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FINANCIAL SYSTEMS AND VENTURE CAPITAL IN NORDIC COUNTRIES: A COMPARATIVE STUDY

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ABSTRACT: In this paper we present a comparative analysis of Nordic countries' financial systems and consider in particular the recent growth of Nordic venture capital industries.

We document that the Nordic countries' financial systems display several similarities that have characterized their evolution over the past decades. These include the liberalization of financial markets in the 1980s, the banking crises in the early 1990s and the renaissance of stock markets in the second half of the 1990s. It seems that during the past decade the Nordic countries' financial systems have not necessarily grown larger overall. However, the financial systems have become more stock market-centered. This characterization seems to apply particularly to Finland. We also show that the Nordic private equity industries have evolved in tandem with the overall macroeconomic conditions and stock market developments.

Despite the growth in recent years, only the Swedish venture capital market has reached the scale of fundraising and investment activity that the country's GDP share in Europe predicts. For the scale of activity achieved, the Nordic countries are also laggards compared to the stage of the average European private equity cycle. Only in Norway, the amount of funds raised, investments and exits are balanced relative to each other when benchmarked to the corresponding European levels; the other Nordic countries' private equity industries are at an earlier stage of the cycle. This suggests that the Nordic venture capital may lack a degree or two of maturity when compared to the other European countries, and emphasizes particularly the importance of successful exits.

We also discuss the implications and challenges that the documented recent changes in the financial systems imply for the Nordic countries.

KEYWORDS: venture capital, corporate finance, financial intermediation.

HYYTINEN, Ari – **PAJARINEN**, Mika. **RAHOITUSJÄRJESTEMÄT JA PÄÄOMASIJOITTAMINEN POHJOISMAISSA: VERTAILEVA TUTKIMUS**. Helsinki: ETLA, Elinkeinoelämän tutkimuslaitos, The Research Institute of the Finnish Economy, 2001, 56 s. Keskusteluaiheita, Discussion Papers, ISSN 0781-6847; No. 774.

TIIVISTELMÄ: Tässä tutkimuksessa tarkastellaan ja vertaillaan rahoitusjärjestelmien kehitystä ja erityisesti pääomasijoitustoimialan kasvua Pohjoismaissa.

Rahoitusjärjestelmien kehitys on Pohjoismaissa ollut viime vuosikymmenten aikana monella tavoin samankaltaista: rahoitusmarkkinat vapautettiin 1980-luvulla, 1990-luvun alkupuolella koettiin pankkikriisi ja 1990-luvun jälkipuoliskolla osakemarkkinat kukoistivat. Rahoitusmarkkinoiden koko suhteessa kansantalouksien kokoon ei ole selkeästi kasvanut viime vuosikymmenen aikana, mutta toisaalta rahoitusjärjestelmistä on tullut selvästi aikaisempaa markkinaehtoisempia ja osakemarkkinakeskeisempiä. Erityisesti Suomessa tämä kehitys on ollut selvästi nähtävissä. Pääomasijoitustoiminnan kehitys on puolestaan seurannut makrotalouden ja osakemarkkinoiden kehitystä.

Huolimatta voimakkaasta kasvusta viime vuosina, vain Ruotsissa pääomasijoitustoimialasta on tullut niin suuri, että se vastaa maan BKT-osuutta Euroopassa. Toisaalta pohjoismaiset pääomasijoittajat ovat – ehkä Norjaa lukuunottamatta – edelleen pääomasijoitussyklissä jäljessä muita eurooppalaisia maita. Heillä on siten vähemmän kokemusta sijoitus- ja irtautumistoiminnasta kuin eurooppalaisilla toimijoilla keskimäärin ja suurempi tarve mm. onnistuneisiin irtautumisiin kohdeyrityksistä tulevaisuudessa.

AVAINSANAT: pääomasijoittaminen, yritysrahoitus, rahoituksen välitys.

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1 Introduction

Financial development can accelerate economic growth by enhancing savings, by channeling the savings into real investments efficiently and by directing the investments of entrepreneurs to the more valuable uses (see, e.g., Beck, et al., 2000). The availability of private risk capital is regarded as a key part of the financial development because such capital often backs economies' most dynamic sectors. In the US for example, private equity has at least since the 1980s been one of the most important sources of external finance for new innovative businesses ("venture capital") as well as for the restructuring of matured firms and sectors (i.e. management and leveraged buy-outs).[1] The challenge of financing young and innovative businesses has been of particular policy relevance in the continental Europe and in the Nordic countries, because the activities of innovative small and medium-sized firms have traditionally been subdued in many of these countries. Moreover, the trend of increasing inflow of risk capital into new ventures is in Europe a much more recent phenomenon than in the US.

Even though the current trend is toward market-based financial systems, many of the European countries nonetheless have bank-oriented systems. There is some evidence and certainly strong views that innovative sectors are the prime candidate for facing financial constraints in such financial systems.[2] Albeit venture capital industry often remains small in relation to the overall size of the financial system, its growth is welcomed, because venture capital firms specialize in financing firms with informationally opaque risks, negligible cash-flows and intangible assets. The venture capital industry therefore has potential to eliminate the financing constraints that the innovative sectors may face in bank-centered financial systems.

The question how private risk capital may emerge and prosper in countries with distinct institutional arrangements has recently received growing attention by

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[1] Private equity consists of venture capital investments, i.e., equity investments in relatively young firms, as well as management buyouts and buy-ins. Unlike in the US, European venture capital statistics classify buy-outs as venture capital. We use these two terms interchangeably and try to be explicit in the analysis where the definition matters.

[2] Hellmann (1997) has for example argued that the financing of technology-based ventures whose value derives mostly from growth opportunities is essentially such a high-risk niche that it may frequently be left open by the traditional financial institutions, such as deposit banks. See also Black and Gilson (1998).

academics (see, Black and Gilson 1998, Gompers and Lerner 1998, Milhaupt 1997, Jeng and Wells 2000, Becker and Hellman 2000) and by policy makers (see, e.g., OECD 1993, 1996, Communication from the European Communities 1998, 2000). The emerging academic literature suggests, above all, a strong link between the development of private equity and the structure of the financial system (Black and Gilson 1998, Jeng and Wells 2000, and Johnson 2000).

In this paper, we analyze financial development and particularly the emergence of the market for private risk capital in the Nordic countries, i.e. in Denmark, Finland, Norway and Sweden. Like the large continental European countries such as Germany and France, the Nordic countries have traditionally had strong banking sectors. It is therefore of interest to compare the importance of private equity as a source of funds in the Nordic countries to the role it plays elsewhere in Europe. To these ends, the analysis has two strands. The first documents general financial market trends in the Nordic countries and weights the recent upsurge of private equity against them. The aim is to compare the progress achieved in creating the market for risk capital to the overall changes in the structure of the financial systems. The second strand of analysis consists of a comparison of the stage of the Nordic countries' private equity market to the other European countries.

The organization of the remainder of this paper is as follows. In Section 2, the evolution of the Nordic financial systems is described. The emergence of Nordic private equity is analyzed in Section 3. Finally, we summarize the paper in Section 4.

2 Financial Systems in Nordic Countries

Recently, there has been a very intense discussion of whether bank-based and market-based financial systems produce different growth patterns and if so, which one is superior (see, e.g. Allen and Gale 2000, Levine 2000).[3] The superiority of one system over another depends on the system's ability to mobilize resources for investment, select best ventures to be funded, and to provide incentives for the monitoring of the ventures that receive external funding. Whether a market-based

[3] The importance of financial development for growth has been emphasized for long; see for example King and Levine (1993a, 1993b) and the references therein.

system performs these tasks more (or less) efficiently than a bank-centered system, in which financial intermediaries of various types play a significant role, is yet to be answered (Levine 2000; Demirguc-Kunt and Maksimovic 2001).

The division between market-based and bank-centered financial systems can have important implications for the economy because there might exist a relation between the structure of the financial system, including the ownership and governance of companies, and the types of activities that the companies undertake (Carlin and Mayer 1999). The argument is that institutional endowment of a country may confer comparative advantage on activities that are relatively dependent on the institutional input in which the country is well endowed. The financing of innovative ventures is a prime example of an instance where such a comparative advantage might lie.

A second approach to the analysis of financial systems has been advocated by La Porta, et al. (1998, 1999, 2000). The approach posits that the legal system of a country, i.e. the character of legal rules and the quality of law enforcement, is an important if not the primary determinant of financial systems' efficiency and corporate financing patterns. La Porta, et al. (1998) for example documents that countries with poorer investor protection have smaller and narrower capital markets. The finding is consistent with the view that if a country's legal system is weak, financial transactions are intermediated through established institutions or agents with bargaining power (see, e.g., Modigliani and Perotti 1999). The reason is that in such an environment, there is a need to enforce financiers' rights privately. Recently, Demirguc-Kunt and Maksimovic (1998, 1999) and Levine (1998, 1999, 2000) have provided empirical evidence on the effects of the legal system on firm financing and firm growth as well as on macroeconomic growth.[4]

These findings and arguments have important implications for the financing of innovative and growing firms. On the one hand, a market-based financial system may be more effective in moving capital from declining industries to emerg

[4] A recent paper by Demirguc-Kunt and Maksimovic (2001) combines the comparison of bank-based vs. market-based systems to the analysis of the importance of the legal system for corporate finance. The paper documents that the development of a country's legal system predicts access to external finance. There is however no evidence for firms using external financing differently in bank-based than in market-based systems.

ing ones.[5] On the other hand, a distinguishing characteristic of the financing of growing firms is the evolving pattern of their control structures. New investors (starting from the founding entrepreneurs, to families, individual investors, small groups of investors and to venture capitalists) are sequentially approached to finance the growth. As a result, different investor groups are at different stages interested in exercising control over the growing firm, suggesting that efficient corporate governance is at the heart of an innovative firm's fundraising ability.

In the remaining of this section, we consider the Nordic countries' financial systems in light of the above-explained approaches: In Section 2.1, we characterize the structure and evolution of the Nordic financial systems and attempt identifying similarities and differences in their development. Section 2.2 contains an analysis of the Nordic corporate finance environment from the perspective of the law and finance approach. In Section 2.3 we briefly discuss the implications that the recent developments have for corporate financing.

2.1 The Nordic Financial Systems: Recent Trends

The Nordic financial systems have traditionally been bank-centered. Particularly in Finland and Sweden, banks have served as house banks for numerous of the countries' important corporations and held either directly or indirectly large ownership blocks in many of their client firms (see, e.g., Niskanen 1999, and Agnblad, et al. 2000). The banks have been influential in Norway, too, albeit they are precluded from having significant ownership stakes in the client firms. In this section, we consider how this traditional Nordic financial landscape has changed over the past twenty years.

2.1.1 Liberalization of Financial Markets and Lending Boom

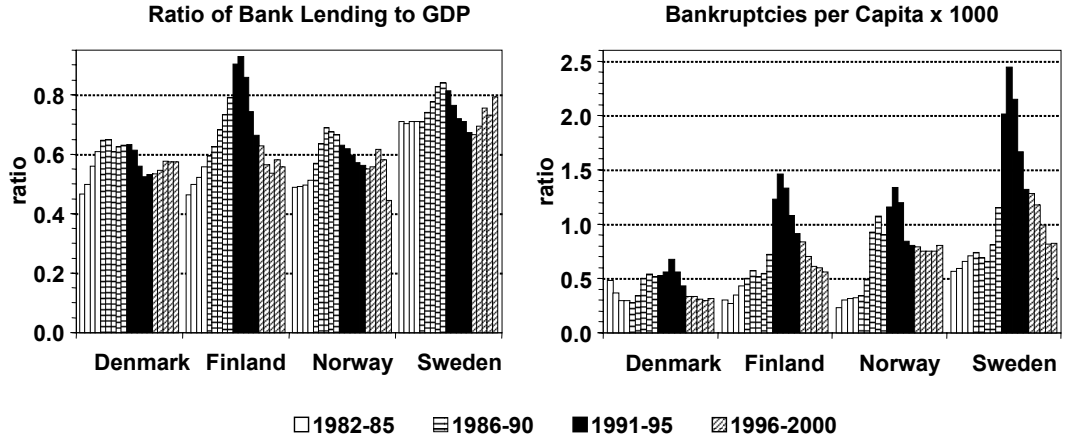
At the beginning of the 1980s, the financial systems of the Nordic countries were relatively heavily regulated. The authorities limited for example both the quantities and rates at which banks could lend, as well as foreign capital flows. Following the lead of other countries, such as the UK, the Nordic countries liberalized

[5] It is often argued that the market-based financial system is better organized to finance emerging industries (see, e.g., Milhaupt 1997, Rajan and Zingales 2000a, 2000b, Holmström and Kaplan 2001).

their financial markets and capital movements quite rapidly in the 1980s.[6] In Norway the financial markets were effectively liberalized between 1984 and 1986. In Finland and Sweden the liberalization took place about the same time, or lagged Norway somewhat, while in Denmark, most of the major steps towards a de-regulated financial system had been taken a bit earlier. Some restrictions concerning e.g. foreign direct investments and certain cross-border capital movements remained however in effect until the beginning of the 1990s, particularly in Finland.

The deregulation of the financial markets led to increased competition between financial institutions and to very rapid lending growth. As Figure 2.1 reveals, the lending growth was rapid also relative to GDP and particularly so in Finland. Even in real terms, the maximum annual lending growth rates were of order 25-30% (Koskenkylä 2000, p. 4). The figure speaks for a sequential expansion of intermediated finance in the Nordic countries. In particular, the amount of bank lending relative to GPD reached its peak first in Denmark in 1986, then about the same time in Norway and Sweden in the late 1980s, and last of all in 1992 in Finland.

Figure 2.1 Bank Lending and Bankruptcies in Nordic Countries in 1982-2000



Sources: IMF: *International Financial Statistic* (August 2001), Pesola (2001) and Suomen Asiakastieto.
Note: Because of certain institutional differences in lending, comparisons across countries are not necessarily valid.

[6] Drees and Pazarbasioglu (1995) provide an excellent account of the liberalization process in the four Nordic countries. See also Vihriälä (1997) for Finnish, Englund (1990) for Swedish and Ongena, et al. (2000) for Norwegian developments.

