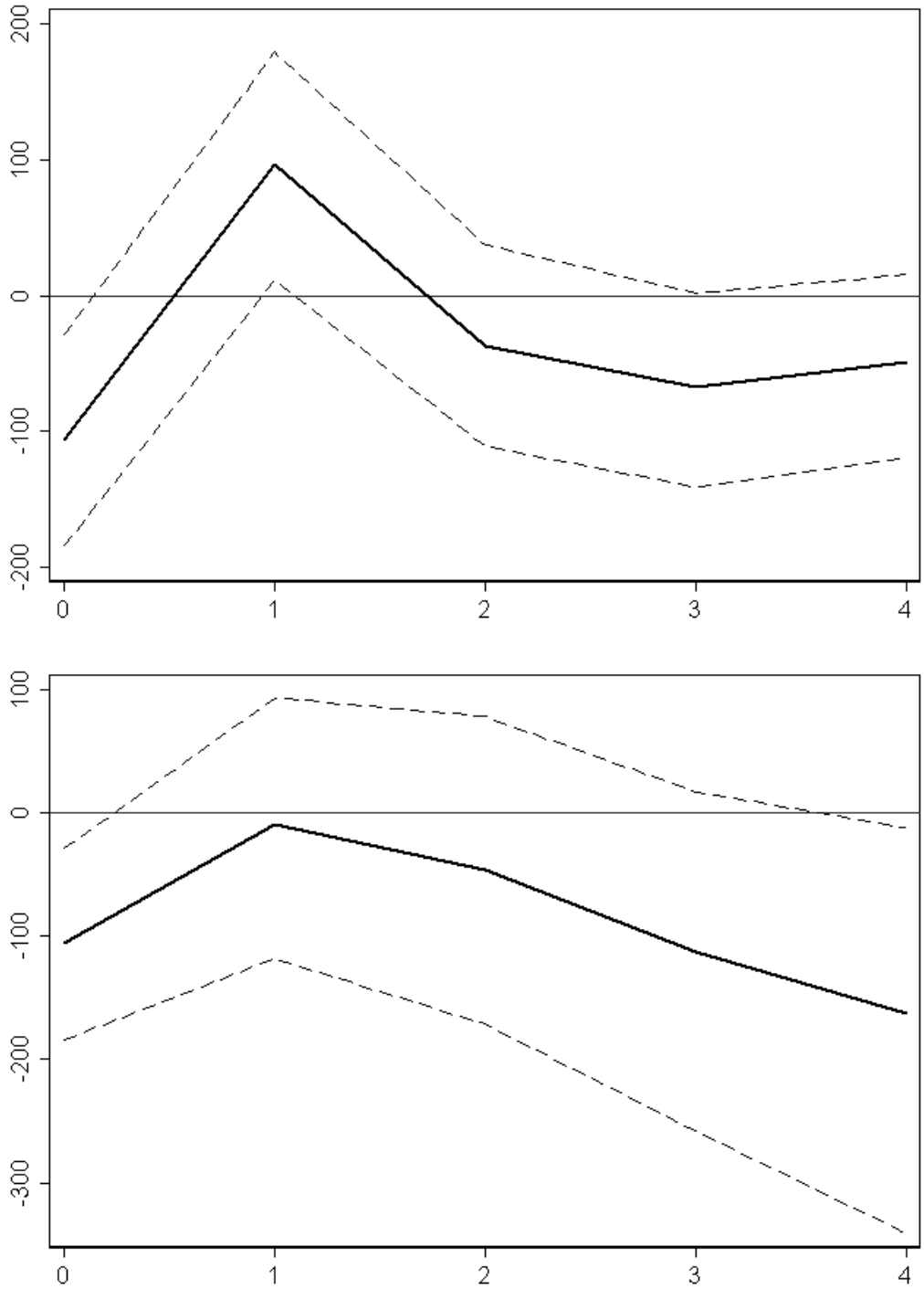


Figure 4: Responses of SEO proceeds to a shock in the stock price index of 100 points.



Notes: The figure reports responses and accumulated responses (in million Euro) for the 4 quarters following the shock. Dashed lines display the 95 % confidence intervals. The graphs also include the within-quarter adjustment of the SEO proceeds raised (period 0).

Figure 5: Responses of SEO proceeds to a shock in the interest rate of 1 percentage point.



Notes: The figure reports responses and accumulated responses (in million Euro) for the 4 quarters following the shock. Dashed lines display the 95 % confidence intervals. The graphs also include the within-quarter adjustment of the SEO proceeds raised (period 0).

B Tables

Table 1: Descriptive statistics.

Variable	Mean	Standard deviation	Minimum	Maximum
Market value of IPOs	290.74	568.90	0	3789.25
Capital raised by SEOs	112.63	140.20	0	771.92
Proceeds from IPOs and SEOs	403.37	617.35	0	3844.83
Number of IPOs	1.97	2.13	0	8
Number of SEOs	3.17	3.47	0	15
Number of IPOs and SEOs	5.14	4.87	0	21
Credit	100106	20619	65978	132567
GDP	42625	5539	31588	51152
Investment	9888	1817	5453	13346
Profits	14568	2815	8674	20076
Stock prices	444.50	110.12	208.07	845.26
Deposits	142288	23226	100348	180924
Interest rate	4.07	1.65	0.85	6.87
Credit growth	3.45	2.71	-2.99	9.36
GDP growth	2.11	1.67	-4.26	4.93
Investment growth	2.39	4.42	-12.65	10.35
Profits growth	3.16	3.98	-10.66	14.99
Stock returns	1.78	12.53	-33.77	47.04
Deposits growth	3.15	1.76	-0.49	8.42
Interest rate change	-0.06	0.35	-0.85	0.91

Table 2: Granger causality test results I.

	Credit	GDP	Investment	Profits	Stock prices	Deposits	Interest rate
						additional dummies are not included	
Market value of IPOs	0.711	0.929	0.547	0.870	0.208	0.731	0.559
Capital raised by SEOs	0.676	0.442	0.307	0.130	0.055	0.963	0.616
Proceeds from IPOs and SEOs	0.564	0.694	0.466	0.897	0.057	0.776	0.409
Number of IPOs	0.107	0.354	0.322	0.488	0.006	0.696	0.476
Number of SEOs	0.024	0.645	0.208	0.672	0.010	0.037	0.001
Number of IPOs and SEOs	0.002	0.878	0.938	0.897	0.000	0.627	0.028
						additional dummies are included	
Market value of IPOs	0.932	0.956	0.824	0.643	0.204	0.612	0.923
Capital raised by SEOs	0.226	0.342	0.399	0.123	0.004	0.937	0.022
Proceeds from IPOs and SEOs	0.739	0.815	0.452	0.414	0.030	0.834	0.591
Number of IPOs	0.133	0.346	0.361	0.620	0.008	0.792	0.504
Number of SEOs	0.030	0.507	0.239	0.359	0.020	0.056	0.001
Number of IPOs and SEOs	0.005	0.763	0.973	0.776	0.001	0.392	0.079

Notes: Granger causality is examined by testing whether the coefficients of all lags of a variable jointly are zero in a particular equation. The table reports p-values for the according F-statistic. The rows of the table illustrate the results for the test on whether the column variable is Granger causal for the row variable. Equations for market values and capital raised were estimated by OLS (if necessary, with robust or Newey-West standard errors), a Poisson model was estimated for the count variables. A trend and seasonal dummies were always included.

Table 3: Granger causality test results II.

	Credit growth	GDP growth	Investment growth	Profits growth	Stock returns	Deposits growth	Interest rate change
							additional dummies are not included
Market value of IPOs	0.657	0.448	0.215	0.658	0.226	0.737	0.450
Capital raised by SEOs	0.504	0.708	0.649	0.162	0.034	0.297	0.034
Proceeds from IPOs and SEOs	0.511	0.471	0.248	0.886	0.142	0.881	0.239
Number of IPOs	0.232	0.472	0.222	0.533	0.000	0.588	0.878
Number of SEOs	0.000	0.105	0.591	0.532	0.000	0.003	0.001
Number of IPOs and SEOs	0.000	0.420	0.219	0.983	0.000	0.085	0.009
							additional dummies are included
Market value of IPOs	0.761	0.879	0.544	0.836	0.074	0.465	0.603
Capital raised by SEOs	0.636	0.800	0.708	0.671	0.067	0.734	0.001
Proceeds from IPOs and SEOs	0.821	0.830	0.673	0.795	0.011	0.841	0.174
Number of IPOs	0.159	0.670	0.124	0.418	0.011	0.539	0.743
Number of SEOs	0.000	0.097	0.519	0.404	0.000	0.002	0.000
Number of IPOs and SEOs	0.002	0.458	0.182	0.705	0.000	0.058	0.014

Notes: Granger causality is examined by testing whether the coefficients of all lags of a variable jointly are zero in a particular equation. The table reports p-values for the according F-statistic. The rows of the table illustrate the results for the test on whether the column variable is Granger causal for the row variable. Equations for market values and capital raised were estimated by OLS (if necessary, with robust or Newey-West standard errors), a Poisson model was estimated for the count variables. A trend and seasonal dummies were always included.

Table 4: Granger causality test results III.

	Market value of IPOs	Capital raised by SEOs	Proceeds from IPOs and SEOs	Number of IPOs	Number of SEOs	Number of IPOs and SEOs
						additional dummies and trend breaks are not included
Credit	0.408	0.689	0.418	0.341	0.770	0.396
GDP	0.877	0.667	0.792	0.897	0.966	0.923
Investment	0.411	0.288	0.286	0.633	0.820	0.482
Profits	0.410	0.301	0.198	0.256	0.918	0.661
Stock prices	0.013	0.684	0.042	0.371	0.892	0.693
Deposits	0.968	0.953	0.970	0.914	0.888	0.805
Interest rate	0.909	0.579	0.853	0.941	0.024	0.066
						additional dummies and trend breaks are included
Credit	0.119	0.620	0.193	0.234	0.593	0.615
GDP	0.807	0.806	0.749	0.893	0.735	0.897
Investment	0.423	0.294	0.290	0.666	0.828	0.513
Profits	0.706	0.179	0.363	0.290	0.480	0.747
Stock prices	0.007	0.340	0.075	0.471	0.284	0.246
Deposits	0.981	0.989	0.986	0.893	0.910	0.754
Interest rate	0.935	0.651	0.875	0.964	0.036	0.098

Notes: Granger causality is examined by testing whether the coefficients of all lags of a variable jointly are zero in a particular equation. The table reports p-values for the according F-statistic. The rows of the table illustrate the results for the test on whether the column variable is Granger causal for the row variable. All equations were estimated by OLS (if necessary, with robust or Newey-West standard errors), a trend and seasonal dummies were always included.

Table 5: Granger causality test results IV.

	Market value of IPOs	Capital raised by SEOs	Proceeds from IPOs and SEOs	Number of IPOs	Number of SEOs	Number of IPOs and SEOs
						additional dummies and trend breaks are not included
Credit growth	0.837	0.661	0.882	0.838	0.332	0.415
GDP growth	0.955	0.678	0.807	0.763	0.351	0.651
Investment growth	0.021	0.281	0.101	0.363	0.169	0.168
Profits growth	0.612	0.402	0.745	0.042	0.971	0.455
Stock returns	0.049	0.902	0.068	0.966	0.642	0.735
Deposits growth	0.638	0.490	0.931	0.880	0.571	0.702
Interest rate change	0.999	0.457	0.801	0.841	0.388	0.592
						additional dummies and trend breaks are included
Credit growth	0.474	0.785	0.536	0.618	0.354	0.364
GDP growth	0.531	0.854	0.486	0.588	0.597	0.837
Investment growth	0.008	0.235	0.098	0.399	0.271	0.275
Profits growth	0.538	0.734	0.596	0.049	0.910	0.465
Stock returns	0.027	0.636	0.034	0.718	0.475	0.460
Deposits growth	0.091	0.923	0.188	0.647	0.330	0.573
Interest rate change	0.990	0.406	0.746	0.939	0.426	0.543

Notes: Granger causality is examined by testing whether the coefficients of all lags of a variable jointly are zero in a particular equation. The table reports p-values for the according F-statistic. The rows of the table illustrate the results for the test on whether the column variable is Granger causal for the row variable. All equations were estimated by OLS (if necessary, with robust or Newey-West standard errors), a trend and seasonal dummies were always included.

Table 6: Selected impulse response results (point estimates).

Response in	based on impulse in	after 2 quarters	after 4 quarters
Market value of IPOs	Stock price index rises by 100 points	135 million Euro	177 million Euro
	Stock returns rise of 1 percentage point	-1.71 million Euro	-1.08 million Euro
Market value of SEOs	Stock price index rises by 100 points	84 million Euro	77 million Euro
	Stock returns rise of 1 percentage point	-0.25 million Euro	0.10 million Euro
	Interest rate rise of 1 percentage point	-47 million Euro	-163 million Euro
Number of IPOs	Stock price index rises by 100 points	0.3	0.8
	Stock returns rise of 1 percentage point	-0.001	0.004
Number of SEOs	Stock price index rises by 100 points	1.8	1.4
	Stock returns rise of 1 percentage point	0.1	0.1
	Credit rises by 1 billion	0.1	0.8
	Credit growth rise of 1 percentage point	0.7	0.7
	Interest rate rise of 1 percentage point	-0.7	-2.9
	Deposits growth rise of 1 percentage point	0.4	0.3
Stock price index	Market value of IPOs rise by 1 billion	49 points	8 points
Stock returns		0.1 percentage points	-0.3 percentage points
Investment growth		0.7 percentage points	0.2 percentage points
Profits growth	Number of IPOs rise by 1	0.11 percentage points	0.06 percentage points

Notes: Effects of a rising stock price index on the market value of IPO proceeds are only shown for comparison as there is no Granger causality found in this direction. Responses of both IPO and SEO market values to impulses in stock returns are featured because there are significant effects on the aggregate proceeds from IPOs and SEOs. In general, responses of IPO/SEO variables are accumulated over time because these are flows in quarterly levels.

