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THE UNIVERSAL BANKS AND THE
MOBILIZATION OF CAPITAL IN IMPERIAL GERMANY

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The Universal Banks and the Mobilization of Capital in Imperial Germany

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Capital mobilization represents a serious obstacle to industrialization. By stimulating savings, matching savers and investors, and offering advice to entrepreneurs, universal banks are believed to have eased such problems during the later stages of the German industrialization. Using evidence on deposit taking, branching, and banks' liability structure as well as the extent of interlocking directorates between banks and industrial companies, this paper demonstrates that the universal banks played a limited part in capital mobilization and expansion until the start of the twentieth century. The paper shows, however, that networks of the provincial banks enveloped a broad range of industrial companies.

Developing economies often experience difficulty in financing the move from small-scale, craft and agrarian systems to modern, technologically-advanced industry. