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Déjà vu All Over Again? Learning from Nonfinancial Business Credit Booms and Busts of the Past

James G. Bohn



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Déjà vu All Over Again? Learning from Nonfinancial Business Credit Booms and Busts of the Past

James Bohn¹

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Abstract

I study nonfinancial business credit booms that took place in the United States, the Nordic Countries, and Korea in the past century. I examine the factors that created the boom, what caused the boom to turn to a bust, and the effect of leverage on the events that followed. The case studies illustrate the variety of economic and institutional factors that contribute to nonfinancial business credit booms as well as the intensity of the fallout when booms turned to busts. Though the factors that led to the booms varied, one commonality is that the turning point between boom and bust period in every case coincided with adoption of central bank policies aimed at raising interest rates. This illustrates the difficulty that central banks have in executing policy when the business sector is highly levered. It also suggests that research aimed at identifying “bad” credit booms or predicting the impact of credit growth on future economic outcomes should consider both institutional factors as well as quantitative measures of credit growth and risk.

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I. Introduction

The amount of outstanding nonfinancial business (NFB) debt has grown rapidly since the global financial crisis. In many nations, including the United States, the ratio of NFB debt to GDP is at or near an all-time high. The high level of NFB debt has raised concerns among policy makers that high leverage could negatively impact financial stability or increase the severity of an economic downturn. The Financial Stability Oversight Council identified the growth of NFB debt and business leverage as a financial stability vulnerability in its 2018, 2019 and 2020 annual reports. The Board of Governors in its May 2021 Financial Stability Report assessed current risks from business leverage as being elevated. The International Monetary Fund's 2020 Financial Sector Assessment for the United States found that financial system vulnerabilities arising from NFB debt were much higher in 2020 than in its 2015 assessment. The business press and industry research also frequently point to NFB leverage as a key source of risk in both advanced and developing economies.

Findings in the academic literature are more mixed. Several recent academic studies have questioned whether high levels of NFB debt increase the likelihood of financial crises or amplify negative economic shocks. For example, Jordà, Kornejew, Schularik and Taylor (2020) find that recessions that follow NFB credit booms are no more severe or lengthy than recessions that are not preceded by such a boom. Curcuru and Jahan-Parvar (2021) find no relationship between the rate of increase in NFB debt relative to GDP and the likelihood of a recession. In contrast, Greenwood, Hanson, Shleifer and Sørensen (2020) find that the probability of a financial crisis is higher following a period of rapid growth in NFB debt but only when there is also rapid appreciation in asset prices.

This paper takes a different approach to much of the academic literature. Rather than study the relationship between NFB debt and economic outcomes using a large panel dataset, I study three NFB credit booms that turned into credit busts. The cases considered occurred in different regions of the world and different periods in time.² I identified credit booms from lists appearing in the academic literature. I limited the set of booms to those for which sufficient data was available to determine the level of NFB

² I do not make the claim that the three cases considered herein are representative of all NFB credit booms. Indeed, there are considerable differences among the three NFB booms examined herein. A strength of the case study approach is that case studies can be used to illustrate diversity within the set of events examined.

and household credit relative to GDP during the boom period. To ensure that the buildup of credit during the boom period was significant, I considered only booms in which NFB credit growth was at least 15 percent of GDP.³ To ensure that the events in the bust period were not due to overleveraging of the household sector, I focus on cases in which NFB debt constituted two-thirds or more of outstanding private sector debt at the end of the boom period and for which commentary at the time suggested that high NFB indebtedness was a significant factor in intensifying the bust.

The case study approach provides a useful compliment to large sample empirical studies. Case studies allow for the examination of qualitative as well as quantitative information regarding the factors that led to the credit boom and the subsequent bust. Case studies are also not subject to some of the difficulties that arise in the study of credit cycles using large panel datasets. Credit cycles vary in length and are often of long duration. Moreover, the duration and amplitude of a cycle as well as the turning point at which a credit boom turns to a bust often hinges on changes in investor expectations and policy choices, two factors which are often difficult to incorporate into econometric models. This creates complications for researchers that seek to associate prior debt growth with future outcomes such as financial crises or economic growth rates.⁴ Finally, the case study approach is useful in overcoming recency bias. Much of the recent experience with private debt booms and the relevant academic work is colored by the events surrounding the global financial crisis for which high levels of household debt played a major role (Mian, Sufi and Verner (2017)). Case studies allow researchers to reach back further in history to explore situations where NFB debt had a prominent role.

In each of the three cases, I first discuss the factors that led to the boom. I then comment briefly on the reasons that the boom turned to a bust.⁵ I finally discuss evidence on the fallout and the deleveraging process, if any, that followed the boom. The concluding section discusses some patterns among the three debt booms, offers some observations that may be of interest to policy makers and suggests areas for further research.

³ Definition of the starting and end points of the boom periods was based on descriptions of the booms in the literature and visual inspection for breakpoints in national debt to GDP series.

⁴ López-Salido, Stein, and Zakarajšek (2017) discuss challenges that arise for identification from the relatively long duration of credit cycles.

⁵ The events that produced the downturns are complex. In this paper, I only provide a brief discussion of the events as they concern the business sector.

II. The Roaring Twenties Debt Boom in the U.S., 1919-1929: Frothy Expectations and Difficulties in Deleveraging

The Roaring Twenties was a period of rapid economic growth in the United States. Table 2.1 contains measures of economic output and corporate debt outstanding.⁶ By 1929, real economic output in the United States was 39 percent higher than in 1919. Growth was even more rapid if measured from 1921 to 1929 as 1921 was the trough of a severe recession. Corporate indebtedness grew even more rapidly than economic output. From 1919 to 1929, the level of outstanding corporate debt increased from 64 to 86 percent of GDP. This section discusses the factors that led to the growth of NFB debt in the period that preceded the 1929 stock market crash and reviews recent findings regarding the effect of leverage on firm-level outcomes in the period that followed.

Corporate debt comprised the bulk of outstanding private sector debt at this time. In 1929, U.S. corporate debt totaled \$88.9 billion. Lending outside of the corporate sector was not as widespread as it is today. In 1929, nonfarm consumer debt totaled \$7.1 billion and one-to-four family mortgage debt totaled \$18.0 billion. Non-corporate business debt was also small relative to corporate debt. In 1929, non-corporate business debt and financial debt totaled \$22.4 billion.⁷

Figure 2.1 contains the level of corporate debt to GDP and household debt to GDP from 1919 to 1939. Data on several components of debt outside of the corporate sector are not available prior to 1929.⁸ Therefore, I take a broad view of household debt to avoid overstating the relative importance of corporate debt as a share of outstanding private sector debt during this time. The measure of household debt in used in Figure 2.1 includes traditional consumer debt, all forms of farm debt, and an estimate of outstanding

⁶ Throughout this section I use the term “corporate debt” rather than “non-financial business debt” due to the differences in the classification of debt types in source material. Prior to 1929, the Census Bureau’s historical statistics grouped certain types of business debt with either household or financial debt. To avoid the possibility of overstating outstanding NFB debt, I consider only debt specifically identified as corporate debt as NFB debt.

⁷ Separate statistics are not available prior to 1939 for non-corporate business debt and financial debt. Financial debt consists of debts owed to banks for the purchase of securities, customer debt to brokers, and debts owed to insurance companies by policyholders. The Census Bureau did not partition financial debt into that owed by businesses and households.

⁸ Prior to 1929, the Census Bureau’s historical statistics group certain types of household debt with types of debt that are typically considered business debt. For instance, separate figures on 1- to 4- family mortgage debt and multifamily and commercial mortgage debt are not available prior to 1929. While I avoid overstating business debt, I also avoid understating the total level of household debt. Therefore, I include a pro-rata share of total outstanding mortgage debt in household debt from 1919 through 1928 based on the share of 1- to 4-family mortgage debt in total mortgage debt in 1929. I also assume that all farm debt is household debt.

one-to-four family mortgage debt. As shown in Figure 2.1, throughout the Roaring Twenties, the amount of outstanding corporate debt to GDP was at least twice as large as household debt.

Many leading economists at the time saw the growth of debt during the Roaring Twenties as either the cause or a contributor to the Great Depression. Persons (1930) documented increases in indebtedness during the Roaring Twenties and argued that excessive credit growth in that period was the cause of the Great Depression (“the existing depression was due essentially to the great wave of credit expansion in the past decade.”) Hayek (1932) saw the Great Depression as having its roots in the expansion of credit in the preceding decade and argued that the interest rate policies of the Federal Reserve contributed to the buildup in debt. Robbins (1934) also saw excessive credit growth during the Roaring Twenties as setting the stage for the depression that followed (“the genesis of the slump can be attributed to the effects of the credit expansion”).