C The Austrian equity market

Market segmentation

Although a new market segmentation for the Vienna Stock Exchange (VSE) was introduced in 2002, the former segmentation still is in use (above all, as a criterion for allocation to the different new market segments) and to be found in official statistics. The three "old" groups are the Official Market ("Amtlicher Handel"), the Semi-Official Market ("Geregelter Freiverkehr") and the Unregulated or Third Market ("Sonstiger Wertpapierhandel"). The listing requirements for the Official Market are the most rigorous (and this market segment features the most liquid and biggest Austrian stocks), whereas for the Unregulated Market no such listing requirements exist (see also Aussenegg, 1997).

Key data

Market capitalization (shares and participation certificates), end of 2003: 43.3 billion Euro. Market capitalization divided by the stock of outstanding credit to private enterprises (incl. non-bank financial intermediaries), end of 2003: 31.1 %. Market capitalization (end of 2003) relative to the nominal GDP of 2003: 19.33 %.

Number of IPOs during the sample period (from 1985 to the first quarter of 2004): 152, with nominal proceeds of 21.74 billion Euro. The number of capital increases in the same period was 244, total nominal proceeds: 8.34 billion Euro.

Percentage of stock corporations (incl. those not listed on the Vienna Stock Exchange) in total enterprises in 2001: 0.43 %, their fraction of net production value of all producing enterprises in 2001 nonetheless was 22 % (Source: Statistical Yearbook 2004, chapter 31, Statistics Austria).

The fraction of shares in total financial liabilities of nonfinancial corporations has been relatively constant (between 33 and 37 %) in the last 5 years. Of course, its fluctuation may also have been driven by valuation (price changes).

Share of the market value of domestic shares and participation certificates quoted on the Vienna Stock Exchange in total financial liabilities of financial and nonfinancial corporations, end of 2003: 3.9 %. Relative to the total financial liabilities of nonfinancial corporations only: 14.5 %.

Share of the market value of domestic shares and participation certificates quoted on the Vienna Stock Exchange in the total value of shares and other equity of financial and nonfinancial corporations, end of 2003: 28.5 %. Relative to shares and other equity of nonfinancial corporations only: 39.9 %.

Share of the 5 "largest" IPOs in the total proceeds from IPOs between 1985 and 2003: 42.7 %. These five IPOs were those of Bank Austria Creditanstalt (2003), Erste Bank (1997), Telekom Austria (2000), VOEST Alpine Technologie (1994) and Austria Tabak (1997). Share of the largest SEO (Erste Bank, 2002) in the total capital raised through SEOs between 1985 and 2003: 8.3 %.

Capital raised on the Vienna Stock Exchange (through IPOs or SEOs) divided by nominal gross fixed capital formation, average for the last 15 years: slighly above 4 % (fluctuating strongly).

Table 7: Fractions (in %, end of 2003) of the total value of domestic shares held by

Households (incl. self-employed persons)	9.4
Private nonfinancial corporations	22.4
Institutional investors (insurance corporations, pension and investment funds)	9.8
Banks (Monetary Financial Institutions, MFI)	18.7
General government	4.9
Foreign investors	34.8

Notes: The total market/book value of domestic shares (quoted and unquoted) in circulation at the end of 2003 was 151.8 billion Euro. Source: OeNB (2004).

Table 8: Fractions of shareholdings (in %, end of 2003) in total fiancial assets of

Households (incl. self-employed persons)	6.3
Private nonfinancial corporations	43.6
Institutional investors (insurance corporations, pension and investment funds)	15.5
Banks (Monetary Financial Institutions, MFI)	6.2

Source: OeNB (2004).

Table 9: Fractions of mutual fund shares (in %, end of 2003) in total fiancial assets of

Households (incl. self-employed persons)	9.6
Private nonfinancial corporations	11.8
Institutional investors (insurance corporations, pension and investment funds)	21.7
Banks (Monetary Financial Institutions, MFI)	2.8

Source: OeNB (2004).