The growth of the lending reflected both increased supply of credit and the willingness of firms and households to accumulate debt. There are several reasons why the rapid lending growth was in most cases not considered problem. First, the level of bankruptcies and loan losses had been very low in the 1970s and in the early 1980s. From Figure 2.1 we can see for example that only in Sweden the number of bankruptcies exceeded 0.5 per thousand of inhabitants in the early 1980s. Combined with quantity rationing, the low regulated interest rates created kind of "favorable selection" among loan applicants (Drees and Pazarbasioglu 1995); the most risky projects were crowded out from the market by the safe ones. Second, it was perceived that the growth of the lending was just reflecting the discharge of the excess demand for loans that had been accumulating during the era of the regulated financial markets. Finally, the tax regimes of the 1980s enhanced the incentives of Nordic firms and households to borrow (Berg 1994).

2.1.2 Banking Crisis and Collapse of Bank Lending

As economic conditions began to weaken and bankruptcies increase, the banking sectors of the Nordic countries experienced severe problems in the late 1980s and in the early 1990s. In Norway for instance, total bankruptcies increased from 1426 establishments in 1986 to 4536 in 1989. Bank loan losses followed suit and began to accumulate rapidly. In terms of loan losses and bankruptcies, the worst years were 1992-1994 in Finland, 1990-1992 in Norway, 1991-1993 in Sweden and 1991-1993 in Denmark (see e.g. Koskenkylä 2000, p. 3, Pesola 2001, and Figure 2.1).

Albeit there are differences between the Nordic countries, a common underlying cause of the crises was, as we now with the benefit of hindsight know, 'bad' monitoring practices by banks, 'bad policies' as well as 'bad luck'. The first of these refers to the very rapid lending growth during the 1980s and the market share competition that led to "built-in" fragility within both debtor and creditor sectors. The second one stems from the fact that almost no attempts to control the expansion were made by government, monetary authorities and bank supervisors during the years of rapid lending growth. "Bad luck" was a crisis trigger; the fragile systems began to experience increasing problems because of the occurrence of certain negative shocks. The shocks were in each country external to the banking sector: In Norway, perhaps the most important factor affecting the econ

omy was the decline in oil prices in 1985-1986, whereas in Finland the collapse of the trade with the former Soviet Union at the beginning of the 1990s provided a start for deteriorating economic performance. In Sweden the general decline in the growth of export markets and the 1991 tax reform (leading to higher post-tax interest rates) have been mentioned as factors contributing to the emergence of crisis.

As can be seen from Figure 2.1, the banking problems led to a sharp fall in the amount of bank lending relative to GDP. They also resulted in a systemic-wide crisis in the other Nordic countries except in Denmark. During the crisis years, most of the Nordic banks and banking groups experienced severe problems. Public support was needed in each country to prevent the banking sectors from collapsing and to limit the perceived adverse impact of the financial sector problems on the real economy. Despite the severity of the problems, only very few of the distressed banks were actually allowed to fail.

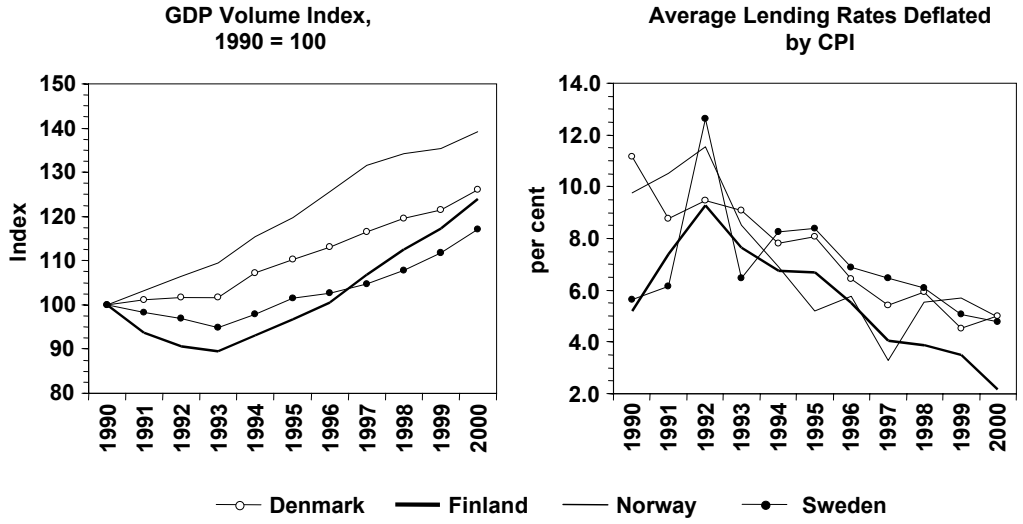
The crises have had a long-lasting impact on the Nordic banking sectors. In Norway for example, the Norwegian government has as late as in 2000 been a large owner in Norway's two largest commercial banks. Perhaps more importantly, the banks with severe problems began to consolidate both voluntarily and involuntarily, with the authorities forcing a number of banks to merger. In 1987, there were 609, 227, 202, and 527 deposit banks in Finland, Denmark, Norway, and Sweden, respectively. By the end of 1998, the number of banks had reduced to 344, 191, 154 and 104 in the four countries, respectively. The consolidation tendency has continued and, in fact, intensified to include cross-border mergers recently (see, e.g. Andersen, et al. 2000). The mergers have resulted in more concentrated banking industries and larger banks (banking groups) relative to the firms they finance.

2.1.3 Economic Growth and Rise of Stock Market

Besides government intervention, the recovery of the financial systems was supported by favorable macroeconomic development during the 1990s. The Nordic economies have, in terms of real GDP, been growing steadily since 1993/94, Norway to some extent notwithstanding. As Figure 2.2 illustrates, the growth has been very rapid, particularly in Finland in the latter half of the 1990s. The Norwegian economy grew essentially the entire 1990s, albeit at a lower rate during the

first and last years of the decade. Paralleling the economic growth, the number of bankruptcies dropped off fast (cf. Figure 2.1).

Figure 2.2 GDP Growth and Real Lending Rates in Nordic Countries



Sources: IMF: *International Financial Statistics (August 2001)* and ETLA Database – *OECD Main Economic Indicators*.

The economic problems of the early 1990s were associated with very high real lending rates (Figure 2.2). In 1992 for example, the real rates of lending were above 9% in all Nordic countries. For comparison it is useful to note that the European real interest rate was, on average, in the range of 4.6-5.2% over the 1991-1998 period (ECB, 2001, p. 18). The rates of the early 1990s were high particularly high if compared to those that prevailed during the latter part of the 1990s. Since then, the rates have decreased, albeit the rate of inflation has in each country remained at moderate levels. Sweden notwithstanding, the amount of bank lending relative to GDP has shown only moderate rates of growth during the late 1990s. Given that Finland is the member of the European Monetary Union and the other Nordic countries are not, it is of interest to note that its real rate of lending have in recent times been the lowest.

Another similarity in the financial development of the Nordic countries is the recent growth of the stock markets, particularly during the late 1990s. The Nordic countries' stock market capitalization represented only 1.5% of the total market capitalization of the advanced countries when averaged over 1982-1989.[7] Due to the Nordic countries' economic problems at the beginning of the 1990s,

[7] These percentages derive from the authors' own calculations, and they are based on data from International Finance Corporation's "Emerging Stock Markets Factbook" (various issues).

their share increased only moderately to 1.6% when measured over 1990-1994. Since then, the situation has somewhat improved in relative terms; the Nordic countries' share of the advanced countries' market capitalization was between 1995-1999 on average 2.2%.

Another way of looking at the development of the stock markets is to compare their size to the size of the overall economy (i.e. GDP). To this end, the development of the nominal market capitalization relative to GDP is presented in Table 2.1. As the table reveals, the stock market capitalization has increased relative to the size of the economy in each country particularly towards the end of the 1990s. The increase reflects above all the asset price cycles associated with the recent economic development.[8] The Nordic trend is by no means unique; the favorable economic development similarly supported the development of asset prices in other countries, such as Germany and the U.S, in the late 1990s. In Finland, the (positive) impact of Nokia on the nominal market capitalization has been substantial. Without Nokia, the ratio of market capitalization to GDP lagged over 1996-2000 clearly that of Sweden and exceeded only slightly that of Denmark and Germany. Since the early 2000, the stock prices have been volatile and decreasing.

Table 2.1 Nominal Market Capitalization to GDP (annual averages)

	Denmark	Finland	Norway	Sweden
1991-1995	30 %	25 %	23 %	53 %
1996-2000	54 %	148 %	38 %	124 %
	Finland w/o Nokia	**Germany**	**US**	**Japan**
1991-1995	19 %	22 %	75 %	72 %
1996-2000	64 %	51 %	142 %	68 %

Source: FIBV and ETLA Database – *OECD Main Economic Indicators.*
Note: When computing the ratio of market capitalization without Nokia to GDP, the GDP has *not* been adjusted to reflect Nokia's GDP share. Over 1996-2000, it has been 2%.

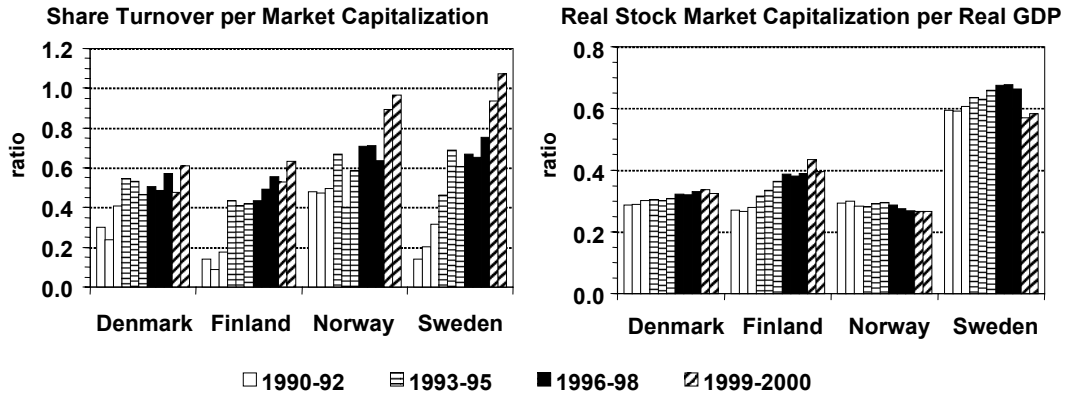
The growth of stock market capitalization reflects, above and beyond initial public offerings (IPOs) and equity issuance by the listed firms, the increase in the discounted value of the listed firms' cash flow (i.e. asset price inflation). We

[8] The prices of stocks declined quite markedly at the beginning of the 1990s from their relative high levels that had prevailed after the liberalization of financial markets in the 1980s. In Finland, Norway and Sweden, stock prices reached their lowest value in 1992 (see Appendix 1, Figure A.1).

therefore measure the development of the stock market also in real terms, i.e. at "constant", expectations-adjusted stock prices (see, e.g., Rousseau and Wachtel 2000). By normalizing the time series of market capitalization at the 1995 stock price level, we obtain a measure of the real developments. They are visible in Figure 2.3: in real terms, only the Finnish and Danish stock markets seem to have grown during the 1990s. In the Nordic comparison, the Swedish market stands out as the largest relative to the size of the economy, and is followed by Finland.

Figure 2.3 also displays a measure of the liquidity of the market, the ratio of value traded to the market capitalization (i.e. the share turnover). Due to differences in the methods of recording trades, conclusions based on the cross-country comparisons of the displayed liquidity measures should be interpreted with caution. Bearing this caveat in mind, it seems that the share turnover has in each country clearly improved from the very low levels of the early 1990s.[9] It appears that the liquidity of the stock market was very low in particularly Finland and Sweden during the first years of the 1990s. The liquidity has however improved since then significantly, especially in Sweden.

Figure 2.3 Stock Market Capitalization and Share Turnover in Nordic Countries in 1990-2000



Sources: ETLA Database – *The Nordic Securities Market: Monthly Statistics* and *OECD Main Economic Indicators*; IMF – *International Financial Statistics (August 2001).*

Note: Market capitalization: Annual average of monthly observations, Share turnover: Sum of monthly value traded. The data on value traded is not fully comparable across countries due to different data collection methods.
Real stock market capitalization: Market capitalization deflated by share price index (1995 = 100); see Rousseau and Wachtel (2000) for details,
Real GDP: GDP at 1995 prices.

[9] It is worth noting that the volatility of stock prices was exceptionally high at the beginning of the 1990s, too (Hyytinen 1999).

2.1.4 Assessment: Measuring Financial Development

There is no single measure of financial development that would fully measure how financial system mobilizes capital, distributes and transforms risks and allocates external finance to firms. In the following we summarize some indicators aimed at capturing the overall development (of the deepness) of the Nordic financial systems over time. We also develop measures in order to assess the relative importance of stock markets and intermediated debt finance. All of these indicators are based on the measures recently developed by Levine, et al. (2000) and Beck and Levine (2001).

The purpose of the *Finance-Activity* measure in Levine, et al. (2000) and Beck and Levine (2001) is to evaluate the volume of the financial market activities in a country. It is given by the log of the product of two ratios, the value of private sector credits by financial intermediaries divided by GDP, and the value of shares traded on the stock market divided by GDP. The larger the measure, the more extensive is the net of financial transactions in the economy at a given point of time.

We modify the *Finance-Activity* measure in two ways. First, we use a more broad aggregate measure of credit in the economy, namely total domestic credit. Second, to filter the forward-looking component of stock prices, we divide the value traded by market capitalization. The resulting measure is a turnover, which is invariant to the expectations-driven prices, because the stock prices enter in the numerator and denominator.

The *Finance-Size* measure in Levine, et al. (2000) and Beck and Levine (2001) is defined as the log of the sum of two ratios, the value of private sector credits by financial intermediaries divided by GDP, and the market capitalization divided by GDP. Despite many advantages, this measure suffers from the defect that in addition to IPOs and equity issuance by the listed firms, the growth of stock market capitalization reflects asset price inflation, i.e, increases in the discounted value of the firms' expected cash flow. To measure the size of the stock market in real terms, i.e., at expectations-adjusted stock prices (see, e.g., Rousseau and Wachtel 2000), we modify the measure by normalizing the time series of market capitalization and GDP at the 1995 stock and overall price levels, respectively. In addition, the credit component we use is total domestic credit. The third measure in our analysis is *Finance-Aggregate* that combines the previous two

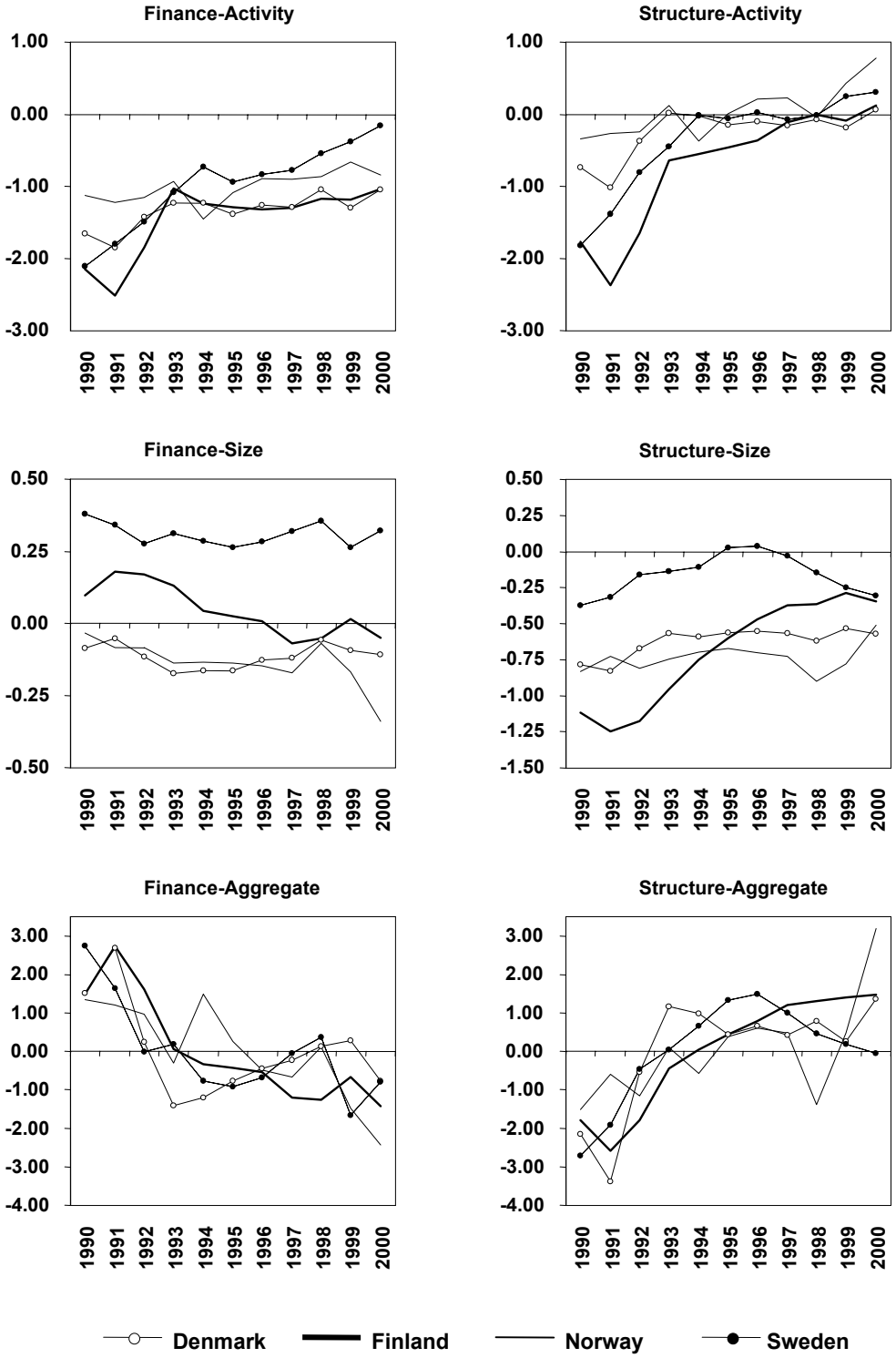
measures and thus represents an aggregate measure of the size and deepness of the financial sector. Specifically, it is the first principal component of *Finance-Activity* and *Finance-Size*.[10]

Levine, et al. (2000) and Beck and Levine (2001) also assess whether a financial system is stock market -based or bank-oriented. To this end they construct two additional measures, called *Structure-Activity* and *Structure-Size*. We adopt the measures but, like in the case of *Finance-Activity*, we modify them to eliminate the forward-looking component of stock prices and use total domestic credit when evaluating the importance of credit for the economy. Therefore, we define *Structure-Activity* to equal the log of the ratio of share turnover to total domestic credit, with the latter expressed as a share of the GDP. It contrasts the activities of the stock market and to those of the intermediated debt market(s). The second measure*, Structure-Size*, is defined as the log of the ratio of the real stock market capitalization to total domestic credit normalized by GDP. This measure captures the relative size of the stock market with respect to the debt finance. The third measure, *Structure-Aggregate*, combines the previous two measures and equals the first principal component of them. This measure is thus a summary indicator of the size and activity of stock markets relative to the intermediated debt finance.

Figure 2.4 illustrates the development of the above-mentioned six indicators in the Nordic countries during the past decade. As we can see, *Finance-Activity* has increased in all countries. In addition, stock market activity has increased relatively more than the debt market activity (*Structure-Activity*). On the other hand, the real size of financial markets compared to the real size of the economy, i.e. *Finance-Size,* has decreased quite clearly in Finland and Norway whereas in Denmark and Sweden the changes have been more moderate. The mean growth rates of the measures are however negative for all countries. A diverging trend can be noticed in the development of relative size of stock market with respect to debt markets (*Structure-Size*): in Finland the relative size of stock market has increased significantly and in Denmark and Norway to a some extent. In the case of Sweden, the relative size of stock market increased in the early 1990s and decreased in the late 1990s.

[10] In principal component analysis, the aim is to evaluate whether certain variables are related to the extent that the number of variables can be reduced without significant loss of information. This amounts to finding the unit-length linear combinations of the variables with the greatest variance.

Figure 2.4 Indicators of Financial Development and Structure in Nordic Countries in 1990-2000



Sources: ETLA Database – *The Nordic Securities Market: Monthly Statistics* and *OECD Main Economic Indicators*; IMF – *International Financial Statistics (August 2001).*

Note: Construction of indicators based on Levine, et al. (2000) and Beck and Levine (2001), with some modifications by the authors.

The development of *Finance-Aggregate* indicates that overall, the real size (deepness) of the financial sectors has decreased relative to the size of the economy in the Nordic countries during the past decade. It is important to note that this decrease has here been documented using purely a relatively simple quantitative indicator. The measure does not take into account for example the firms' need for external finance or the adoption of financial innovations in the Nordic countries, and may hence give a too pessimistic view of the development. On the other hand, the development of *Structure-Aggregate* indicates that the countries have moved toward stock market-centered financial systems. This seems to apply in particular to Finland that had the lowest values for *Structure-Activity* and *Structure-Size* in the early 1990s and that has in this regard clearly catch up the other Nordic countries since then. This trend of increasing importance of stock markets is of course not unique to the Nordic countries; the same trend has characterized the development in many of the countries in the Europe.

2.2 Legal Systems and Corporate Governance

The law-and-finance approach to the analysis of the effectiveness of financial systems has been advocated in a series of papers by La Porta, et al. (1998, 1999, 2000). The approach theorizes that the legal system of a country is an important if not the primary determinant of corporate financing patterns because it is the key mechanism that protects outside investors from expropriation and from being mistreated by the insiders. When investor rights are well defined and enforced, investors are willing to provide capital to firms, and no substitute, possibly costly mechanisms are needed. According to this approach, the distinction between bank-based and stock market -based systems is of second-order importance.

The studies of La Porta, et al. portray the following picture of the Nordic countries' corporate governance model.[11] First, the Nordic average for an index measuring minority shareholder protection (antidirector rights) is 3.00, which is the same as the world average, computed over 49 countries (Table 2.2). It is however lower than the score for the US. Overall, the Nordic countries' legal systems provide less protection for shareholders than those of the common law countries

[11] Due to their common history, the Nordic countries have similar legal systems. The basics of the legal system in these countries are different from those of common-law and civil law countries to the extent that they form "a separate family" (La Porta, et al. 1998).

on average do. In terms of creditor protection, the Nordic countries' average score is 2.00, which is somewhat below the world average of 2.30. The Nordic countries' score is below the average of the civil-law family associated with Germany's legal traditions, which is 2.33.

Second, the quality of enforcement of laws, i.e. the tradition of law and order, is very high in the Nordic countries (La Porta et al. 1998)). Measured over the 1980s and 1990s, the Nordic countries received the maximum score (i.e. 10.00) in an assessment of the law and order tradition. The world average was 6.85, while that of the German-civil-law countries and the score of the US were 8.68 and 10.00, respectively.

Table 2.2 Investor Protection

	Denmark	Finland	Norway	Sweden
Antidirector Rights*	2.00	3.00	4.00	3.00
Creditor Rights**	3.00	1.00	2.00	2.00
Ownership Concentration***	0.45	0.37	0.36	0.28
	World Average	**Germany**	**US**	**Japan**
Antidirector Rights*	3.00	1.00	5.00	4.00
Creditor Rights**	2.30	3.00	1.00	2.00
Ownership Concentration***	0.46	0.48	0.20	0.18

Source: La Porta, et al. (1998).
Note: * Index of minority shareholder rights.
** Index of secured creditor rights.
*** Ownership fraction of three largest shareholders in the ten largest non-financial firms.

Third, the Nordic countries' average level of ownership is close to the world average (La Porta, et al., 1998; see also Table 2.2.). Hence they do not have a more concentrated ownership than the other countries do. Such a finding would be predicted if the level of investor protection was particularly poor. The hypothesis is that concentrated ownership is a substitute for weak protection of investors.

Finally, the Nordic countries have smaller external market capitalization (in terms of approximated minority ownership) relative to GNP as well as less listed domestic firms per capita than many other countries (La Porta, et al., 1997). The result holds even if the size of economies, growth rates, the degrees of legal investor protection and law and order are accounted for. The same does not hold for indebtedness; La Porta, et al., (1997) document that the amount of intermediated debt in the Nordic countries has not been different from the rest of world.

In sum, it appears that on the basis of the analysis on the laws on books, the Nordic countries have adopted an intermediate stance toward the protection of investors; the protection of shareholders is in relative terms weaker than that of the creditors.[12] This finding may explain why the Nordic countries have had relatively subdued stock markets when compared to the rest of the world.

Some recent analyses have augmented the picture portrayed by La Porta, et al.[13] In Sweden, informal corporate governance mechanisms and other means, such as dual-class shares and pyramid holding companies, have enhanced the ability of the Swedish firms to raise external finance (Angblad, et al. 2000). In Norway, the legal protection of shareholders is stronger than captured by the measures of La Porta, et al., allowing for a relatively low concentration of ownership (Bohren and Odegaard 2000). In Finland, the protection of shareholders has improved while that of the creditors has decreased. Despite the change, the concentration of ownership appears stable (Hyytinen, et al. 2001). Finally, the large limited companies are characterized by very concentrated ownership in Denmark, reflecting the fact that ownership has been a substitute for the relatively weak protection of the Danish shareholders.

2.3 Discussion

The corporate sectors of the Nordic countries have historically been highly dependent on borrowing from financial institutions. Loans were together with retained earnings clearly the most important source of corporate sector funding in all four Nordic countries in the 1980s.[14] Particularly small and medium-sized firms have traditionally relied heavily on intermediated debt financing. This traditional landscape began to change in the 1980s and the rate of change accelerated in the 1990s together with the overall development of the financial system. Besides the liberalization of financial markets, the main driving forces of the change have been the problems of banking sectors, the increasing importance of stock markets, as well as technological and industrial advance.

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[12] It is important to note that the results of these studies apply best to the situation that prevailed around 1994/1995. It is an open question how much things have changed since then both in absolute and in relative terms.

[13] See Appendix 2 for a more detailed discussion.

[14] See Drees and Pazarbasioglu (1995) and Edey and Hviding (1995, especially p. 61, Table A4).

During the lending boom phase that followed the liberalization, the availability of external financing was hardly much of an issue. However, the importance of loans as a source of corporate funding became more of a burden to the firms when the problems of the banking sectors began to accumulate. The financing options of small- and medium-sized firms became fewer because of the banking sector problems and restructuring. The access to privately intermediated debt finance was hampered by the binding capital constraints of the distressed banks, disrupted lending relationships, and increased interbank competition.[15] The reduction of financing options may have been acute particularly for smaller and younger firms that do not have access to public debt or equity markets.[16] The financing of innovative start-ups may have suffered from the situation even more because of their high risk of default and reliance on intangible assets.

As we documented earlier, the Nordic financial systems have during recent years become more market-based. Stock markets have grown in size and their liquidity has improved. This type of financial development is important for its direct effects on growth and capital allocation. For example, it is equity rather than debt financing that is essential for firms whose near-term cash-flows are negligible and main assets are growth opportunities. Moreover, an arms-length financial system, relying on market-based corporate financing, may be more efficient in providing price information for guidance and hence for more efficient allocation of capital to investments, particularly to investments in intangible assets (see, e.g., Rajan and Zingales 2000a). In other words, by making prices more informative and the system less dependent on relationships, the increasing role of the stock market has enhanced the ability of the Nordic financial systems to finance projects with a high ratio of intangible to tangible assets. The smaller and younger firms have however not benefited directly from the stronger stock markets; besides lack of investor interest, the fixed costs of flotation preclude the listing of firms that are not mature and large enough. In this sense, a financing gap may have existed.

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[15] See for further analysis Appendix 3 where we develop this argumentation in detail.

[16] Edey and Hviding (1995, p. 28-29) have documented that at the beginning of the 1990s, Finland, Norway and Sweden had outstanding amounts of commercial paper and corporate bonds in relation to their respective GDP that compares to those of Japan, United Kingdom, Canada and France. The US commercial paper and corporate bond markets were at the time clearly more, and the respective German markets less developed than those of the three Nordic countries. This

Recent technological advance have created new industries and opportunities for investment. The emergence of new industries may have increased the demand for external funds and the need for a reallocation of capital from the declining industries to the new ones, because in such industries the firms can rely on internal sources of finance only to a limited extent.[17] The growing importance of hi-tech industries, such as information and communications technology (ICT), has in turn created demand for new forms of finance due to the intangible nature of the industries' assets.[18]

We return to these trends later. It is, however, against this background on which we build our analysis of the Nordic venture capital in the next section.

3 Venture Capital in Nordic Countries

Practitioners have for long emphasized that the various stages of private equity process are interrelated. Because of the interrelatedness, the business of private equity is best viewed as a private equity cycle (Gompers and Lerner 2000, 2001a), consisting of three interrelated stages: *fundraising*, *investing*, and *exiting*.

Raising capital to establish a venture fund is the first step of the cycle. Investors investing in venture funds include pension funds, insurance companies, banks, and corporate investors, to name a few. Once a desired amount of commitments from the investors have been received, the fund is "closed", i.e. no more commitments are accepted. The capital committed is drawn down over a number of years during the investment stage, which is the second stage of the cycle. It consists of an initial search for venture candidates, ex ante monitoring of the candidates, investment decision, as well as interim monitoring and giving advise to the investee firms. Capital is often infused in stages as the investee firms grow and mature. Disposing of, i.e. exiting, the investee firms completes the cycle, meaning that venture capitalists sell their stakes in successful firms and write off failures. Because the lifetime of a typical private equity fund is, at least in the U.S,

source of finance was however of limited importance for many firms, as only larger firms had an access to these segments of capital markets.

[17] It is difficult to evaluate to what extent the demand for finance has not been satisfied. In Appendix 4, we touch upon this question by considering to what extent the Nordic firms have used long-term external finance on and above their internal finance to fund their growth.

[18] See Appendix 5 for the characteristics of the Nordic corporate sectors and the importance of ICT firms therein.

typically predetermined and around ten years, there is mounting pressure to liquidate investments as the lifecycle of the fund approaches its end. The need to exit and return the committed capital forces venture capitalists to periodically return to markets if they are going to raise new funds and remain active in the business of venture capital. The more successful was the previous cycle, the easier it is for a venture capitalist to raise additional funds, and to restart the cycle.

3.1 Birth and Growth of Venture Capital Markets

In this section, we first study briefly the era of infant venture capital in the 1980s. We then examine the 1990s, focusing separately on the development of each stage of the venture capital cycle, i.e. fundraising, investing, and exiting.

3.1.1 The Era of Infant Venture Capital: the 1980s[19]

The roots of the modern private equity were created in all four Nordic countries no earlier than in the late 1970s and in the early 1980s. In Sweden for example, the first venture capital firm, Företagskapital, was established in 1973 (Karaömerlioglu and Jacobsson 2000). Many of these early venture capital firms were "semi-private", i.e. based on co-operation between the government and private sector.[20] In the 1980s the industry began to grow as several new private venture capital firms were founded. By the mid 1980s, there were about 20 venture capital firms in Denmark, 5-6 in Norway and some 20 private venture capital funds in Sweden, accompanied by around 30 regional and government run investment companies (Chritiansen 2000; Karaömerlioglu and Jacobsson 2000). In Finland, the growth lagged a bit the other Nordic countries. However, by 1988 there were 48 venture capital and development companies in Finland (Seppä 2000, p. 210). As we discuss later in more detail, the booming economies together with rising stock prices and high level of investment activity were important catalysts to this early growth of the Nordic venture capital industries.

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[19] See Karaömerlioglu and Jacobsson (2000) for a detailed analysis of the development and emergence of the Swedish venture capital industry; Christensen (2000) for Danish developments; and Seppä (2000) for a description of the Finnish developments.

[20] The Swedish Företagskapital was based on such an arrangement. In Finland, the very first development (venture capital-like) company, Sponsor, was established already in 1967 by the Bank of Finland and certain major private-sector financial institutions.

Around the mid 1980s, a shakeout period began in Sweden, followed by the other Nordic countries during the latter part of the decade. In Sweden for example, most of the private venture capital firms left the industry (Karaömerlioglu and Jacobsson 2000); in Denmark, the number of active venture capital firms decreased to 4-5 by the end of the 1980s (Christensen 2000); and in Finland, the total number of venture capital firms dropped from 48 in 1988 to 30 in 1990, with the private firms being the ones who left the market (Seppä 2000). In Norway, the industry shrank dramatically, if not collapsed, too.

The decrease in activity was reflected in the flows of risk capital. Between 1988-1990 venture capital investments (i.e. start-up, seed and expansion investments) were on average 0.148, 0.111, 0.219 and 0.165 as per million of average GDP in Denmark, Finland, Norway and Sweden, respectively (Jeng and Wells 2000). The corresponding figures for France, the UK and the US were 0.541, 1.120 and 0.383, respectively, and thus clearly higher. The collapse of activity was also long lasting. For example, averaged over 1986-1995, the UK and US had 2.581 and 2.405 private equity new funds raised per million of average GDP, while the Nordic average was 0.679, with Sweden having the largest amount raised in relative terms. Thus, when compared to the US and to many other European countries, the Nordic venture capital industry remained - despite the strong start - undeveloped the entire 1980s and, as we shall discuss shortly, much of the early 1990s.

With this background we now proceed to analyze the growth of the venture capital in the Nordic countries in the 1990s and hence the industry's "renaissance". To this end, we consider each part of the venture capital cycle in turn.

3.1.2 The Era of Renaissance of Venture Capital: the 1990s

Before analyzing the Nordic private equity developments in the 1990s, we discuss certain data and measurement problems. First, both the definition of venture capital as well as the data on the venture capital activity varies across countries and sources.[21] In the analysis of this section we adhere to the US definition and

[21] The primary data used here are the various yearbooks of the European Private Equity and Venture Capital Association (EVCA). The most recent data set is based on a Pan-European survey that covers the activity of all participants in the industry, regardless of membership of the EVCA. The data are standardized, as it is collected similarly from all countries surveyed. However, the previous surveys by the EVCA and therefore the figures represented for the earlier years may be of

exclude buy-outs when referring to venture capital. Second, available data pertains to activities *by* a country's private equity firms ("country-of-management") rather than private equity activity *within* a country (Baygan and Freudenberg 2000).[22] Recently, European data on funds raised by country of origin and investment by country of destination have become available, allowing thus an analysis of the importance of international flows of venture capital. We point out in the discussion that follows instances where international flows may obscure the interpretation of the country level data.

Funds Raised

Figure 3.1 displays funds raised as a share of GDP and by the type of investors in the 1990s. The figure reveals that in the early 1990s, the amount of funds raised was close to negligible in each Nordic country. In Finland and Sweden fund raising started to increase earlier and has been during the latter part of the 1990s at a higher level, on average, than in Denmark and Norway. Since the mid 1990s, the countries have experienced quite a strong growth in the fund raising activity.

Governmental initiatives played a rather important role in the revitalization of the venture capital industries in the Nordic countries. The Swedish government released amidst the banking crisis in 1992 no less than SEK 6.5 billion for venture activity via two new investment organizations (Atle and Bure) and state-owned venture capital organizations. In Norway, the government launched a Nkr 800 million program in 1989 to rebuilt the industry that had collapsed after the banks begun to run into troubles in the late 1980s. A new (reorganized) governmental investment organization called the Norwegian State Industrial and Development

poorer quality because of the limited coverage of the survey in some countries; see, for instance, Karamömerlioglu and Jacobsson (2000) who question the representativeness of the Swedish data in the earlier EVCA surveys. On the basis of their own data collection, the authors find that certain earlier studies (using the EVCA data) may have underestimated the size of the Swedish venture capital activity, as well as the share of the high-tech investments and the importance of the early-stage investments by the Swedish venture capital firms. The same applies at least to some extent to the Danish and Finnish data, too. More recent EVCA surveys should no longer be as deficient in this regard. Anyhow, in international comparisons the use of the standardized EVCA data is preferable.

[22] In addition, the statistics cover only formal private equity that is raised, invested and managed by specific financial intermediaries, venture capital firms. Reynolds, et al. (2000) have estimated that total *informal* risk capital invested in 1999 by private investors was USD 1165 million in Denmark, USD 269 million in Finland, USD 656 in Norway and USD 535 million in Sweden. As a percentage of all nascent, new firm financial support, these numbers represented for 94%, 74%, 87% and 67%, respectively, in the four countries. In the US, the corresponding figures were USD 54 billion and 54%.

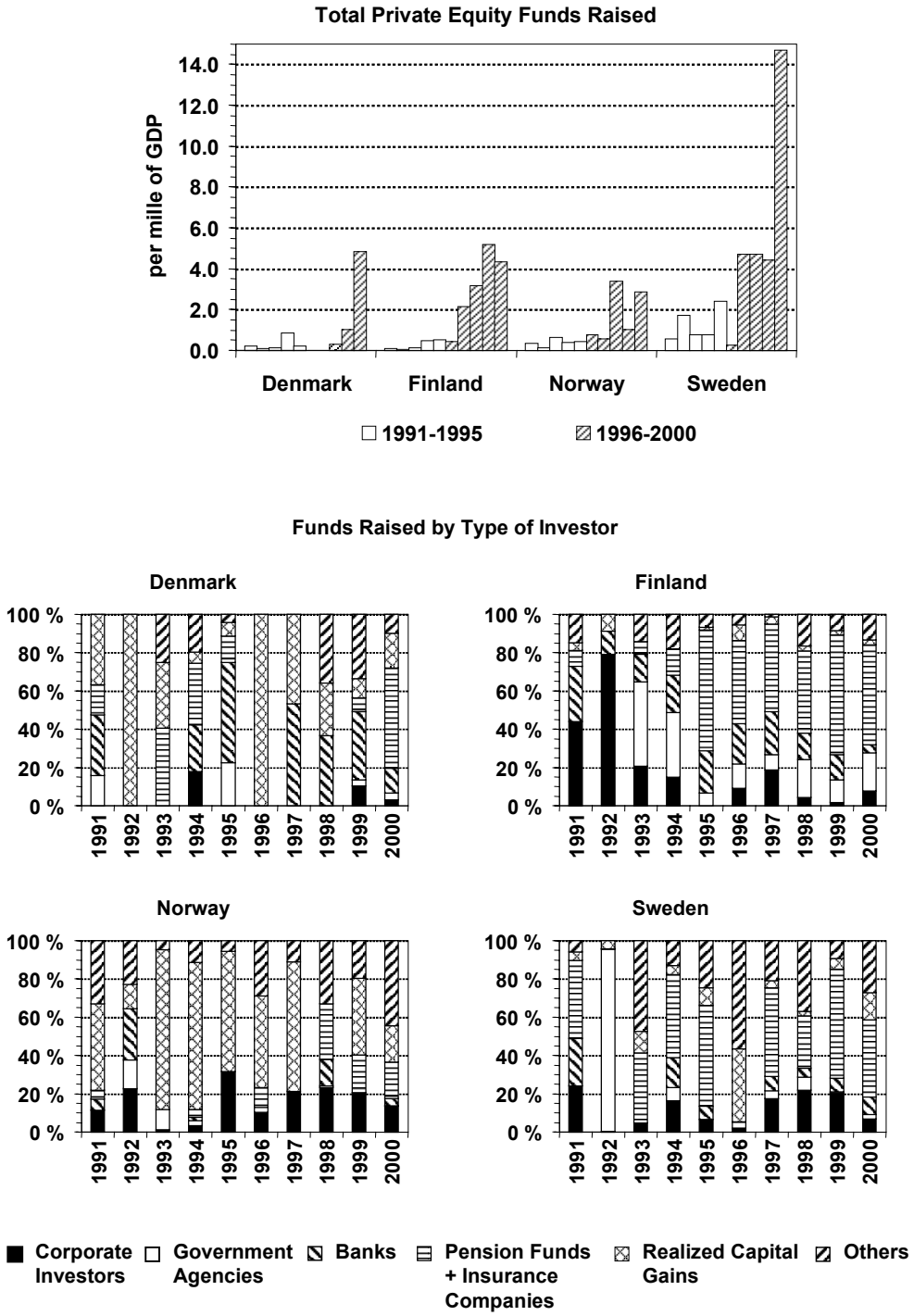
Fund was launched with added financial resources in 1993. In 1996, an (additional) amount of NKr 200 million was earmarked for private equity projects by the Norwegian government. In Finland also, governmental activity has been quite crucial to the revitalization of the industry (see, e.g., Seppä 2000).[23] Besides having run governmental venture capital investment organizations (e.g. The Finnish National Fund for Research and Development "Sitra"), the Finnish government has offered quarantines and provided funding to the industry (since 1995) through a fund-of-funds vehicle, Finnish Industry Investment Ltd.

Year 2000 was the most active year ever for the venture capital industry in Europe. The total sum of funds raised amounted to EUR 48 billion and almost doubled the previous record set in 1999. The UK private equity firms contributed 37% of the total amount raised. During the record year, all the Nordic countries except Finland experienced substantial increase in the fund raising activity: the amount of funds raised was EUR 852 million in Denmark (over five times increase from the previous year), EUR 570 million in Finland (nine percent down), EUR 497 million in Norway (over three times increase) and EUR 3.6 billion in Sweden (over 3½ times increase).[24]

[23] A telling example of the activities by the authorities is an SME council report of the Ministry of Trade and Industry from 1990, proposing measures for the development of the venture capital industry (see Seppä 2000, p. 214, for details).

[24] It is worth noting that according to an analysis of the geographic origin of funds by Baygan and Freudenberg (2000), the amount managed by the Danish, Finnish and Norwegian private equity companies were, *in 1999*, smaller than the funds originating from the countries' investors. Such outflows of funds were not observed however for Sweden, where inflows amounted to around 50% of the funds raised by the Swedish private equity firms. In a European comparison (Baygan and Freudenberg, 2000, p. 17), funds originating from the domestic sources but managed by other European private equity firms were far more important for Netherlands and Finland than for the other European countries. On the other hand, the Nordic countries managed essentially no funds that originated from non-European countries and only the Swedish private equity firms managed a non-negligible amount of funds that originated from other European sources. This analysis applies unfortunately only to one year, i.e. 1999. The picture may be very different over time because of the volatile nature of private equity flows.

Figure 3.1 Private Equity Funds Raised in Nordic Countries in 1991-2000



Source: European Private Equity & Venture Capital Association (EVCA), various yearbooks.