Several factors were behind the NFB credit boom of the 1920s. One was increased demand for credit to finance business expansion and innovation. Eichengreen and Mitchener (2003) and Cao and L’Huillier (2018) argue that the early part of the debt boom of the 1920s was driven by increased capital investment and a wave of merger and acquisition activity. Increased capital investment was necessary to reconfigure production from military to consumer goods following World War I. The early 1920s was also a period of technological progress. Substantial investment in productive capacity was needed to produce new types of mass market consumer goods such as radios and automobiles.

Changes in commercial lending practices may also have contributed to the boom. Rötheli (2013) studied changes in commercial credit evaluation and loan marketing practices during the 1920s. The 1920s marked the beginning of the systematic collection and widespread dissemination of borrower financial information. Prior to the 1920s, the evaluation of credits was based on the quality of the relationship and the lender’s knowledge of the borrower and its business. Financial ratio analysis became commonplace in the 1920s and was aided by the publication of industry-level data on firm financial characteristics as well as so-called “credit barometrics,” measures of aggregate credit quality based on a weighted sum of financial ratios. Rötheli argues that these early forms of “scientific credit analysis” were flawed in that they did not provide lenders with a warning of increasing risks. Instead, they created a false sense of security and thereby led to greater credit expansion. Rötheli also argues that changes in loan marketing practices led to a deterioration in lending standards. The first business units dedicated to loan marketing emerged during the 1920s. These business development departments had high fixed costs which created

incentives for the aggressive marketing of loans in order to spread fixed costs over a larger portfolio of credits.

A third factor that may have contributed to the credit boom were the interest rate policies of the Federal Reserve. Both Hayek (1932) and Robbins (1934) stressed the role of low policy rates in bringing about the credit expansion in the Roaring Twenties. Figure 2.2 contains the discount rate on eligible paper by the Federal Reserve Bank of New York from 1919 to 1930. Lending rates were reduced during the early part of the 1920s from between 7.0 percent in early 1921 to 3.0 percent in late 1924.⁹ The discount rate remained at 4.0 percent or below through early 1928.

Investor assessment of credit risk declined as the boom went on. Table 2.2 contains corporate and government bond yields for the period between 1919 and 1932. Following the recession of 1921, corporate bond yields drifted downwards until 1929.¹⁰ Spreads between Aaa and Baa bonds narrowed. In 1927 and 1928, the average spread between Baa and Aaa bonds was less than 100 basis points. This was less than half of the comparable spread earlier in the decade. Spreads between Baa corporate bonds and Treasury securities also narrowed. The decline in spreads is consistent with easier availability of credit and expectations that the boom would continue. Anecdotal evidence also suggests a loosening in lending standards in the boom period. Robbins (1934) noted that the easy availability of credit during the boom provided a favorable atmosphere for “the fraudulent operations of sharks and swindlers.”

Though the exact cause of the market crash of 1929 continues to be the subject of debate within the economics profession, the crash was preceded by a shift by the Federal Reserve to tighter monetary policy. The New York Federal Reserve increased its discount rate from 3.5 percent in January 1928 to 6.0 percent in August 1929. Bernanke (2002) argues the shift to tighter monetary policy was the critical event that led to the crash and that the shift to contractionary monetary policy was due to misplaced concerns by the Federal Reserve over a rising stock market. Bernanke states:

The correct interpretation of the 1920s, then, is not the popular one—that the stock market got overvalued, crashed and caused a Great Depression. *The true story is that monetary policy tried overzealously to stop the rise in stock prices.* But the main effect of the tight monetary policy ... was to slow the economy—both domestically and, through the working of the gold standard, abroad. *The slowing economy, together with*

⁹ At this time, discount rates were set by each reserve bank. The Federal Reserve Bank of New York was the largest lender.

¹⁰ Eichengreen and Mitchener (2003) attribute the recession of 1921 to increases in interest rates designed to slow the growth of business indebtedness.

rising interest rates, was in turn a major factor in precipitating the stock market crash.
[emphasis added]

As will be seen in the other two case studies in this note, a common thread in the transition between NFB credit boom and bust periods is a rise in interest rates.

The Depression years are associated with a sharp rise in business bankruptcies. However, firm-level research on the role of leverage as an amplifier during the Great Depression is only recent. Graham, Hazarika and Narasimhan (2011) examined the effect of leverage on the likelihood of failure of public companies during the Great Depression. They find a strong relationship between firm leverage in 1928 and the probability that firm will fail during the 1930s. They report that a one standard deviation increase in leverage in 1928 (from a debt to assets ratio of 11.10 percent to 23.38 percent) is associated with an increase in the probability of bankruptcy from 14.54 percent to 22.98 percent over the period from 1930 to 1938.

Benmelech, Frydman and Papanikolaou (2019) examined the effect of rollover risk on employment outcomes at the firm level during the Depression years. They find that the inability of firms to refinance existing debts had a negative effect on payroll employment. They report that firms that were at the 90th percentile in terms of outstanding debt issues maturing between 1928 and 1933 (relative to total assets) reduced employment by 4 to 5 percent more than the median firm (which had no debt). The availability of alternative sources of financing mattered. Firm-level declines in employment were larger among firms in regions with more troubled banks.

The deleveraging process that followed the 1929 crash was exceedingly slow. Debt to GDP varies due to changes in the denominator as well as the numerator making changes in debt to GDP somewhat difficult to interpret in downturn periods. Figure 2.1 includes a measure of the level of corporate debt to GDP assuming that economic output in the United States remained at 1929 levels (the thin, solid line in the figure). The figure shows that even if output had remained at 1929 levels, the amount of outstanding corporate debt to GDP would have been at or slightly above the levels that preceded the 1929 crash throughout the 1930s. Relative to GDP, the level of outstanding corporate debt in 1939 at end of the Great Depression was as high as it was in 1929.

One reason that deleveraging was so slow during the Great Depression was that equity markets were shut down during the 1930s. Figure 2.3 contains annual levels of corporate stock and bond issuance from

1925 to 1940.¹¹ Stock issuance dried up beginning in 1931 and remained low thereafter making it difficult for firms to alter their capital structures. Bond markets were essentially closed between 1932 and 1934. This made it difficult for firms to refinance outstanding debt obligations when they came due.

Aggregate data on corporate debt levels during the depression years in Table 2.1 and Figure 2.1 and the firm-level work of Benmelech, Frydman and Papanikolaou (2019) illustrate the importance of well-functioning capital markets and a healthy banking sector in facilitating the deleveraging process when a credit boom turns to a bust. Later in this note we will examine a case in which the banking sector and capital markets played an important role in facilitating the corporate deleveraging process following a NFB credit boom.

III. The Nordic Debt Boom, 1985-1990: Low Interest Rates and Difficult Policy Tradeoffs

Finland and Sweden experienced NFB debt booms in the latter half of the 1980s. The debt booms followed a period of financial liberalization. The economies of both nations grew rapidly during the boom years, however, increased corporate indebtedness made their economies more vulnerable to external shocks. When the central banks of these two nations raised interest rates in an effort to defend currency pegs, they made it more difficult for domestic firms to service their debts. The result was a sharp rise in business bankruptcies. The experience of the Nordic countries illustrates how high levels of corporate debt complicate central bank efforts to pursue macroeconomic policy objectives.

Figures 3.1 and 3.2 contain the level of NFB and household debt relative to GDP in Finland and Sweden over the period from 1985 to 1995. The level of NFB debt in Finland relative to GDP increased from 65 percent in the first quarter of 1985 to 86 percent in the second quarter of 1990 (Figure 3.1).¹² During the boom period, the Finnish economy grew rapidly. The Finnish economy began to contract in the third quarter of 1990. The rise in business debt was even more rapid in Sweden (Figure 3.2). NFB debt increased from 58 percent of GDP in the first quarter of 1985 to 100 percent of GDP in the fourth quarter of 1990. Thereafter the Swedish economy began to contract.

¹¹ Annual totals in the Figure 2.3 include both new issuance and issuance for the purpose of refinancing.

¹² Data on NFB and household credit to GDP in Finland and Sweden is from the Bank for International Settlements Total Credit database.