Table 10: Shares in total financial liabilities (in %, end of 2003)

	Nonfinancial corporations	Financial corporations
Shares and other equity excl. mutual fund shares	36.3	5.4
Short- and long-term securities	6.7	18.4
Short- and long-term loans	54.0	3.0
Mutual fund shares	-	13.8
Deposits	-	49.7
Currency, financial derivatives, insurance technical reserves, other accounts payable	3.0	11.5

Source: OeNB (2004).

D Description of the data

The sample period for all series starts in the first quarter of 1985 and end in the first quarter 2004.

New listings and capital increases

The source of data are the "Annual Statistics" of the Wiener Börse AG (Vienna Stock Exchange, VSE). Initial public offerings (IPOs) and seasoned equity offerings (SEOs) are recorded according to the first listing date. The market values were converted to millions of 1995 Euro by use of the GDP deflator.

Both the IPO and SEO series (values and numbers) comprise domestic shares and participation certificates. IPO market values were calculated as number of shares issued times the first listed price. The capital raised by SEOs was calculated on the basis of the subscription price. Only capital increases for cash are included. Not covered are capital increases for contributions in kind or by exercise of subscription, conversion or option rights.

Compared to the IPO time series published by the Wiener Börse AG there are some major differences. Unlike these statistics, we do not categorize as IPOs: transfers between the Official and the Semi-Official Market (but we keep transfers coming from the Unregulated Market), new listings resulting from changes of the company name, mergers or company splittings as well as new listings because of conversion of participation certificates into shares.

National accounts series

GDP, investment (gross fixed capital formation) and profits are valued at 1995 prices. Profits include the income of self-employed persons. Source: Austrian Institute of Economic Research (WIFO). Dimension: million Euro (quarterly levels). These series, which are in accordance with the European System of Accounts (ESA) 1995, only date back to 1988. For the years from 1985 to 1987, we calculated backwards by use of the growth rates of the corresponding SNA (System of National Accounts) 1993 series for this time period. The source of the latter series is the OECD.

Credit

Credit to private corporations (excluding banks, including non-bank financial intermediaries) at the end of the quarter. Source: Austrian National Bank (Oesterreichische Nationalbank, OeNB). Dimension: million Euro. Nominal credit was converted to millions of 1995 Euro by use of the GDP deflator.

The Wiener Börse Index (WBI)

The WBI, the most comprehensive Austrian stock price index, covers all shares listed in the Official and Semi-Official Market (segment). Source: Wiener Börsekammer (WRBK). Dimension: index value (31. 12. 1967 = 100) at the end of the quarter. Real stock price index values were calculated by use of the GDP deflator (1995 = 100).

Deposits

Total deposits of domestic non-banks (sight, time and savings deposits) at the end of the quarter. Source: OeNB. Dimension: million Euro. The nominal deposits were converted to millions of 1995 Euro by use of the GDP deflator.

Interest rate

Secondary market return of bonds of all issuers, end of quarter. Source: OeNB. Dimension: percent p.a. The real interest rate was calculated by deducting the inflation rate (the growth rate of the GDP deflator relative to the same quarter in the previous year).

Growth rates

The growth rates of real credit, GDP, investment, profits and deposits were calculated by multiplying the seasonal difference of the series in levels by 100. The growth rates therefore are percentages measuring the growth relative to the corresponding quarter of the previous year.

Stock returns (growth rates of the stock price index) were calculated from quarter to quarter. Dimension: percentage. Also interest rate changes are from quarter to quarter. Dimension: percentage points.

E Dummies and trend breaks used in estimation

Table 11: Dummies and trend breaks.

Market value of IPOs, Proceeds from IPOs and SEOs	pulse dummies for 1994:2, 1997:4, 2000:4 and 2003:3
Capital raised by SEOs	pulse dummy for 2002:3
Number of IPOs	shift from 1993:1 on
Number of SEOs, Number of IPOs and SEOs	shift from 1995:1 on
Credit	trend break in 2002:1
Credit growth	trend break in 2002:2
GDP	trend break in and shift from 2000:1 on
GDP growth	one dummy for 1988:2 to 1988:4
Investment	trend break in 2001:2
Investment growth	one dummy for 1988:2 to 1988:4
Profits	shift from 1993:2 on
Profits growth	one dummy for 1988:1 to 1988:3
Stock prices	shifts from 1989:2 and 1991:3 on
Stock returns	one dummy for 1989:2 and 1989:3, pulse dummies for 1990:1 and 1990:3
Deposits	shift from 1990:1 on
Deposits growth	pulse dummies for 1987:2 and 2001:4, one dummy for 1988:4 and 1989:1, trend break in 1998:1
Interest rate	shift from 1989:2 on
Interest rate change	pulse dummy for 2004:1