As we can see from Figure 3.1, there is a lot of variation in the sources of funds managed by the Nordic private equity firms over time. Nevertheless, if we focus on the 1995-2000 period, there are some differences in the sources of funds between the four countries. Pension funds and insurance companies stand for an important source of capital both in Finland and Sweden. In Denmark, the primary sources of funds have been banks, although, in 2000 pension funds and insurance

companies were clearly the largest source of funds. In Norway, realized capital gains and corporate investors have been an important source of funds during the late 1990s and in 2000. Interestingly, the banks' share of the funds provided has been the highest in Denmark, which is consistent with the fact that therein the banking sector distress was less severe than in the other Nordic countries. The relatively minor role of the Nordic banks as a source of funds to private equity industry is surprising because in Europe, banks have rather consistently been the largest single source of capital.[25]

Investments Made

Figure 3.2 displays total private equity investments as a share of GDP as well as the stage distribution of the investments for 1991-2000. The ratio of private equity investments to GDP, measured by the country-of-management approach, was quite modest and stable prior to the growth years at the end of the 1990s. Particularly in 1999 and 2000, the ratio of private equity investment flows to GDP increased dramatically. Averaged over 1995-2000, the Finnish, Norwegian and Swedish private equity industries exhibit significantly higher investment levels than the Danish one. Relative to GDP, the amount invested by the Swedish private equity firms look as if it was exceptionally high in 1999-2000. To some extent, the increase may however reflect improved data gathering and the poor quality of investment figures during earlier years (EVCA 2000, p. 144, and Karaömerlioglu and Jacobsson 2000). Nevertheless, the developments in the Swedish market were in 1999 and early 2000 fuelled by the strong growth of the economy's high technology sectors. The growth is by no means unique, as the total amount invested has recently grown rapidly in most of the other European countries, too.[26]

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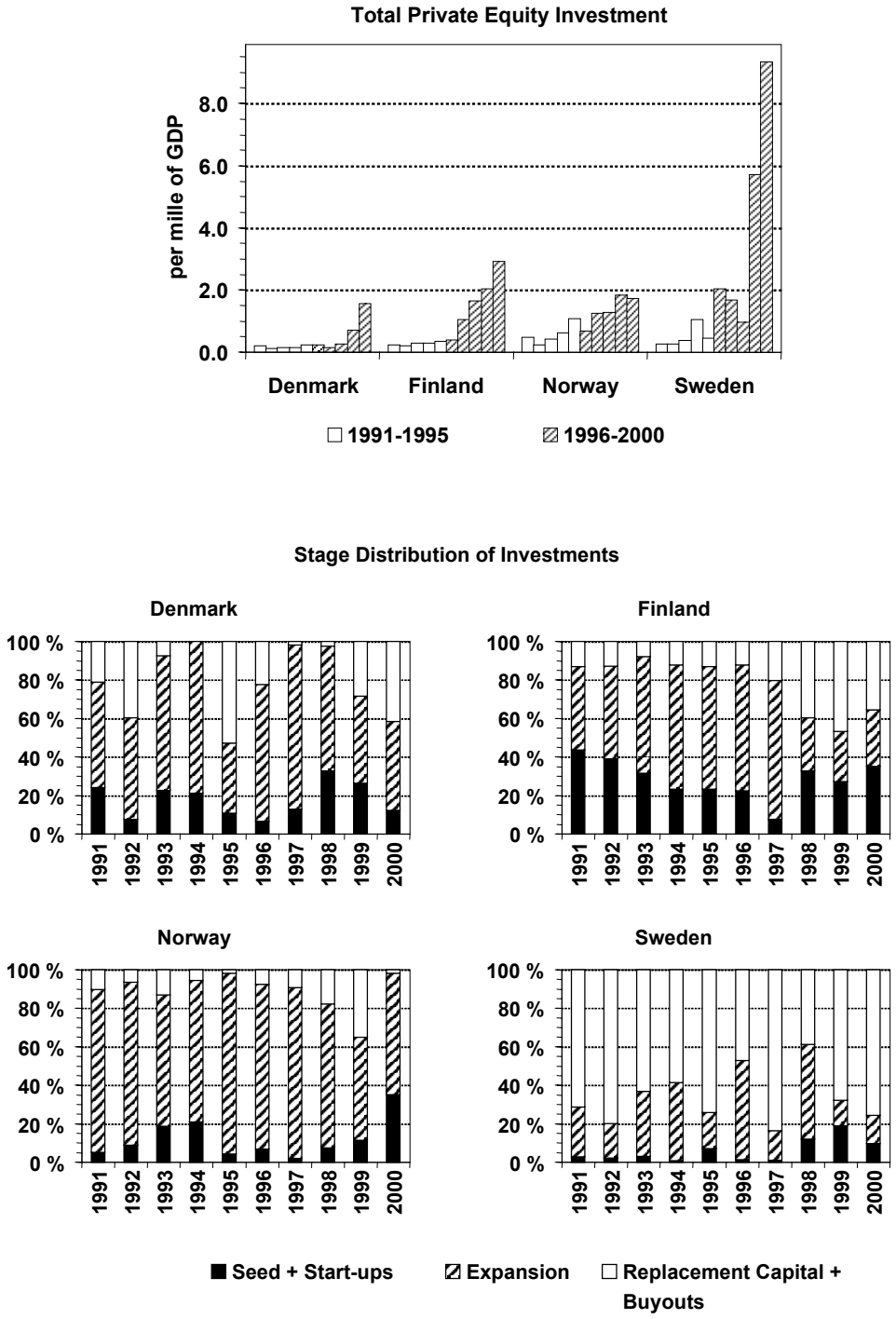
[25] This may reflect the importance of bank-affiliated captive organizations in Europe. Pension funds have been another important source of funds, though by no means is the European market homogenous in this regard (see, e.g., Baygan and Freudenberg 2000).

[26] The picture portrayed by Figure 3.2 changes somewhat when, first, international inflows of private equity are taken into consideration. Baygan and Fredenberg (2000) have shown that in Denmark inflows of private equity outweighed investment by domestic private equity firms by a factor of 4.5 in 1999. For Finland, Norway and Sweden the corresponding figures were 1.5, 0.8, and 1.0, respectively. As a percentage of GDP, the relative importance of inflows was largest for Denmark, followed by Finland and Sweden. In Norway, the inflow of funds was small but not non-negligible. Second, in terms of outflows, investments managed by the Swedish and Norwegian private equity firms but going to other European countries were more important than the same figures for Finland and Denmark. In sum, the analysis of Baygan and Fredenberg (2000) reveals that in an European comparison of private equity flows of European countries (concerning the year

Figure 3.2 Private Equity Investments in Nordic Countries in 1991-2000



Source: European Private Equity & Venture Capital Association (EVCA), various yearbooks.

1999), net flows were clearly positive and thus most important for Denmark, relatively important for Finland, negative but quite negligible for Sweden and negative, albeit moderately, for Norway.

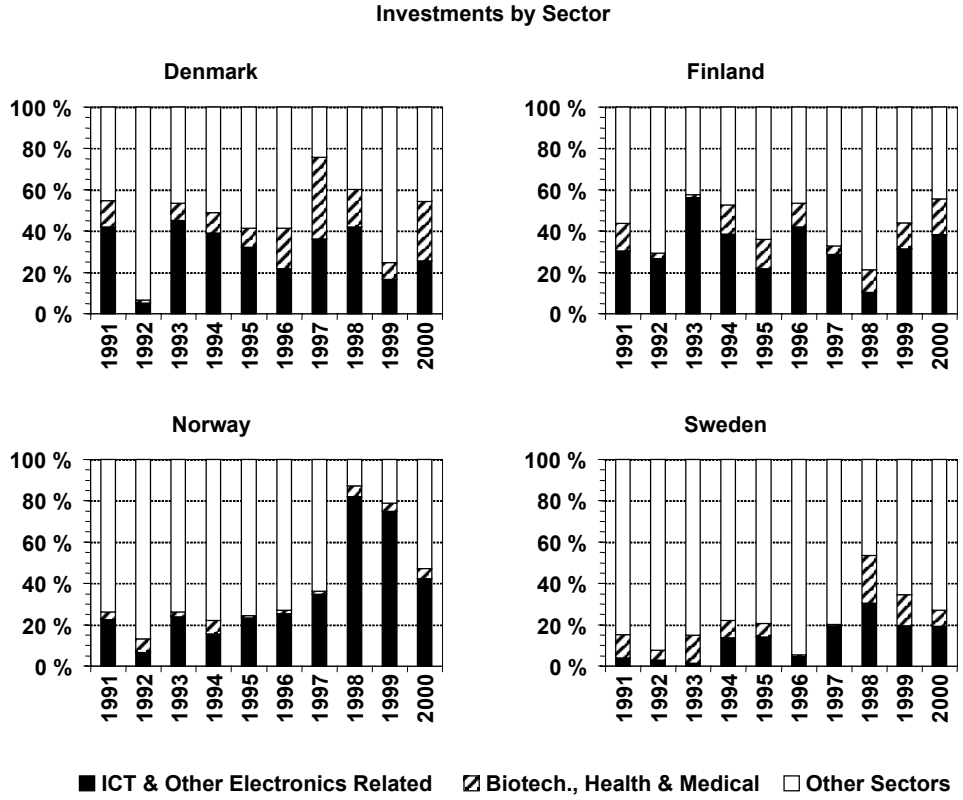
The Finnish private equity industry, and to some extent the Danish one, are drawn apart from the rest of the Nordic countries in terms of relative share invested in early-stage firms (i.e. seed and start-up finance in Figure 3.2). During the past decade, private equity firms in Finland have invested in early-stage-firms around 30% of the total investment amount, on average. The Swedish private equity investments seem to be more concentrated on replacement capital and buyout activity, albeit again a caveat as regards data quality is in order. In fact, Karaömerlioglu and Jacobsson (2000, p. 73) report that, based on their own data gathering up to 1998, the distribution of firms receiving venture capital appears to have shifted more towards early stages than the corresponding EVCA numbers suggest. In Norway, the major share of private equity investment has been made to expansion stage. However, in recent years early-stage investments have gained more importance.

At the European level, management buy-outs and buy-ins dominate private equity investments. Recently, early-stage investments have, however, increased both in absolute and relative terms. In the 1995-2000 period early-stage capital investments accounted for 14 % of total private equity investments; in 2000 the share was 19%. Compared to these proportions, private equity investment activity in Finland and Denmark has been more focused on early-stage finance than in Europe, on average (cf. Figure 3.2).

In addition to the stage distribution of investments, it is of interest to study the industry distribution of investments. In Figure 3.3 we have divided investments into three classes: 'ICT and other electronics related', 'Biotechnology, and health and medical', and 'Other sectors'. Of these, the first two benchmark investments in high technology sectors. The figure reveals that the Danish and Finnish private equity industries have invested in the two high technology sectors on average above 40% of the annual investments during the past decade; investments in ICT and related sectors have dominated in the high technology investments. Furthermore, in Norway the proportion of investments in the ICT sector increased quite dramatically in the late 1990s. The figure also shows that in Sweden the share of the high technology sectors to the total investments has been significantly smaller than in the other Nordic countries. In absolute terms, however, the cumulative Swedish investment value in the high technology sectors during the past decade was about as high as the sum of all the other Nordic countries' cumulative investments in the high technology sectors. The Finnish private equity firms, for

instance, have invested in the high technology sectors only half the value of the Swedish ones.

Figure 3.3 Private Equity Investments by Sector in Nordic Countries in 1991-2000



Source: European Private Equity & Venture Capital Association (EVCA), various yearbooks.

Divestments Achieved

The holding period of private equity investments varies quite a lot depending on investors' preferences, fund's lifecycle and type of investment. In buyouts the involvement of a private equity investor may be less than two years whereas in early-stage investments the exit of investor usually occurs several years later. There are, basically, three main categories for exits: 1) trade sale, i.e., a sale of the portfolio company to another company; 2) public offering of the portfolio firm's shares in an IPO, or sale of quoted equity; and 3) write-off if the investment turns out to be unsuccessful. Another quite frequently used exit mode is management buy-outs. Typically, the private equity investors seek to take public the most successful firms in their portfolios. On the other hand, a trade sale is often the only option for (smaller) companies with minor public interest.

Figure 3.4 presents private equity divestments in the Nordic countries over 1991-2000. The figure reveals that the Finnish and Swedish figures for 1999-2000 notwithstanding, the total number of exits have remained relatively subdued in the Nordic countries.[27] On average, less than 50 exits were made annually over the 1991-98 period. The recent rise in divestments reflects, among other things, the favorable stock market developments and the increased mergers and acquisitions activity in 1998-99 and early 2000. However, it is of interest to note that except in Norway, the amount of divestments decreased in 2000.

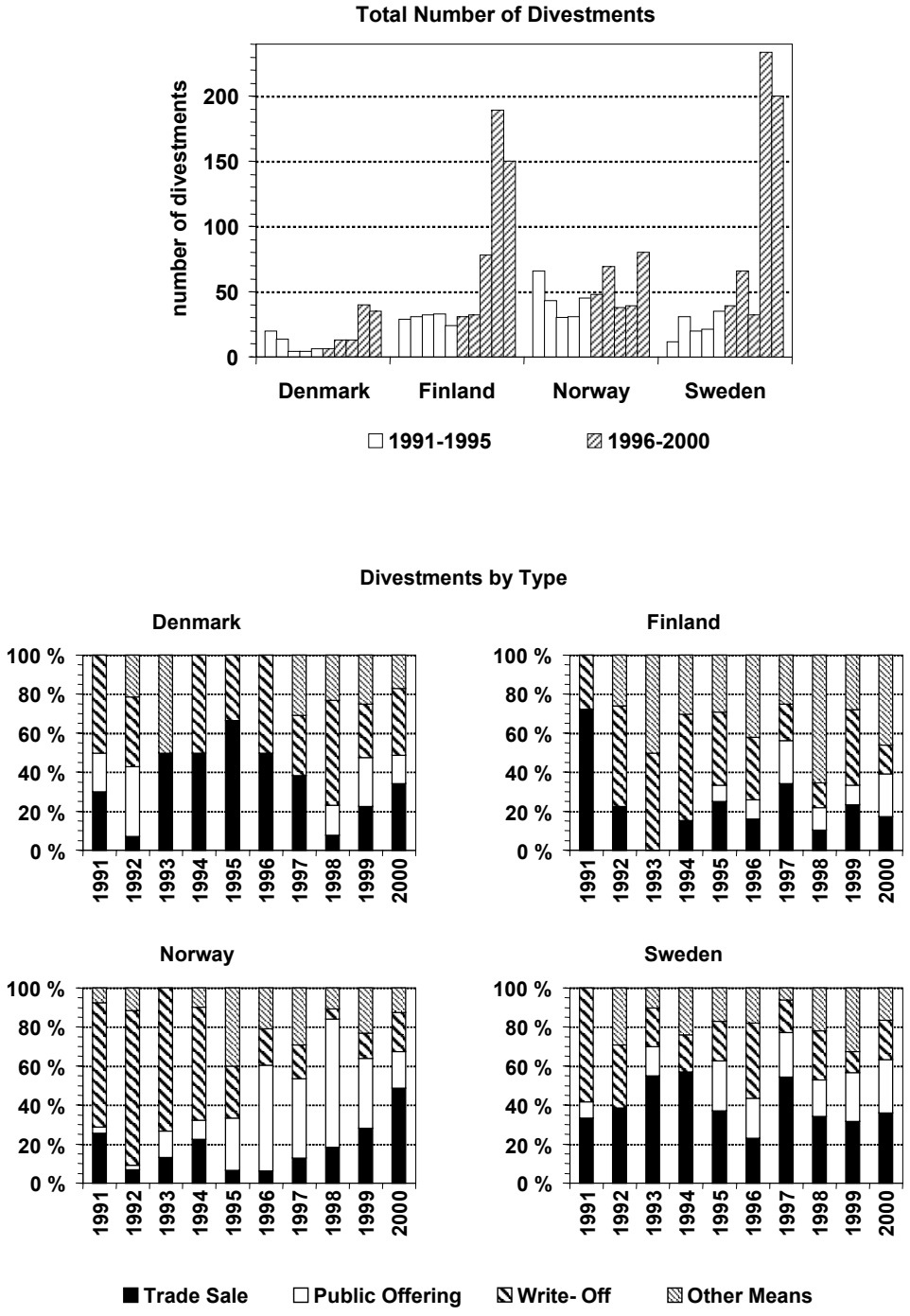
Most of the divestments have in recent years been trade sales in Sweden, public offerings and trade sales in Norway, and trade sales and write-offs in Denmark (Figure 3.4). In Finland, no clear pattern seems to emerge, except that since 1995 the public offerings have become somewhat more important avenue of exit than they were during the economic turbulence of the early 1990s. At that time write-offs accounted for a significant share of divestments in Finland.[28]

These findings fit to the European patterns of exit. In Europe, trade sales have recently been the most popular type of exit at almost 30% share of the total number of exits during the 1995-2000 period. The proportion of public offerings has been around 15% and the share of write-offs about 18%. However, the Nordic countries have only very recently achieved a non-negligible amount of exits. We address this observation in more detail in the next section.

[27] The amount of divestments can be measured both at cost and in terms of the number of divestments. For brevity, we focus here on the latter. The total Nordic proportion of the European divestments (at cost) was, on average, about 4.2% during the second half of the 1990s (see also Section 3.2).

[28] See also Ali-Yrkkö, et al. (2001).

Figure 3.4 Private Equity Divestments in Nordic Countries in 1991-2000



Source: European Private Equity & Venture Capital Association (EVCA), various yearbooks.

3.2 Nordic Venture Capital in European Comparison

The analysis of the previous section revealed that the private equity markets of the Nordic countries developed initially fast in the 1980s, but decreased then quite drastically and developed slowly in the early 1990s. The situation however changed in the course of the last part of the 1990s when the private equity activity increased in all Nordic countries both in terms of funds raised, capital invested, and exits. In the following section, we attempt evaluating to what extent the Nordic venture capital has during the 1990s progressed when compared to their European counterparts. To this end, we evaluate both the scale and stage of the venture capital cycle at which the Nordic countries today stand.

3.2.1 Scale of Activity

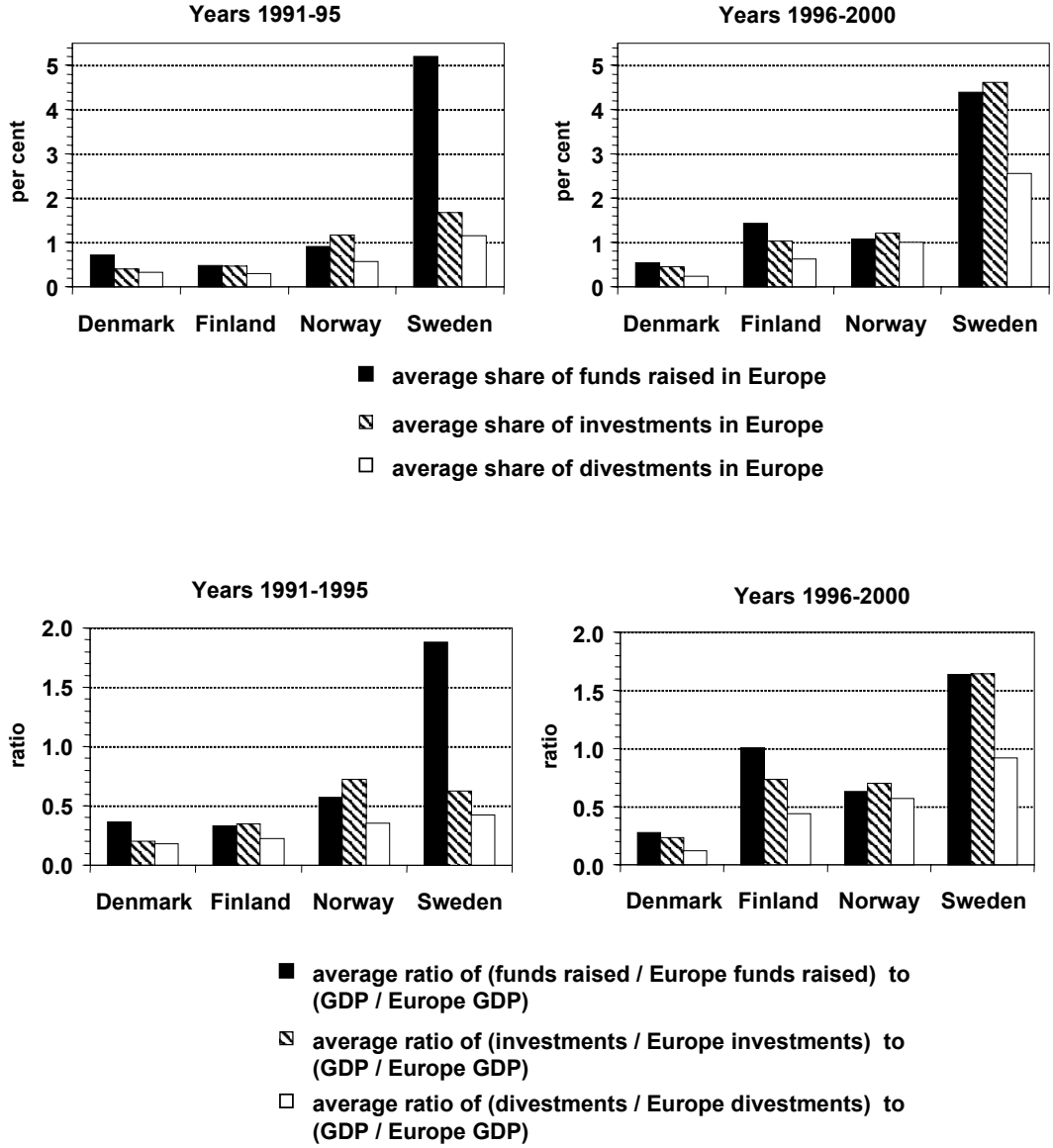
In the first half of the 1990s, the Nordic private equity firms' share of the funds raised in Europe was, on average, around 7.3%, of the capital invested 3.7% and of the divestments achieved 2.4%. In the 1996-2000 period, the shares were 7.4%, 7.3% and 4.4%, respectively. These figures show that the Nordic private equity firms' share of the funds raised remained quite unchanged during the past decade while their shares of the European investments and divestments increased. This suggests that the Nordic countries have lagged the European development. However, it is worth pointing out that in 2000 the Nordic countries' proportion of the funds raised was as high as 11.6%. This was mostly due to tremendous fund raising activity in Sweden.

For a closer look, Figure 3.5 reports each Nordic country's share of private equity activity in Europe in two different ways. First, the upper part reports the Nordic countries' share of the total European activity for the periods of 1991-1995 and 1996-2000. The figures indicate that the most significant changes have occurred in Sweden; its private equity industry has in particular increased its share of the investments. In addition, Finland's shares of funds raised, investments and exits have all steadily increased.

Second, the lower part of Figure 3.5 presents the Nordic countries' share of different venture capital activities relative to their GDP share in Europe. If the ratio is larger than one, it implies that the country has more venture capital activity than its GDP share predicts. The figure shows that only Sweden has over the

past years reached the level of fundraising and investment activity that its GDP share predicts. Even its private equity market lags the European counterparts in terms of exits. Finland has been catching up the European venture capital with regard to funds raised: during the 1996-2000 period, the Finnish proportion of European private equity funds raised reached the level predicted by its GDP share among the European countries. The Finnish shares of investments and divestments also increased but remained still notably below the level predicted by its GDP share. The Danish and Norwegian venture capital industries show only moderate growth by this measure, albeit it might be that the picture is too pessimistic due to the problems with the EVCA survey coverage.

Figure 3.5 The Share of Nordic Countries in Private Equity Activity in Europe



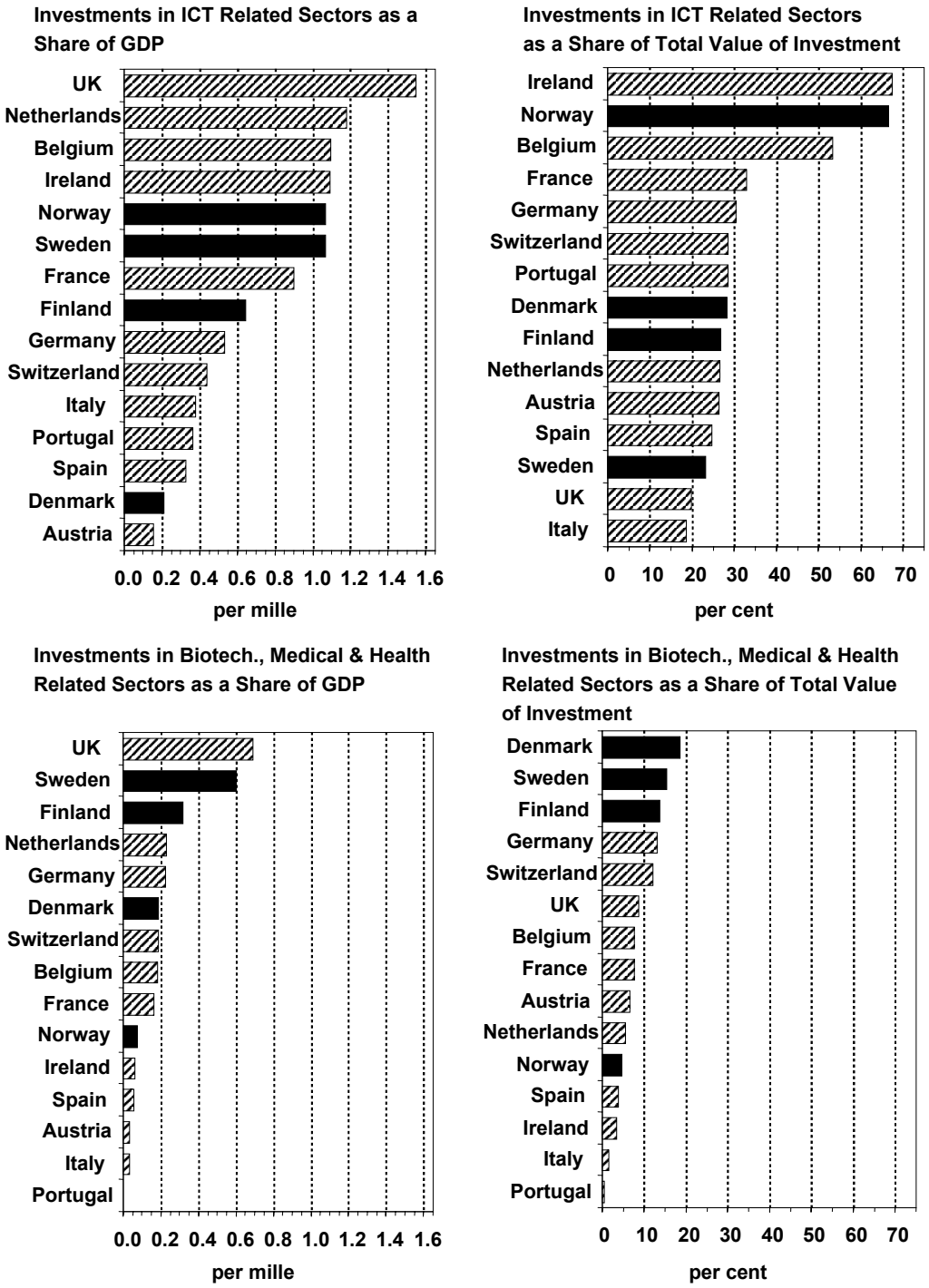
Sources: European Private Equity & Venture Capital Association (EVCA), various yearbooks and ETLA Database – *OECD Main Economic Indicators*.
Note: Europe aggregates consist of 15 EVCA member countries' data.

Private equity investments tend to cluster in certain sectors, such as ICT and biotechnology. At least to a certain extent, the concentration is related to the degree to which entrepreneurs and innovators are able to extract profits from their new products and innovations. For example, in 1995-2000, the average share of the investments in ICT and other electronics related sectors has in Europe been around 24% and the proportion of biotechnology, medical and health related sectors about eight percent.

Figure 3.6 summarizes the recent concentration of the private equity investments in the high technology sectors in selected European countries in couple of alternative ways.[29] The figure shows, first, that when we normalize the amount of investments by GDP the Norwegian and Swedish private equity industries have been in the leading group in investments in the ICT sector in Europe. By this measure, the Swedish and Finnish industries have invested quite a lot in biotechnology and health and medical sectors. Second, if measured by the proportion of total investment value, the Nordic countries perform well in the case of investments in biotechnology, health and medical sectors; in the case of ICT, the Norwegian firms rank exceptionally high among European countries. However, no data are available to determine the extent to which they have been investing in the domestic (i.e. Norwegian) ICT firms.