Prior to liberalization, Finnish and Swedish firms were severely credit rationed. Tax policies encouraged the use of debt by allowing firms to fully deduct interest expense from taxable income (Englund (1999)). Central banks kept interest rates low to support expansionary fiscal policies. The real rate of interest was particularly low in Sweden. Figure 3.3, which was extracted from Englund (1999), shows the real rate of interest on the Swedish five-year government bond. Real rates were negative for most of the period between 1960 and 1990. At the same time, regulatory policies restricted the flow of credit to domestic firms. Both countries maintained strict capital controls that limited the ability of domestic firms to borrow abroad (Brunila and Takala (1993)). Regulatory policies discouraged Finnish and Swedish banks from lending to riskier firms through the imposition of an average interest rate ceiling on bank loan portfolios.¹³ In Sweden, the Riksbank imposed quantitative limits on the amount of lending by banks and insurance companies.

Deregulation began in the mid-1980s. The deregulatory process in both countries was swift. Interest rate ceilings were abolished in Sweden in the spring of 1985 and in Finland in August 1986. In November 1985 the Riksbank decided to no longer impose quantitative restriction on lending by banks and other intermediaries. Restrictions on long-term borrowing abroad by Finnish and Swedish firms were loosened. Deregulation was not offset by enhanced supervision to dampen bank risk taking (Nyberg and Vihriälä (1994), Englund (2015)).

The increased use of debt was also encouraged by favorable macroeconomic developments. Both countries benefitted from the decline in oil prices in 1986. Finnish firms experienced favorable demand and price movements in export markets (Honkapohja et al. (1999)). The market value of publicly traded companies in Finland and Sweden roughly tripled during the 1985-1990 boom period (Figure 3.4). Commercial property values also rose dramatically. Figure 3.5 contains indices of the real value (value after adjusting for inflation) of office buildings in Stockholm and of Swedish homes. After adjusting for inflation, the price of Stockholm office space increased by 85 percent between 1985 and 1989 after doubling in the previous 5 years. Similar run-ups occurred in other Swedish business centers. The run up in commercial property values far exceeded the growth of residential home prices.

The rise in asset prices became a source of concern to policymakers. The Bank of Finland raised interest rates between 1987 and 1989 in an effort to slow the boom (Jonung, Kiander and Vartia (2008)). The Finnish government took steps to curtail the boom by raising the capital gains tax rate (Gulan, Haavio and

¹³ Drees and Pazarbaşıoğlu (1998) and Englund (2015).

Kilponen (2014)). Sweden was slower to pursue contractionary policies. The Riksbank began tightening monetary policy in early 1989.

External events led both central banks to further tighten monetary policy in order to defend their currencies. The Finnish markka and Swedish krona had been pegged to the deutsche mark through the European Monetary System. Interest rates in Germany began to rise with reunification. There were also increasing concerns about the ability of Finland and Sweden to maintain the peg as both countries had a history of prior devaluations. To defend their currencies, the Bank of Finland and Riksbank further tightened monetary policy to raise the real rate of interest in an effort to stem capital outflows. Figure 3.6, which was extracted from Jonung, Kiander and Vartia (2008), illustrates the size of the real interest rate shocks in Finland and Sweden in the early 1990s.

Another adverse development was the collapse of the Soviet Union. The Finnish economy was particularly heavily exposed to the Soviet Union. The Soviet Union accounted for 20 percent of Finnish exports. Gorodnichenko, Mendoza and Tesar (2012) noted that Finnish exports tended to be specialized for Soviet needs, a strategy termed “icebreakers for the communists, luxury liners for the capitalists”. At the same time, Finland imported most of its oil and all its natural gas from the Soviet Union. The sudden collapse of the Soviet Union resulted in high costs to redeploy industrial production to other markets and an adverse energy price shock.

The decision to defend the currency peg was motivated by political as well as economic considerations. Both countries viewed the currency peg as important to restraining inflation. Finland was also interested in maintaining the peg because policy makers viewed the maintenance of a stable currency as important for the country’s membership in the European Union. In Sweden, the newly elected government had campaigned on maintaining the peg for the krona.

The rise in interest rates put pressure on highly indebted businesses. Figure 3.7, which was extracted from Nyberg and Viriälä (1994), illustrates extent of the squeeze in debt service requirements (interest plus amortization) on the cash flows of Finnish businesses. Business bankruptcies in each country increased significantly as the economies slowed. According to Statistics Finland, the number of business bankruptcies rose from 2,749 in 1989 and 3,634 in 1990 to 6,255 in 1991 and 7,391 in 1992. The Riksbank (2009) reports that number of business bankruptcies in Sweden increased from 1,809 and 2,620 in 1989 and 1990 to 5,323 and 7,811 in 1991 and 1992. There is some evidence in the academic literature that the sensitivity of the business bankruptcy rates to leverage and economic conditions increased

following deregulation. Takala and Viren (1995) investigated the time series properties of Finnish business bankruptcy rates. They find that following the liberalization of the Finnish financial sector bankruptcy rates became more sensitive to leverage, real interest rates, and asset price levels.

Brunilla and Takala (1993) sum up the effect of high NFB leverage on the Finnish business sector as the debt boom turned to bust:

[T]he indebtedness of Finnish firms did not become a major problem until 1990-91, because a large part of the debt growth was matched by increases in corporate earnings to asset values during the late 1980s. ... *For the first time since the second world war, high leverage during a deep recession has become a major concern also for firms in the domestic markets.* In conjunction with the deregulation of bank lending and foreign borrowing, firms in the service and home market sectors subsequently increased their debt financing, half of which was denominated in foreign currencies. ... *[T]he problems of debt overhang in the corporate sector have been exacerbated by the heavy burden of debt servicing resulting from high real interest rates combined with low or even negative growth in corporate earnings.* [emphasis added]

IV. The South Korean Debt Boom, 1990-1997: Moral Hazard and the Role of Nonbanks

South Korea experienced a NFB debt boom in the early and mid-1990s. Between the first quarter of 1990 and the third quarter of 1997, NFB debt increased from 70 percent to 108 percent of South Korea's GDP.¹⁴ Household debt increased modestly during this period though in absolute amounts the increase in corporate debt as a share of GDP was about three times larger than the increase in household debt.

Two things are distinctive about the Korean case. One is the important role played by non-bank lenders. Non-bank lending increased rapidly following financial liberalization but contracted sharply as the debt boom turned to a bust. The Korean case provides a vivid example of the fragility of non-bank lenders that rely heavily on short-term funding. The second is the high degree of moral hazard in the Korean financial system. Expectations that the government would bail out troubled banks and industrial firms led Korean firms to become much more highly levered than similar firms in other advanced nations.

¹⁴ Data on nonfinancial business and household credit to GDP is from the Bank for International Settlements Total Credit database.

Financial liberalization in the early 1990s reduced barriers to entry into Korean credit markets by non-banks and foreign lenders. An important consequence was the rise of lending by merchant banking firms. Merchant banks were not funded by deposit taking. Instead, merchant banking firms relied for funding on commercial paper and borrowing in the interbank market. Because merchant banks were not deposit takers, they were subject to less stringent regulation than commercial banks. Merchant banks generally had lower lending standards than commercial banks and lent heavily to the chaebols.¹⁵

As was the case with the Nordic countries, liberalization was not accompanied by stronger supervision of financial intermediaries. Loan classification criteria and loan loss provisioning by Korean bank was very lenient by international standards.¹⁶ Disclosure by borrowers was poor. There were extensive cross holdings and loan agreements between firms that were part of the chaebol groups. However, the chaebols were not required to produce consolidated financial statements. As a result, lenders were often unable to get a consolidated picture of the financial condition of large borrowers.

The chaebol structure also gave rise to serious agency conflicts. Poor financial disclosure made it difficult for lenders to monitor borrowers. At this time many Korean firms were pursuing growth strategies. Poor external monitoring coupled with the pursuit of growth-oriented strategies resulted in overinvestment and poor allocation of capital within the chaebols (Kim and Kim (2008)). Shin and Park (1999) and Kim (2002) studied the investment behavior of Korean firms during the boom period. These studies found evidence that firms which were part of the Korean chaebol groups made more investments in sectors with poor growth opportunities than independent firms. Their results are consistent with high agency costs in the chaebol structures.

Finally, close ties between the chaebols and politicians and between banks and politicians created a perception that the government would bail out troubled banks and companies. The belief that certain banks and firms were too-big-to-fail reduced the incentive for lenders to screen and monitor borrowers. Lending to so-called “zombie” firms became widespread. Hahm and Mishkin (2000) report that in each year from 1992 and 1997 between 17 percent and 26 percent of new bank loans were to companies with an EBITDA/interest expense ratio less than one.

¹⁵ Chaebols are groups of affiliated firms operating in several different industries. The chaebols are typically controlled by a single family. The Korean chaebols differ from the Japanese keiretsu in that keiretsu are usually bank-centered whereas the chaebols typically allocate funds through internal transactions between affiliated firms (Murillo and Sung (2013)).

¹⁶ Hahm and Mishkin (2000), Ahn (2001).

The combination of loose lending practices, entry by non-bank lenders, weak monitoring of borrowers, the pursuit of growth-oriented strategies, and the expectation of government bailouts should things go wrong led Korean firms to become highly leveraged. Table 4.1 contains measures of financial leverage among manufacturing firms in Korea, the United States and Japan. In 1997, the average Korean manufacturing firm had a debt ratio (liabilities-to-shareholder's equity) of 396 percent up from an average of 362 percent in the previous decade. This compares to an average ratio of 154 percent among U.S. manufacturing firms and 193 percent for Japanese manufacturers. Korean firms became more reliant on borrowed funds during the boom period. In the 1980s, borrowings to total assets averaged 44.3 percent. Borrowings to total assets increased by ten percentage points to 54.2 percent in 1997. Korean firms were more reliant on external financing than either U.S. or Japanese manufacturing firms.

By most measures the Korean economy was performing well in 1997. Economic growth was strong. In the third quarter of 1997, GDP was up by 6.6 percent from the same quarter in the previous year and unemployment was 2.4 percent. The nation had been running a current account deficit, however, the deficit in 1997 was below that of the previous year due to strong export growth.

The July 1997 devaluation of the Thai baht is generally viewed as the event that touched off the Asian Financial crisis. However, Korean firms were exhibiting signs of stress earlier than that. The Hanbo chaebol failed on January 23, 1997.¹⁷ This was the first failure of a large chaebol.¹⁸ Hanbo's major businesses were in steel, construction, pharmaceuticals and energy. Hanbo was burdened by debts from the construction of a large steel mill at a time when the Korean steel industry was experiencing overcapacity.¹⁹ Two more large chaebol groups failed in March and April. A fourth chaebol group failed in July. Two more chaebols failed in November before the collapse of the won. The six chaebols that failed prior to devaluation had a median debt ratio of 598 percent. This compares to 380 percent among the chaebols that either survived or failed after devaluation took place.

¹⁷ The failure revealed widespread corruption including the extension of loans by Korean banks in exchange for bribes from the founder.

¹⁸ For the purposes of the analysis above, large chaebols are considered to be groups with sales in excess of \$1 billion in 1996. There were 32 chaebols in 1996. Feenstra, Hamilton and Kim (2002) at Table 8.

¹⁹ Wall Street Journal, *Hanbo Steel Goes Bankrupt with Debt of \$5.85 billion*, January 24, 1997.

That the chaebols were allowed to go bankrupt was a surprise.²⁰ South Korean President Kim Young-sam was elected in 1992 promising to clean up official corruption. The government did not automatically bail-out the failed chaebols. Instead, government aid was extended to allow them to continue operation if they were judged to be viable in the long-term. In many cases, the management teams of failed firms were replaced. The government's unexpectedly hard line may have been influenced by revelations of corruption among top officials in Kim's government and his family which made it difficult for the government to assist Hanbo and other troubled chaebols without conditions.²¹

As in the Nordic case, the Korean credit boom turned to a bust when the Bank of Korea raised interest rates to stem capital outflows. The exchange rate fell from 999 won to the dollar on November 10 to 1835 on December 24. In response, the Bank of Korea tightened monetary policy leading to a sharp rise in interest rates. The tightening was one of the conditions prescribed by the International Monetary Fund in its bail-out package. Figure 4.2 contains the yield on 3-year AA- corporate bond and the 3-year Treasury as reported by the Bank of Korea. The shock to yields was severe with yields on AA- bonds rising above 20 percent and yields on commercial paper approaching 30 percent. Yields declined in the latter half of 1998 when the Bank of Korea shifted to a more expansionary monetary policy.

High interest rates weakened the balance sheets of private firms. Business bankruptcies in Korea rose dramatically. In 1997, 17,168 Korean firms failed and in 1998, the first full year of the bust, 22,828 firms failed (Ahn (2001)). This compares to 13,922 in 1995 and 11,589 in 1996, the two full years preceding the crisis. In March 1998, 16.9 percent of bank loans by value was nonperforming as were 9.6 percent of loans by non-bank financial institutions (Ahn (2001)).

The experience of the Korean merchant banks illustrates the fragility of non-bank lenders that rely on short-term funding. Table 4.2 contains the amount of loans outstanding (Panel A) and the annual change in total loans (Panel B) for banks and three types of non-bank lenders. What is distinctive is the rapid decline in lending by merchant banking companies between 1997 and 2000. As noted above, merchant banking firms were particularly reliant on short-term funding. Of the 30 merchant banking firms that were in operation at the end of 1997, 16 failed by the end of 1998 (Ahn (2001)). This was the highest

²⁰ Graham (2003).

²¹ Hanbo executives bribed influential individuals in Kim's government and Kim's son to pressure banks to extend loans to Hanbo on favorable terms. Kim's son and the CEO of Hanbo were both convicted and jailed in the bribery scandal. New York Times, *Hanbo Steel Founder Given 15 Years in Korean Scandal*, June 2, 1997.

failure rate of any type of Korean financial institution.²² By 2000, business sector borrowings from merchant banks were only a quarter of what they were in 1997 (Panel A). In contrast, the share of loans from commercial banks increased after the crisis from 48 percent in 1997 to 58 percent of all commercial loans in 2000. This is similar to the pattern of bank versus non-bank lending observed in the United States during the global financial crisis. Nini (2017) documents a sharp contraction in loan supply from non-bank lenders versus commercial banks in the period between 2008 and 2010.

Korean firms rapidly deleveraged following the crisis. Figure 4.1 illustrates the trend of NFB debt relative to GDP in Korea between 1998 and 2005. As opposed to the Great Depression in the United States, NFB debt relative to GDP declined rapidly after 1998. This is due in part to the resumption of economic growth following the crisis. But it is also due to the replacement of debt with equity in the capital structures of Korean companies. Table 4.1 shows a decline in leverage among Korean manufacturing firms over the period between 1997 and 2000. Figure 4.3, which is extracted from Lim (2010), shows the rapid decline in leverage of Korean companies by type in the decade that followed the 1997 crisis. As a result of the deleveraging, Korean firms were better positioned to weather the 2008-2009 global financial crisis (Lim (2010)).

Korean firms were able to delever in part because Korean capital markets continued to function.²³ Table 4.3 shows contains net funding flows to Korean firms between 1995 and 2000. In 1998, Korean firms reduced their reliance on commercial paper and non-bank sources of funding through the issuance of large amount of corporate bonds. In 1999 and 2000, Korean firms issued large amounts of equity which reduced their dependence on all forms of corporate borrowing and in particular commercial paper and non-bank sources of funding. Similar shifts were observed in the United States during the global financial crisis. Adrian, Colla and Shin (2012) document a shift away from intermediated borrowing and increased reliance on direct issuance of corporate bonds among public companies in the United States during the global financial crisis. The Korean experience underscores the importance of well-functioning debt and equity markets in facilitating NFB deleveraging following a credit boom.

²² Of the 33 commercial banks in operation at the end of 1997, 5 failed and 3 were merged into other institutions.

²³ Korea also increased lending standards and strengthened corporate governance requirements. Beginning in 1998, loans were required to be classified on the basis of expectations regarding future cash flows (Ahn (2001)). Korea enacted corporate governance requirements similar to Sarbanes-Oxley that required certification of company financials by the CEO and CFO, greater representation by outside directors, and disclosure of intra-group ownership structures (Kim and Kim (2008)).

Conclusions

What are some of the takeaways for researchers and policy makers concerning the risks from NFB credit booms? One is that high levels of NFB debt complicates the execution of interest rate policies by central banks. In all three cases, the shift between boom and bust periods coincided with the adoption by central banks of policies that raised interest rates. The factors that led to the decision to raise rates varied: a desire to slow the rate of asset price appreciation (the United States in the late 1920s); a desire to defend against adverse movements in exchange rates (the Nordics and Korea); and the need to conform to conditions imposed by external actors (the IMF in the Korean case). In each case the rise in interest rates weakened an already highly leveraged corporate sector resulting in a wave of business bankruptcies. Currently, NFB business leverage in many advanced nations is at or near all-time highs. The high current levels of NFB leverage in most advanced nations may cause central banks to face difficult choices should they seek to raise interest rates to meet other policy goals. The interplay between NFB indebtedness and central bank policy also has implications for research regarding the macroeconomic consequences of credit booms. Several recent papers have examined whether NFB debt growth alone can be used to predict future GDP growth or financial crises (Mian, Sufi and Verner (2017), Curcuru and Jahan-Parvar (2021)). The case studies suggest that consideration of both debt levels and macroeconomic conditions, as in Greenwood, Hanson, Shleifer and Sørensen (2020), is more likely to identify situations where the downside risk from NFB indebtedness is high.

The case studies also illustrate the importance of institutional factors in the creation of “bad” credit booms—booms that end with a banking or financial crisis. By that measure, the three booms examined in this note can be considered “bad” booms. Case studies can compliment efforts aimed at developing quantitative tools for the identification excessive credit growth and risk by providing insights into what circumstances set the stage for credit busts in the past. The three NFB debt booms considered in this note offer the beginnings of a watch list. Two “bad” booms (the Nordics and South Korea) arose following financial liberalizations. In both cases, liberalization was not accompanied by more stringent supervisory oversight. Low real interest rates were important in the Nordic boom and reductions in policy rates by the Federal Reserve during then Roaring Twenties may have accelerated a credit boom that had its origins in technological change. The South Korea case illustrates risks that arise from too-big-to-fail policies and the growth of lending by non-bank institutions that rely on short-term funding sources.

The case studies also suggest several avenues for further research. One area for further research concerns the conditions that facilitate deleveraging following a NFB credit boom. Most academic and policy work has been focused on the identification of emerging risks from the build-up of NFB debt. Work on deleveraging is scant. The South Korean case provides an example of a corporate sector that underwent significant deleveraging after a boom (Figure 4.3 and Table 4.1). Three years after the end of the boom, Korean firms were significantly less leveraged than before. Additional case study research concerning past episodes of deleveraging in other nations, especially those that were not accompanied by widespread business bankruptcies, could provide useful insights to policy makers on the use and effectiveness of tax, regulatory and monetary policies in defusing excessive NFB indebtedness without triggering a crisis.

An additional area for further work concerns the risks that arise from non-bank providers of business credit. The Financial Stability Board, International Monetary Fund and several central banks have efforts underway to improve data collection and risk identification in the non-bank sector. The Korean case illustrates how rapidly the supply of credit from non-bank lenders can contract in a bust and the fragility of institutions with funding models that rely on short-term borrowing and which are not subject to strong regulatory oversight. Korea's national financial accounts provided detailed, aggregate data on the amount of NFB lending by several types of non-bank financial institutions. Additional historical and archival research on the performance of non-bank lenders in other nations during and following credit booms would provide a useful supplement to quantitative data collection and risk identification efforts.

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Figures and Tables

Table 2.1: U.S. Corporate Debt and Debt to GDP From 1919 to 1939

Year	Corporate Debt \$ billion	Corporate Debt to GDP	Real GDP 1919=100
1919	53.3	63.5%	1.00
1920	57.7	63.1%	0.96
1921	57.0	81.9%	0.87
1922	58.6	79.1%	1.01
1923	62.6	73.6%	1.13
1924	67.2	79.3%	1.13
1925	72.7	78.1%	1.23
1926	76.2	78.6%	1.30
1927	81.2	85.6%	1.30
1928	86.1	88.8%	1.30
1929	88.9	86.2%	1.39
1930	89.3	98.8%	1.25
1931	83.5	110.2%	1.16
1932	80.0	137.9%	0.98
1933	76.9	138.3%	0.97
1934	75.5	116.0%	1.05
1935	74.8	103.6%	1.16
1936	76.1	92.2%	1.32
1937	75.8	83.8%	1.39
1938	73.3	86.5%	1.32
1939	73.5	81.2%	1.43

Source: U.S. Census Bureau, Historical Statistics of the United States, Colonial Times to 1970

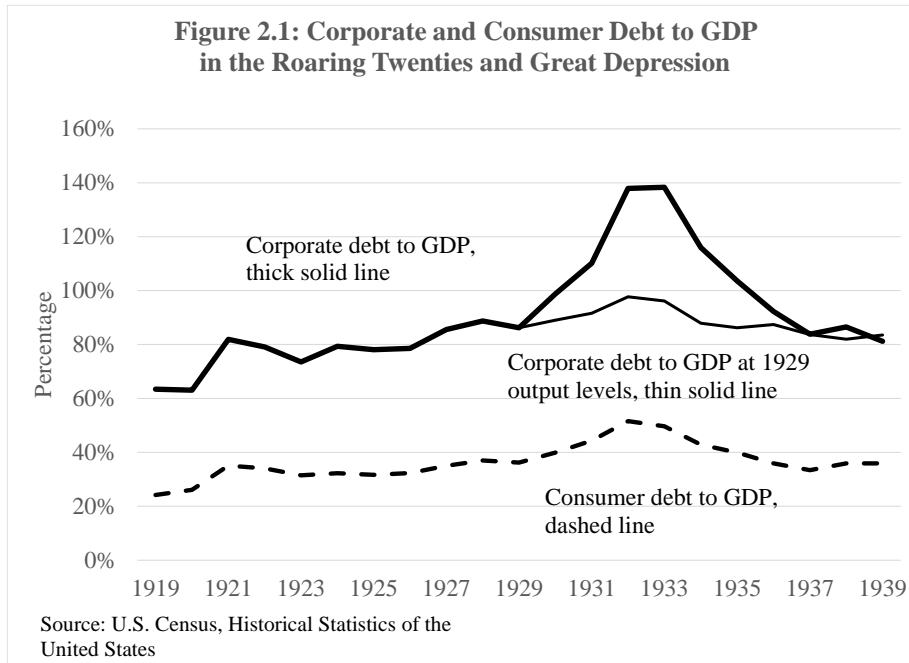
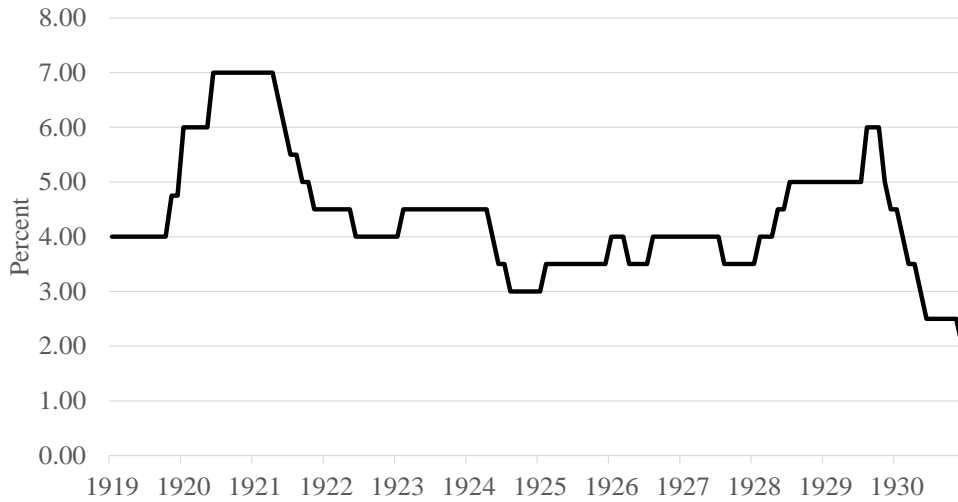


Table 2.2: Corporate and Government Bond Yields 1919 to 1932, Percent

Year	Corporate Yield (Moody's)		U.S. Gov't Yield	Spread Baa - Aaa	Spread Baa-Gov't
	Aaa	Baa			
1919	5.49	7.25	4.73	1.76	2.52
1920	6.12	8.20	5.32	2.08	2.88
1921	5.97	8.35	5.09	2.38	3.26
1922	5.10	7.08	4.30	1.98	2.78
1923	5.12	7.24	4.36	2.12	2.88
1924	5.00	6.83	4.20	1.83	2.63
1925	4.88	6.27	4.09	1.39	2.18
1926	4.73	5.87	3.68	1.14	2.19
1927	4.57	5.48	3.34	0.91	2.14
1928	4.55	5.48	3.33	0.93	2.15
1929	4.73	5.90	3.60	1.17	2.30
1930	4.55	5.90	3.29	1.35	2.61
1931	4.58	7.62	3.34	3.04	4.28
1932	5.01	9.30	3.68	4.29	5.62

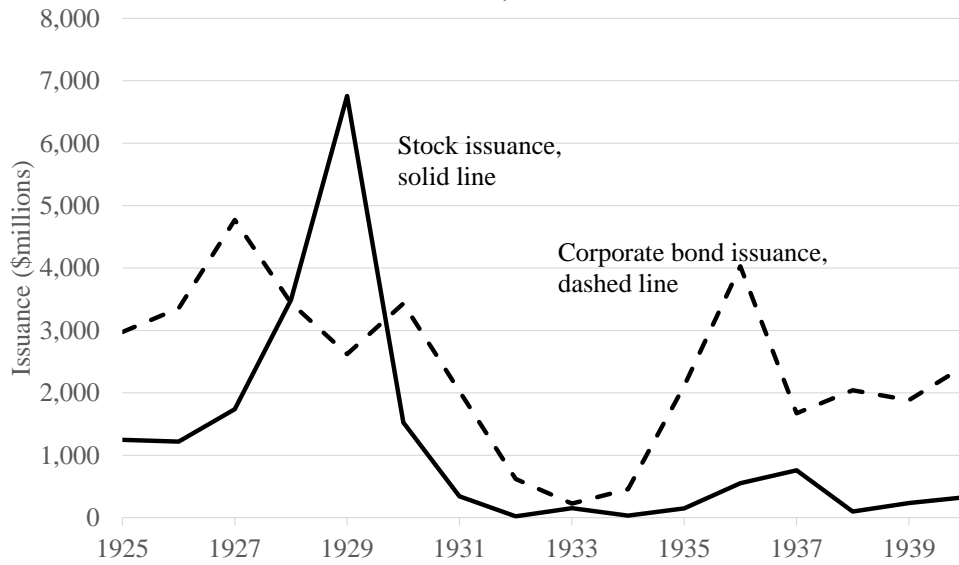
Source: Board of Governors of the Federal Reserve System, Banking and Monetary Statistics, 1914-1941

Figure 2.2: Discount Rate on Eligible Paper, Federal Reserve Bank of New York, Monthly Data



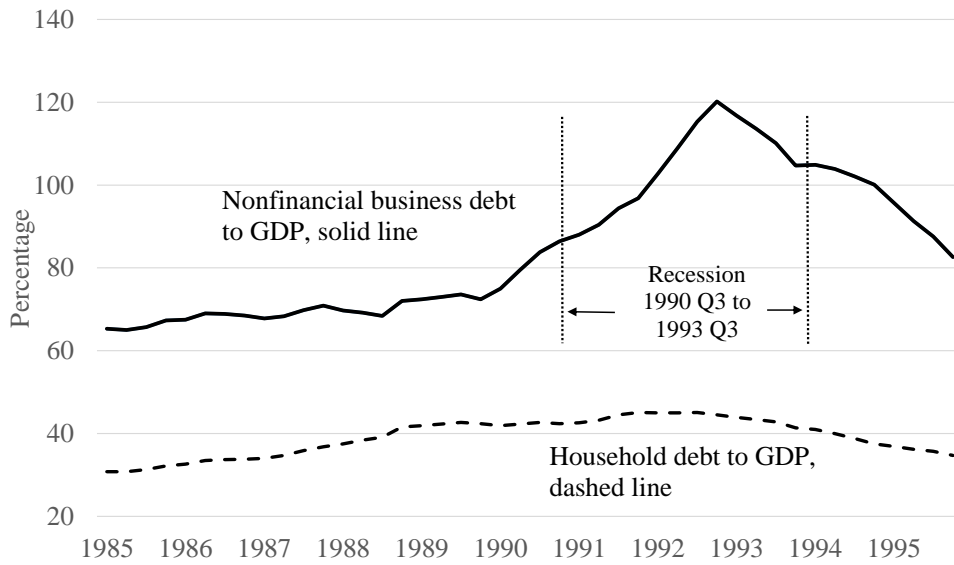
Source: Board of Governors of the Federal Reserve System, Banking and Monetary Statistics, 1914-1941.

**Figure 2.3: U.S. Corporate Bond and Stock Issuance
1925-1940, \$million**



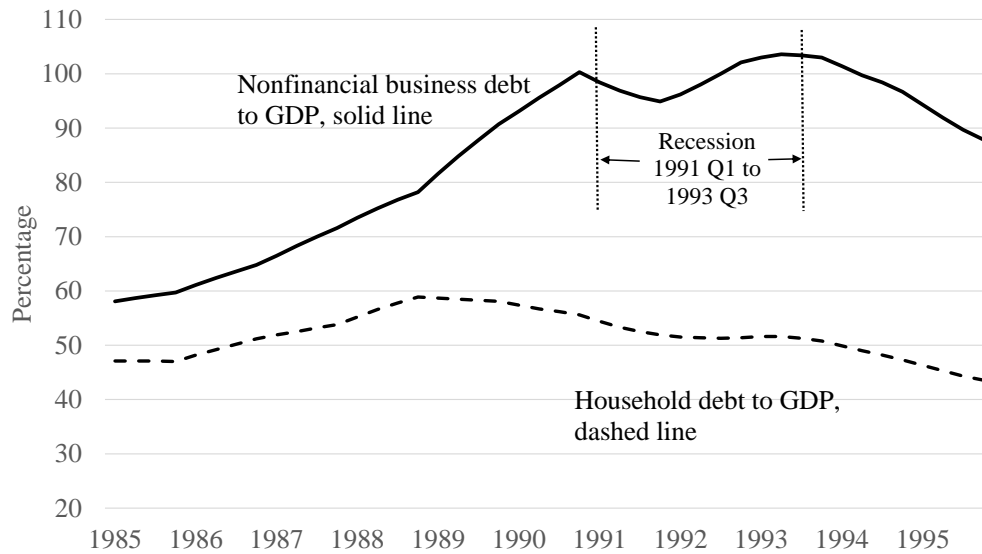
Source: Board of Governors of the Federal Reserve System, Banking and Monetary Statistics, 1914-1941

**Figure 3.1: Finland: NFB and Household Debt to GDP
1985-1995, Quarterly Frequency**



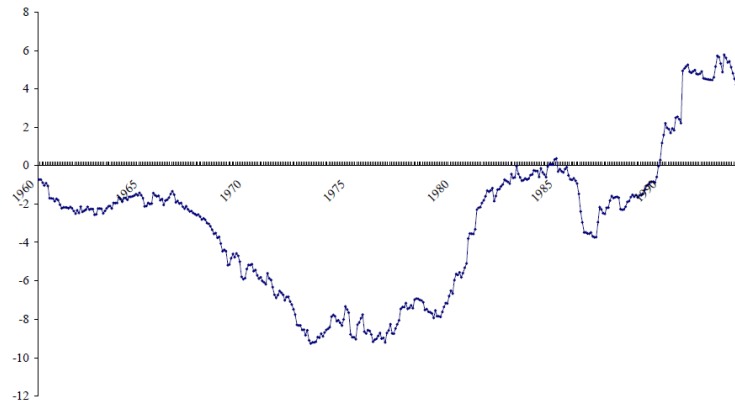
Sources: Bank for International Settlements, OECD

**Figure 3.2: Sweden: NFB and Household Debt to GDP
1985-1995, Quarterly Frequency**



Sources: Bank for International Settlements, OECD

Figure 3.3: Real Rate of Interest in Sweden, 1960-1995, percent

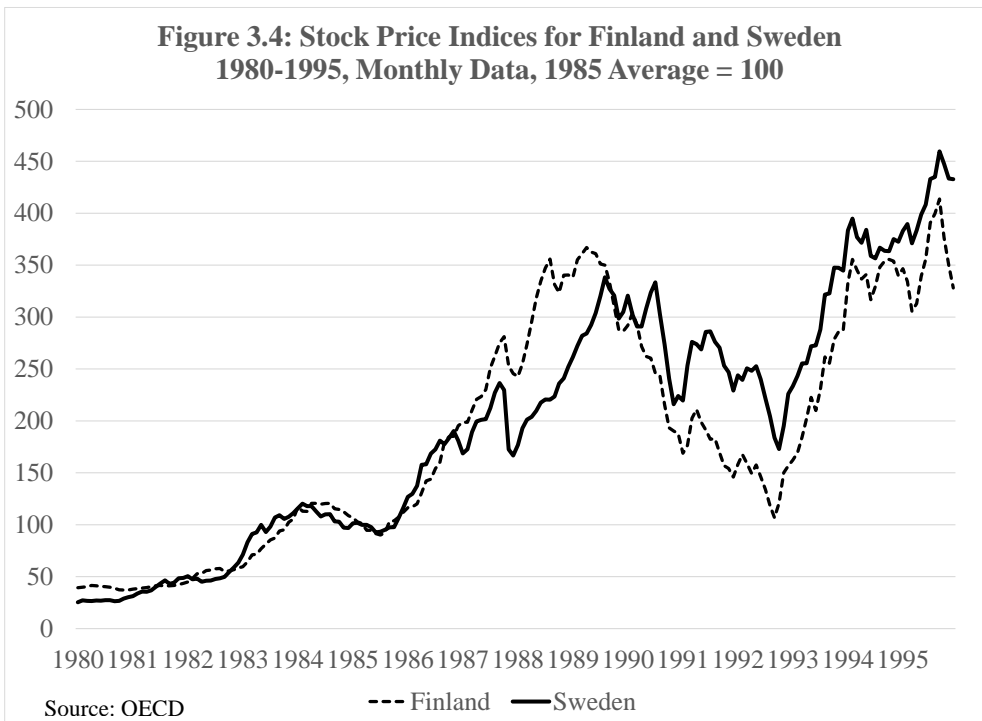


Source: Sveriges Riksbank.

Note: The graph shows $r_t^5 (1 - \tau_t) - \pi_{t,t+5}$, where r_t^5 is the 5-year interest rate at t , τ_t is 0.5 until 1990 and 0.3 thereafter, and $\pi_{t,t+5}$ is the average yearly rate of inflation between t and $t+5$.

Source: Englund (1999)

Figure 3.4: Stock Price Indices for Finland and Sweden 1980-1995, Monthly Data, 1985 Average = 100



Source: OECD

--- Finland — Sweden

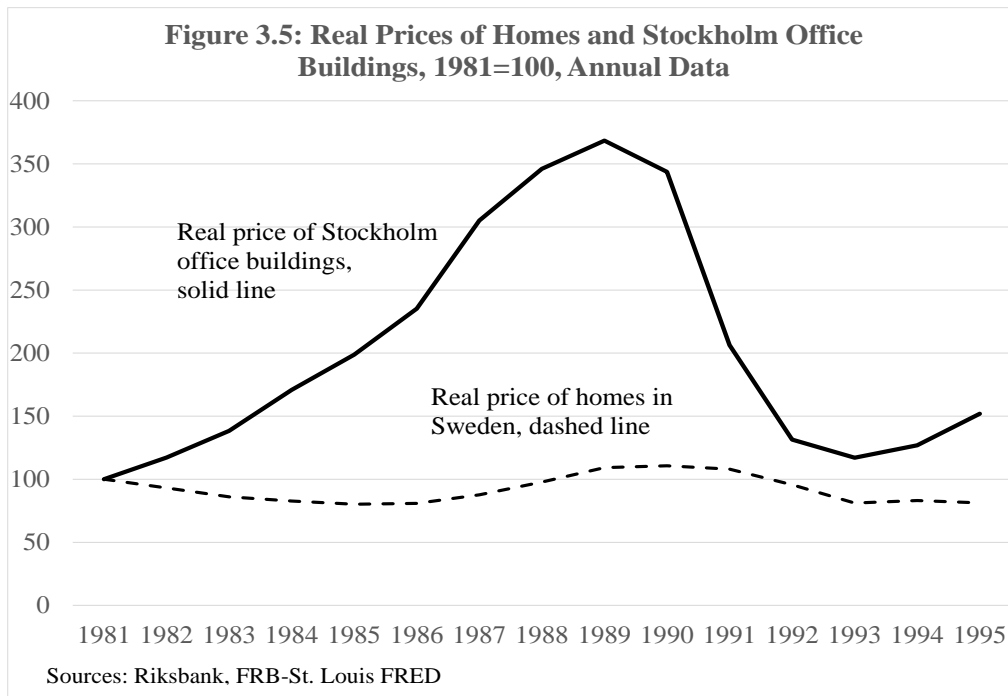
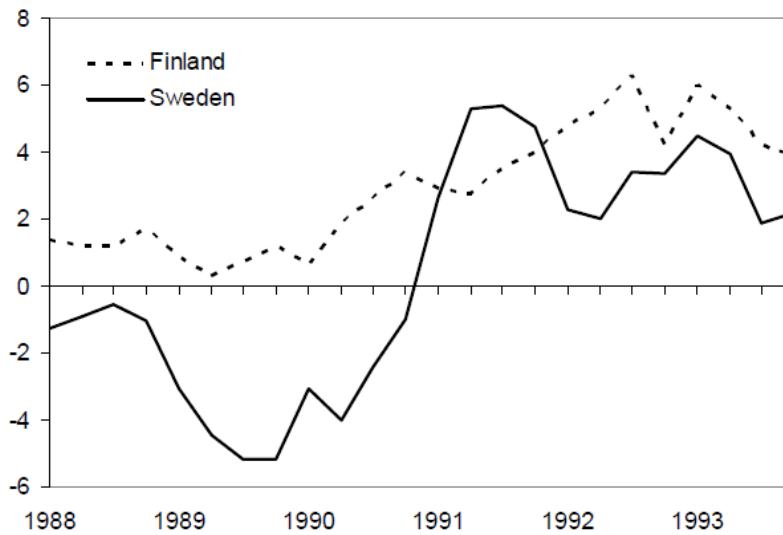


Figure 3.6: Real Rate of Interest ex post in Finland and Sweden, 1988-1993

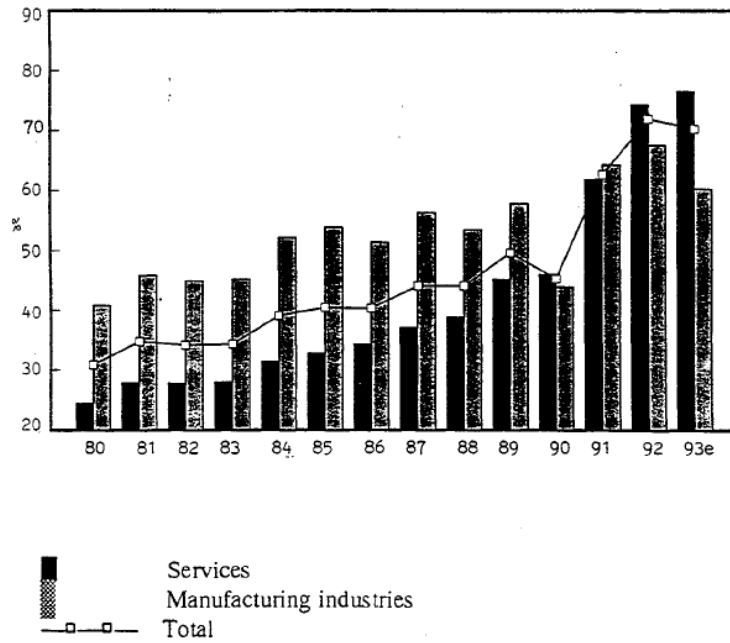


Comment: The real rate of interest ex post after tax is calculated by the following: $(1 - \text{tax rate on capital}) * \text{nominal interest rate} - \text{inflation rate}$.

Source: Jonung, Kiander and Vartia (2008)

3.7: Debt Burden of Finnish Firms, 1980-1993

Interest payments and estimated amortizations, per cent of value added, 1980-1993 *



Source: Nyberg and Vihriälä (1994)

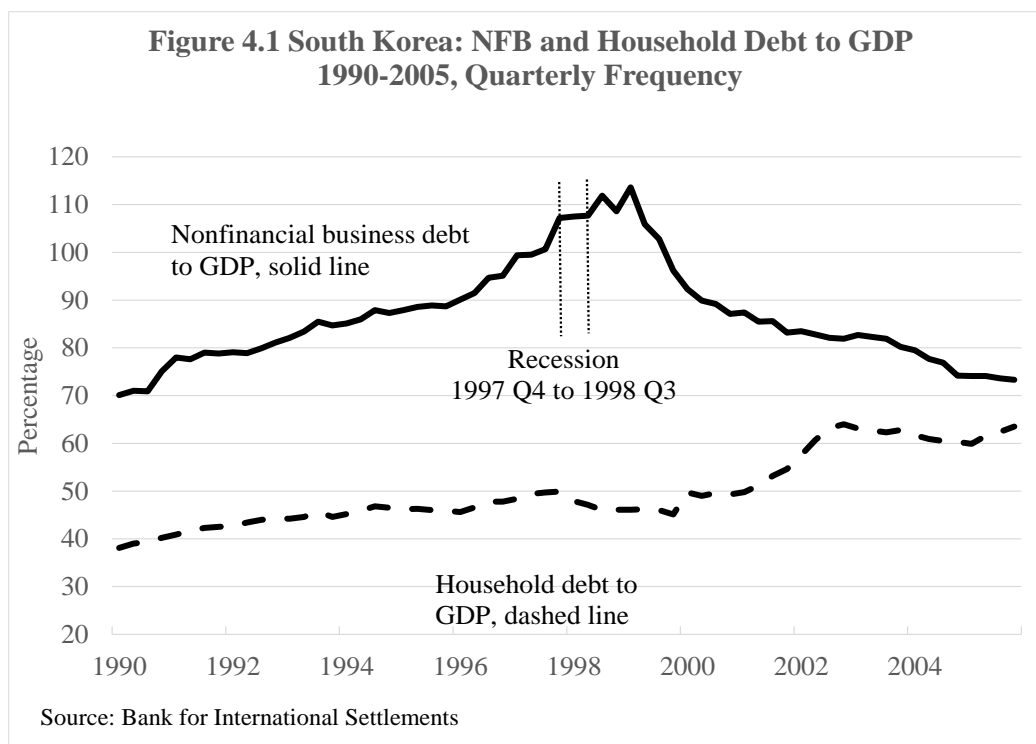


Table 4.1: Financial Leverage in the Korean Manufacturing Sector

	Korea					U.S (1997)	Japan (1997)
	1980-1989	1997	1998	1999	2000		
Debt ratio	361.2%	396.3%	303.0%	214.7%	210.6%	153.5%	193.2%
Borrowings to total assets	44.3%	54.2%	50.8%	42.8%	41.2%	25.6%	33.1%

Source: Bank of Korea, Financial Statement Analysis for 2000, Ahn (2001)

Notes: Debt ratio is total liabilities to total assets; Borrowings include loans, short- and long-term bonds and capital lease liabilities

Figure 4.2: Yields on AA- 3-year Corporate Bonds, 3-year Treasury Bonds and 91-day Commercial Paper, Monthly Data

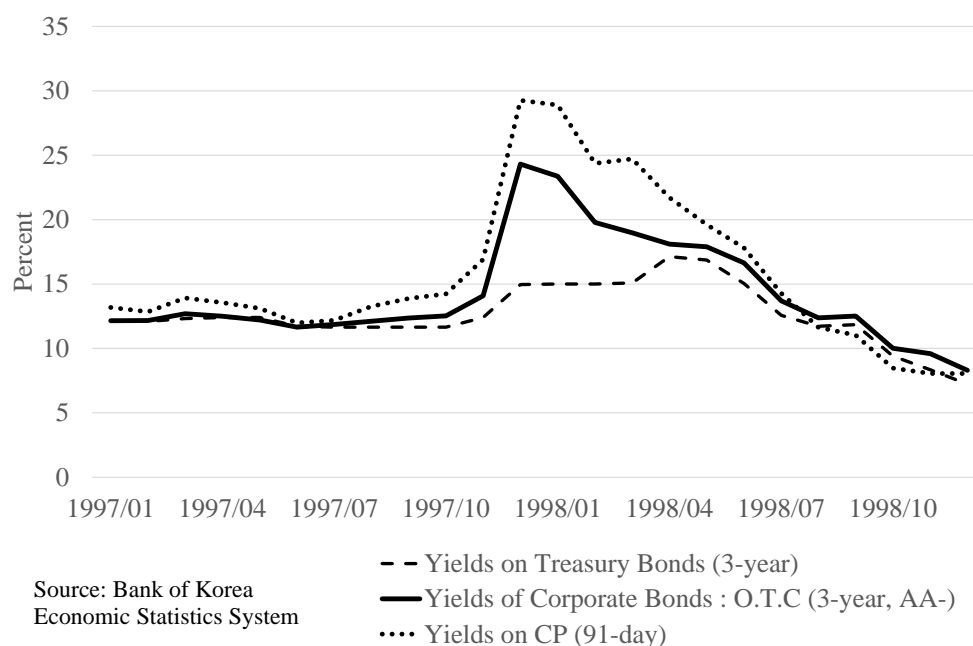


Table 4.2: Lending by Banks and Nonbank Institutions to Nonfinancial Businesses in Korea (billion won)

Panel A: Loans Outstanding at Year-end

	1996	1997	1998	1999	2000
Lender Type					
Banks	123,095.8	150,165.8	147,557.6	162,433.9	177,010.5
Insurance Companies	22,908.1	21,566.1	20,481.2	21,021.8	22,135.9
Merchant Banking Companies	15,423.6	18,077.5	11,969.3	10,625.9	4,628.7
Other Intermediaries	89,228.4	117,572.5	110,785.2	95,284.7	86,361.7
Total Loans	250,655.9	311,383.0	290,793.2	289,386.3	305,607.1

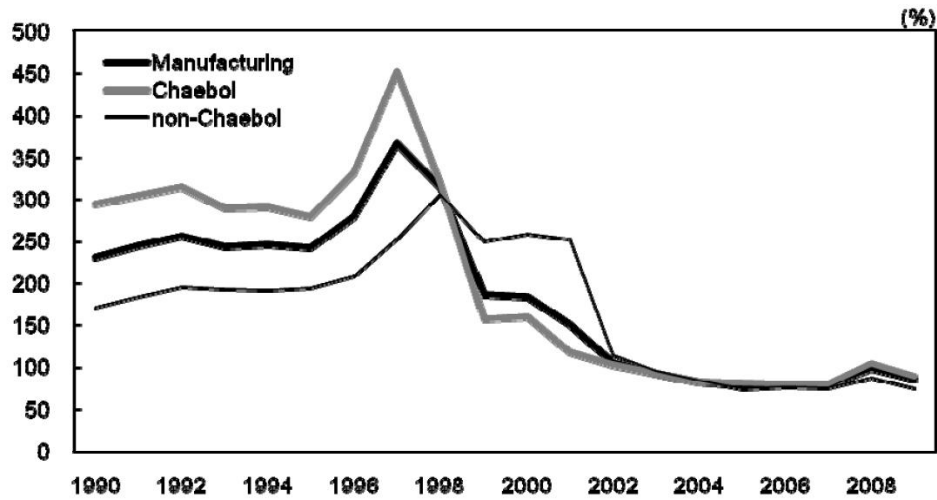
Panel B: Net Flows

Year	1996	1997	1998	1999	2000
Lender Type					
Banks	16,016.3	13,576.9	231.4	16,028.8	23,577.7
Insurance Companies	2,697.3	2,658.3	-5,085.0	540.7	1,963.3
Merchant Banking Companies	-861.5	2,653.9	-6,108.3	-1,343.3	-4,022.8
Other Intermediaries	12,755.5	21,923.4	-4,192.7	-14,761.0	-6,640.4
Change	30,607.8	40,812.2	-15,154.5	465.2	13,906.6

Source: Bank of Korea, Economic Statistics Yearbook

Note: Other intermediaries includes development institutions, savings institutions, investment institutions, securities institutions, and public financial institutions

Figure 4.3: Debt-to-equity Ratio of Listed Companies in Korea



Note: asset weighted average value
Source: Lim (2010)

Table 4.3: Net Funds Raised by the Korean Business Sector by Source (billion won)

Source	1995	1996	1997	1998	1999	2000
From Intermediaries	31,855	33,231	43,375	-15,862	2,198	11,391
Banks	14,898	16,676	15,184	259	15,525	23,348
Non-banks	16,957	16,555	28,191	-16,550	-13,267	-11,997
Direct Finance	48,071	56,097	44,087	49,496	24,792	18,996
Commercial Paper	16,096	20,737	4,421	-11,678	-16,116	-1,133
Stocks	14,445	12,981	8,974	13,515	41,137	20,806
Corporate Bonds	15,351	21,213	27,460	45,907	-2,827	-2,018
Borrowing Abroad	8,392	12,383	6,563	-9,809	11,537	15,765
Other	11,699	17,058	23,997	3,839	13,228	20,380
Total Fund Raising	100,016	118,769	118,022	27,664	51,755	66,531

Sources: Bank of Korea, Economic Statistics Yearbook

Notes: Direct finance total differs from component totals due to the use of instruments not listed in the table



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