[29] We focus here on the period 1998-2000 to reduce the potential problems due to data quality as well as to portray a more recent picture of the concentration.

Figure 3.6 Private Equity Investment in High Technology Sectors in Europe



Source: European Private Equity & Venture Capital Association (EVCA), various yearbooks.
Note: 1998-2000 averages.

3.2.2 Maturity (Stage of Venture Capital Cycle)

The stage of the venture capital cycle is reflected in the relative amounts of funds raised, investments and exists. For example, if a lot of funds have been raised compared to the investments made, a country is at a relatively early stage of the cycle. In contrast, if a lot of investments have been made compared to exists achieved, a country is about to enter the exit stage of the cycle. Because of yearly variation in venture capital flows and the recent growth of the venture capital activity in Europe, our analysis of the stage of the cycle is based on the cumulative values, i.e. on the entire history of the venture capital industries. The idea is to measure the cumulative experience and hence the overall lifecycle of the industry.

Albeit Figure 3.5 already provided some clues about the stage of the venture capital cycle at which the Nordic countries are, we now test directly whether the Nordic countries are lagging behind the European venture capital cycle. To this end, we calculate the ratios of cumulative funds raised to cumulative investments and cumulative investments to cumulative divestments using all the data we have, i.e. for 15 European countries for the 1991-2000 period. Table 3.1 summarizes this exercise, with null hypothesis being that the position of the Nordic venture capital industries in the venture capital cycle is the same as that of the other European countries. The hypothesis is tested by computing *t*-tests for the ratios. The data speak for a laggard's position in the cycle, if the ratios are statistically significantly higher in the Nordic countries than in Europe.

As we can see from Table 3.1, both ratios are statistically significant for the Nordic countries as a whole. Of individual countries, statistically significant values are obtained for Denmark, Finland and Sweden. This analysis indicates that, although the private equity industry in the Nordic countries has grown quite rapidly in recent years, it is still a laggard relative to the European private equity cycle. In particular, only in Norway the amount of funds raised, investments and exits are balanced relative to each other when benchmarked to the corresponding European levels; the other Nordic countries' private equity industries are at an earlier stage of the cycle. They have therefore less experience in investing the funds raised and particularly in exiting the portfolio companies than the European countries have on average. This conclusion is reinforced if one agrees with the view that despite their recent growth, the European venture capital markets are at

a very early stage of development, less diversified and less efficient than those of the US (see, e.g., Communication of the European Commission 1998 and UNICE 2001).[30]

Table 3.1 Analysis of Venture Capital Cycle in Nordic Countries versus Europe in 1991-2000

	Ratio of Cumulative Funds Raised to Cumulative Investments	Ratio of Cumulative Investments to Cumulative Divestments
Nordic Average	1.66**	3.94***
Denmark	2.15***	4.35***
Finland	1.80***	3.81***
Norway	1.14	3.02
Sweden	1.56*	4.57***

*** indicates statistical significance at 1% level
** indicates statistical significance at 5% level
* indicates statistical significance at 10% level

Source: European Private Equity & Venture Capital Association (EVCA), various yearbooks.
Note: *t*-test for the null hypothesis that the ratios are the same for the Nordic countries as for the other European countries.

3.3 Discussion

The supply of venture capital is determined by the willingness of investors to provide capital to venture capital firms. The willingness, in turn, depends on the returns that the venture capital firms are expected to offer. From this perspective it is not surprising that previous research has linked venture capital flows to the availability of exit mechanisms for venture capitalists and particularly to the strength of the IPO market and the size of the stock market. Milhaupt (1997), Black and Gilson (1998), Jeng and Wells (2000) have for example demonstrated that IPOs are one of the main drivers of venture capital flows (both investments and fundraising) over time and across countries.[31] There hence exists a strong in

[30] Another sign of the maturity of the venture capital industry is its ability (and willingness) to finance seed and start-up firms. From this perspective, Finland has a more mature industry than the other Nordic countries have.

[31] Raw U.S time series data also supports this view; the correlation between the volume of IPOs in general and particularly the volume of venture-backed IPOs and the (subsequent) fundraising appears to be strong (Black and Gilson 1998, Gompers and Lerner 2001a, 2001b). The strength of the IPO market is strongly related to the overall level of stock market prices and capital inflows into venture capital funds are greatest during booming asset markets.

direct link between the availability of external finance to young entrepreneurial firms and the stock market.

The importance of well-functioning financial markets for venture capital stems to a large extent from the vitality of the exit stage for the entire venture capital cycle.[32] Perhaps the most obvious reason for the importance of exits is that the exits affect the monetary incentives of venture capitalists to invest in certain firms and industries. Because many venture-backed firms generate little, if any, cash flow, exiting is critical to ensuring attractive returns. The incentives to invest therefore depend on how profitably venture capitalists can exit the portfolio companies. The reverse direction of the venture capital process is important also because the opportunities for exits influence the venture capitalists' ability to raise capital in the future.

Closely related, Black and Gilson (1998) argue that the exit opportunities enabled by the stock market are important for the venture capital investing because the potential for exit through an IPO allows the venture capitalist and the entrepreneur to contract implicitly over control, in a way that gives the entrepreneur an option to reacquire control if she so desires in connection of listing the firm. The initial transfer of control to venture capitalists is required because otherwise the venture associated with agency problems and high-risks would not be able raise external financing. The IPOs are important because the other profitable vehicles of exit, such as trade sales, do not include the option for the entrepreneurs to reacquire the control. An active stock market enables the development of the market for private risk capital also because it facilitates "the recycling of informed capital", i.e. the experience and human capital of the venture capitalists (Black and Gilson 1998, Michelacci and Suarez 2001). The informed capital is recycled when the mature portfolio companies go public. The listing enables exiting and allows the venture capital firms to redirect their financial and non-financial capital towards younger firms.

The earlier research suggests that besides a strong stock market, there are also other preconditions for the development of an active private equity market. According to the literature, the development is enhanced by the availability of funding from independent sources (e.g. pension funds); the incentive structures

[32] The fact that achieving a profitable exit lies in many ways at the heart of the venture capital cycle has been recognized for long; see e.g. Sahlman (1990).

and contracting mechanisms of the economy; and finally, overall risk tolerance and willingness of entrepreneurs and venture capitalists to pursue high-risk, high-return ventures (see for example Milhaupt 1997, Black and Gilson 1998, Gompers and Lerner 2000).[33] Macroeconomic conditions and government programs can play an important role, too.

The Nordic developments are quite consistent with the findings of the earlier research.[34] Let's emphasize the main stages and drivers of the development: First, the liberalization of domestic financial markets had a positive influence on the development of venture capital by raising the number of potential investors and liquidity, both in private and public equity markets. The development improved the prospects for exits and the favorable stock market environment attracted the first movers to the industry.

Second, the Nordic venture capital activity nearly collapsed by the end of the 1980s mainly because of the deteriorating macroeconomic conditions. The deterioration increased the number of bankruptcies (cf. Section 2.1). The firms financed by the venture capital firms have typically high risk of default. Because such firms are more likely to suffer from macroeconomic turbulence, the venture industry was hit by a downturn sooner and harder than the economy on average. Moreover, the Nordic venture capital firms were not up to face an adverse macroeconomic shock because of the following reasons:

- Banks competed for market shares after the liberalization of financial markets. The credit boom of the 1980s may have in this way substituted credit for equity and worsened the adverse selection that the infant venture capital industry faced.[35] In other words, the average quality of ventures among the potential investee firms may have been of low quality because only very bad projects did not received financing from the banks.

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[33] Other (non-financial market related) details of the design of institutional environment that support active venture capital market are the regulation of labor market and labor mobility and taxation (Milhaupt 1997, Black and Gilson 1998). An analysis of these other factors for Nordic venture capital is beyond the scope of this study.

[34] Karaömerlioglu and Jacobsson (2000) have recently argued that difficulties in access to available funding, inefficient incentive structures, and deficient exit possibilities for venture capitalists blocked for long the revitalization of the venture capital industry in Sweden. It seems that the same factors have had bearings on the development of the private equity industry also in the other Nordic countries.

[35] The lending boom may thus have postponed in this way the early development of the Nordic private equity industry.

- The venture capital firms lacked a degree or two of maturity and critical size to face adverse shocks. The early venture capitalists were inexperienced to guide their portfolio firms over the difficult market conditions. Due to the small size of many of the venture firms, their portfolios were not well diversified and their financial resources were not sufficient to back up the portfolio firms in financial distress.
- At least some of the early venture capital firms were quite strongly growth-oriented, such as Mancon in Finland, and had therefore had fewer incentives for careful ex ante screening of potential investee firms (see also Seppä 2000).

The Nordic banks were heavily involved in the venture capital sector, but the banks' own problems prevented them from helping the declining venture capital industry. There was little capital available for the venture capital firms and as a result, a period of slow progress followed in the early 1990s.

Third, the change in the structure of the Nordic financial systems led to the renaissance of venture capital in mid of the 1990s, albeit the governmental initiatives taken after the collapse of the venture industry contributed to the initial recovery, too. In 1999 and 2000, the industry almost exploded in Finland and Sweden, and grew strongly, albeit to a much smaller extent, also in Norway and Denmark.

The renaissance was driven by the growth of the Nordic stock markets and increased liquidity therein during the last years of the 1990s. This development had a positive impact on the private equity activity because it improved the prospects for exits and recycling of informed capital. Hence, the link between the venture capital and the stock market, as suggested by the received theory, was at work. The change in the financial landscape may have also increased the willingness of financial institutions and other institutional investors to provide funds to the sector.

Finally, the demand side has been important for the recent developments. The demand for venture capital is largely determined by entrepreneurial activity, i.e. the availability of entrepreneurs that have promising ventures, managerial skills and ambitions for growth, as well as alternative sources of external funds to ventures. On the one hand, the heavy investments in high technology sectors that were made during the 1990s provided the Nordic private equity investors with plenty of interesting investment opportunities. On the other hand, the severity of

the banking problems created for sure room for new providers of funding in the mid 1990s. Especially from the early-stage and high-risk firms' point of view, the increase of private equity activity in the mid-1990s was welcomed because these firms may have faced relatively more severe difficulties in getting sufficient financial backup from the traditional sources of funds, i.e. from the banks. In this sense, the growth of venture capital was on demand to fill the financing gap that the reducing lending by the banks induced. Also the high real rates of interest in the early 1990s may have adversely affected the availability and costs of debt funding for firms with above average risk and uncertain cash flows.

4 Conclusions

We have documented several similarities that characterize the development of the Nordic countries' financial systems over the past decades. These include the liberalization of financial markets and the lending boom in the late 1980s, the banking crises and collapse of bank lending in the early 1990s, as well as the growth of stock markets in the late 1990s. We have also documented that after a strong start, the private equity industries of the Nordic countries first collapsed and then grew slowly in the early 1990s. In recent years, the industries have grown rapidly, if not exploded. As a result of the development, the Nordic financial systems have not necessarily become larger. Rather, the countries have moved towards stock market-centered financial systems. This characterization seems to apply particularly to Finland where the stock market has grown and the intermediated debt finance has contracted more relative to the size of the economy than in the other Nordic countries during the past few years.

Despite the recent growth, only in Sweden venture capital has over the past years reached the level (scale) of fundraising and investment activity that its GDP share predicts. Even there, the exits are subdued. For the scale achieved, the Nordic countries are still laggards compared to the European private equity cycle. Only in Norway, the amount of funds raised, investments and exits are balanced relative to each other; the other Nordic countries' private equity industries are at an earlier stage of the cycle. They have therefore less experience in investing the funds raised and particularly in exiting the portfolio companies than the European

countries have on average. This suggests that the Nordic venture capital may lack a degree or two of maturity when compared to the other European countries.

These findings warrant four broad conclusions. First, because the steps towards stock market based financial systems and the growth of venture capital are recent phenomena and because it takes time to build a well-functioning financial infrastructure (Rajan and Zingales 2000a), the Nordic financial systems are not necessarily mature enough yet to provide the financial services that undertaking (and completing) large-scale change, emerging industries and knowledge-based economic growth require. Whether the Nordic financial systems are, as a whole, up to the task warrants further analysis.

Second, the future of the recently established venture capital firms (with weak, if any, reputation) depends on the returns they are able to generate for their investors. Because it seems that the Nordic countries' private equity industries are at an earlier stage of the venture capital cycle than elsewhere in Europe, the long-run vitality of the market for risk capital hinges in these countries on the exit opportunities that their financial systems generate. Whether the Nordic financial systems are up to this particular task warrants further analysis, too.

Third, because of the recent step towards stock market-centered financial systems, the legal systems of the Nordic countries may have a more important role to play for the patterns of corporate finance in the future. The reason for this is that explicit contracts and transparency are relatively more important for an economy with a market-based financial system (Rajan and Zingales 2000a). In such systems, institutional relationships and market power matter less, the providers of finance have to rely more on the "protection" provided by the legal system and the ability to write explicit contracts and their pricing determine the financial transactions undertaken. Prompt and unbiased enforcement of contracts is instrumental to the efficient functioning of a market-based financial system. In addition, efficient corporate governance is at the heart of innovative firms' fundraising ability because of the evolving pattern of their control and capital structures. Whether the Nordic legal systems, mechanisms of corporate governance and particularly the protection of shareholders are up to the task(s) warrants further analysis.

Finally, the Nordic private equity industries have evolved in tandem with the overall macroeconomic conditions and stock market developments. The initial growth phase and the renaissance in the 1990s coincided with favorable macroeconomic conditions while the collapse coincided, albeit not perfectly, with in

creasing bankruptcies and macroeconomic turbulence. Even though the current situation is in many ways different from the one that prevailed prior to the collapse in the 1980s, there are similarities, too. This - together with the US experiences (see, Gompers and Lerners 2000, 2001b) - suggests that today's turbulent economic environment is likely to have a strong impact on the Nordic private equity industries, particularly if the turbulence continues. Because of frictions in fundraising and investing (due to e.g. the contracts with the initial providers of capital), the industry may however respond to the turbulence with a lag. Thus, if the history is of any guidance, the question is not whether the Nordic venture capital activity will contract as a result of the currently ongoing macroeconomic turbulence; rather, the question is how much and for how long it will contract.

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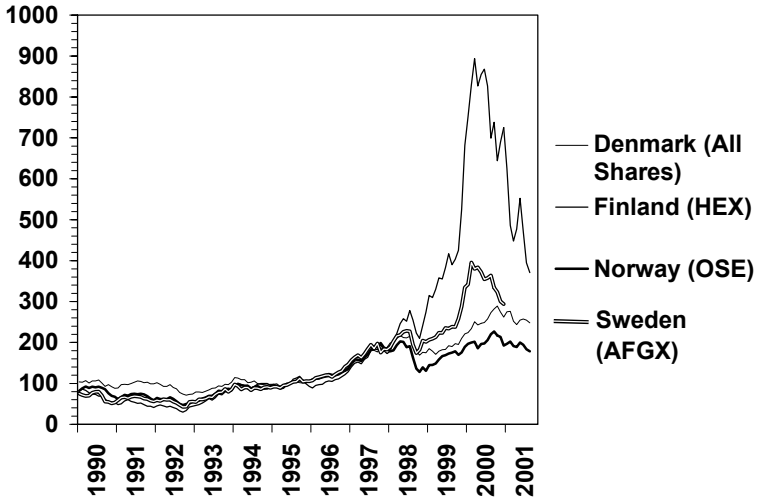
Appendix 1. Development of Share Prices

Figure A.1 Share Prices in Nordic Countries (1995=100)



Source: ETLA Database – *OECD Main Economic Indicators.*
Note: Period 1990/01 – 2001/08, except for Sweden 1990/01-2000/12.

Appendix 2. Corporate Governance: Further Analysis

Some recent studies have augmented - and at least to some extent questioned - the picture portrayed for the Nordic countries by La Porta, et al. (1998, 1999, 2000). In this appendix, we briefly summarize some of these studies.

Angblad, et al. (2000) argue that Sweden in fact presents a puzzle for the recent literature on law and finance. They argue that because by the measures used, formal protection of minority investors is relatively weak and separation of ownership and control is strong, the Swedish firms "should be starved of capital." According to the authors, that is not however the case; there is no evidence that the growth of (the larger) Swedish firms have been hampered by lack of capital or that the Swedish financial system is underdeveloped. The authors argue quite the contrary and provide an explanation. They argue that because the larger Swedish firms are closely held and tightly controlled by means of dual-class shares and pyramid holding companies, informal corporate governance mechanisms and concerns over social status by the large owners have reduced minority exploitation. That has enhanced the ability of Swedish firms to raise external capital. In Sweden, the pivotal shareholder appears to be a controlling minority shareholder that controls a majority of votes but provides less than half of the capital (Angblad, et al. 2000).

The ownership structures of Norwegian firms have been considered to display characteristics of an outlier, too (Bohren and Odegaard 2000). Bohren and Odegaard (2000) document that in Norway, individual ownership is low and decreasing, the largest owners of firms own as a general rule only a small stake, and financial investors have increased their share constantly. In particular, it takes typically the four largest owners to establish a simple majority and as many as the ten largest to change the corporate charter. Moreover, corporations and bureaucrats (state) control more of the voting power than in other European countries. Bohren and Odegaard (2000) argue that these patterns are related to strong legal protection of shareholder rights, not necessarily fully captured by the measures of La Porta, et al., and to a long period of social-democratic rule. The important role

of state as owner reflects the social-democratic rule because of the associated significant public involvement in industry during the past 50 years or so.[1]

In Norway, banks have traditionally not been able to consistently establish strong control rights over firms, in contrast to what they have done in Finland and Sweden. That too may be explained by the strong protection of minority shareholders (Ongena, et al. 2000). In this regard, the minor role of banks may have been blessing for Norway, because it might explain why many of the Norwegian (larger) firms seem to have suffered relatively little from the banking crisis.

In Finland, recent evidence on the evolution of financial systems and formal corporate governance is more in line with the law and finance tradition. The protection of shareholders has increased significantly during the past twenty years, while that of creditors has decreased (Hyytinen, et al. 2001). This finding is consistent with the evidence that the Finnish corporate financing environment has taken a major step toward a stock market -based financial system. Because the corporate lending stock of financial institutions has decreased in relative terms, the transition has at least to some extent taken place at the expense of the banking sector. Finland also presents a small puzzle to the growing law and finance literature because despite the strengthening of shareholder rights, the level of ownership concentration appears stable. On the other hand, the financial institutions own today only a fraction of equity when compared to the levels that they held in the 1980s. Exactly the opposite holds for foreign owners; they are nowadays very important shareholders in Finland. Thus, because the major creditors are no longer large owners and because the level of shareholder protection has increased, we should, according to the theory, observe a declining trend in the concentration of ownership.

Denmark is to some extent opposite to Norway because the large limited companies are characterized by very concentrated ownership. Among the 400 largest companies, the largest shareholder controls more than half the votes. In 312 of the 400 largest companies, the two largest owners together more than half the votes. Because Denmark has a relatively weak protection of shareholders, the country's concentrated ownership seems to be a substitute for it. The most important group of owners of shares in Danish firms are the institutional investors,

[1] The high state ownership in banks reflects however more the role of the Norwegian state in preventing the banking system from collapsing in the early 1990s.

which have however been relative passive in their role. Because of regulation, they cannot have a dominant position in a company either. Also foundations, state and municipalities own a large number of firms. Thus, it is a characteristic feature of the Danish corporate governance system that a large number of sizeable owners are not strongly motivated to be active owners, or they have restrictions to do so.

Appendix 3. Banking Problems and Corporate Finance

We argue that the banking problems of the late 1980s and the early 1990s and the subsequent banking sector restructuring had important implications for the patterns of corporate financing in the Nordic countries. In this Appendix, we motive this argument in more detail.

Short-term Impacts

There are several reasons why the banking crises may have hampered the access of firms to external financing during the first half of the 1990s. First, due to weak asset quality, public support and capital requirements, the banks had to at that time pay particular attention to the composition of their loan portfolio and to the risks of their lending. If anything, there was a need to reduce the overall risk level to avoid further loan losses.

Second, the supply of so-called relationship credit is often regarded as one of the most important mechanism of channeling external finance to firms and particularly to small businesses (see, e.g., Petersen and Rajan 1994, and Berger, et al. 2001). The banking crisis and mounting bankruptcies are likely to have weakened such relationships and even disrupted them. When the banks struggled for survival and many credit officers faced mounting loan losses, it must have been hard to sustain mutually beneficial relationships and value their future profitability. Kinnunen and Vihriälä (1999) document for example that in Finland, small and medium sized firms that were the customers of the banks in most trouble, i.e. the savings banks, were more likely to close in 1992 than other firms, or the same firms in other years.[1] In his study of Swedish micro and small firms over the period 1994-97, Heshmati (2001) further documents that the level of debt financing was limited both by demand and supply side constraints. The author argues that of the supply side constraints, the financial crisis did not play the smallest role.

[1] Saarenheimo (1995) finds that in Finland, the negative shocks to the credit supply in the early 1990s deepened the collapse of private investment by around EUR 3.3 billion annually. However, there seems to be only few indications, if at all, on a general credit crunch in Finland (Vihriälä, 1997). Ongena, et al. (2000) provides an analysis of the impact of bank distress on the stock prices of firms maintaining a relationship with a distressed bank. The study finds that the debtor firms faced a small and temporary adverse stock price impact. However, the deterioration of the Norwegian banks' assets during the crisis resulted mainly from small business bankruptcies. It is therefore likely that it was the supply of small business credit that was disturbed by the banking problems, and not that of the relatively healthy publicly listed companies.

Third, the banking problems were paralleled by exceptionally high real rates of lending (cf. Figure 2.2 in the main text). Such high rates have no doubt discouraged the use of debt by firms. Perhaps more importantly, the high rates may have worsened the adverse selection problem facing financial intermediaries, leading to further credit rationing (Stiglitz and Weiss 1981). The high rates of interest may have also encouraged risk-taking by the firms that then faced difficulties in meeting their debt-service obligations.

Fourth, small firms and new high-technology firms may have suffered from the situation of the early 1990s somewhat more, because they have, as a group, higher default rates than large or mature firms.[2] In downturns and during economic turbulence, the cash flow volatility of such firms can be expected to increase relatively more. The volatility however increases the likelihood that a firm will need to access to external capital as well as the costs of receiving outside financing (Minton and Schrand 2000, Johnson et al. 2000). It is therefore likely that the high technology firms' access to bank intermediated finance was, at least temporarily, clearly hampered at the beginning of the 1990s.

It is telling that the debt-equity ratios of non-financial enterprises declined in 1991-1993 basically in all four Nordic countries when compared to the levels that had prevailed in the 1980s and, quite interestingly, in the 1970s, i.e. *prior to* the liberalization.[3] The decline in the borrowing from banks was rapid after the crisis (cf. Figure 2.1 in the main text). It is worth noting that despite the crisis, loans were together with retained earnings the most important source of corporate sector funding in the Nordic countries at the beginning of the 1990s.

Long-term Impacts

The banking crises have had longer-term implications, too. First, the Nordic countries have traditionally had banks (banking groups) that have been fewer in numbers but larger relative to the firms they finance when compared e.g. to the US. If anything, the recent mergers of Nordic banks and insurance companies have led to further consolidation. This trend raises concerns as to the availability of credit to small businesses. The reason is the empirical finding that it is the

[2] Evidence from other countries support the view that the most technologically advanced firms are more likely to report that financial constraints restrict their growth (see, e.g., Westhead and Storey 1997).

smaller banking institutions that tend to devote larger proportions of their assets to small business lending than large institutions (see, for a discussion, Berger and Udell 1998). Besides organizational complexity, there may be diseconomies in the provision of relationship based financial services and transactions-driven (larger) loans (see Williamson 1988).

In a recent study, Cetorelli and Gambera (2001) echo this argumentation: they find that concentration in the banking sector depresses growth.[4] They do find, however, that bank concentration may be beneficial selectively, i.e. for industries that are more in need of external finance, by reducing banking competition and hence by fostering the formation of longer-term relationships. In the Nordic countries, the concentration of banking sectors has taken place to a large extent due to banks' problems, and hence the overall intensity of banking relationships may have weakened.

Second, the restructuring of the banking sectors due to the crises and the associated changes and disruptions in customer relationships may have increased interbank competition. The argument is that the banks have more impetus for competition the less tight their relationships with borrowers. This factor in addition to increasing competition from capital markets may well have undermined total bank lending and, particularly, relationship-based corporate lending (see, e.g., Petersen and Rajan 1995, and Booth and Thakor 2000).[5]

[3] See, e.g., Edey and Hviding (1995), p. 60, Table A3.

[4] The study also provides evidence for bank concentration in different countries over 1989-1996. When measured by the sum of market shares (in terms of total assets) of the three and five largest banks, Finland has the second highest concentration ratio in the study's sample of 42 countries. The other Nordic countries have high ratios, too. For the record, the five-bank concentration ratio for Denmark, Finland, Norway and Sweden were 0.82, 0.98, 0.74 and 0.94, respectively. The sample average was 0.69 while the ratio for the US was as low as 0.20. Because of the recent Nordic consolidation, the ratios may have increased further.

[5] Another impetus for increasing competition has during recent years been the reduced switching costs due to technological development in creditworthiness analysis and monitoring; in the US for example, the distance between the lenders and borrowers (i.e. physical location) matters less than before for the availability of credit (Petersen and Rajan 2001).

Appendix 4. Demand for External Finance

There is not much sense in analyzing the development of financial systems and their impact on corporate financing if the firms were mostly able to finance their growth internally. In this Appendix, we briefly touch upon this issue.

The demand for external finance arises whenever the magnitude of a firm's internal cash flow lacks its investment opportunities. Estimates of such firms' external financing needs are however not readily available. Luckily for us, Demirguc-Kunt and Maksimovic (1998, 2001) have recently presented estimates of the proportion of firms that rely on external finance in several countries. A firm is defined to rely on external finance if its realized sales growth rate exceeds a maximum growth rate that would have been attainable via internal (or internal and short-term debt) financing of investments. Figure A.2 presents the demand for external finance in selected countries, as estimated by Demirguc-Kunt and Maksimovic (2001).

Figure A.2 Demand for External Finance in Selected Countries

Source: Dermirguc-Kunt & Maksimovic (2001).
Note: 1989-96 averages for largest publicly traded manufacturing firms.

The figure shows that over 1989-1996, Australia, Germany and Canada have had an insufficient internal supply of investment capital, implying that the firms of these countries have been relatively more dependent on external financ

ing. The Finnish firms have relied more on external finance than the firms in the other Nordic countries. In the total sample of Demirguc-Kunt and Maksimovic (2000), South-African firms relied least on external financing; only 11% of the firms had growth rates that exceeded their internally generated supply of investment funds. In the figure, the UK firms relied least on external financing. Even though the estimates are based only on larger manufacturing firms, they provide some indication of the overall use of external finance by the firms in the economy. The earlier estimates of Demirguc-Kunt and Maksimovic (1998) mostly echoes these results, albeit the sample of the earlier study was smaller and the time period covered 1981-1991. Thus, we conclude that the Nordic countries' firms have at least in relative terms been in need for external finance, with the Finnish firms being its heaviest users.

Appendix 5. Characteristics of Corporate Sectors

Table A.1 Characteristics of Corporate Sectors in the Nordic Countries

	Denmark	Finland	Norway	Sweden
Number of firms	326,820	220,000	130,257	498,756
Inhabitants (1000)	5,330	5,171	4,445	8,861
Number of firms per 1000 inhabitants	61	43	29	56
Average firm size, employees	7	6	8	4
Share of firms with less than 9 employees	94.3 %	93.4 %	84.2 %	<97.3 %
Share of firms with less than 250 employees	98.8 %	99.8 %	99.6 %	99.8 %
Share of start-up firms	5.0 %	11.8 %	12.0 %	7.9 %
Number ICT firms (1998)	12,860	6,040	9,112	16,030
Share of ICT firms of all enterprises (1998)	5.6 %	3.1 %	7.0 %	6.0 %
Share of ICT sector employment of total employment (1998)	8.1 %	8.4 %	4.5 %	9.6 %
Number of listed firms (2000)	235	158	215	311

Source: Ali-Yrkkö and Ylä-Anttila (2001).
Note: If nothing else is indicated, data account for the following years: Denmark 1998, Finland 2000, Norway 1999 and Sweden 1999.

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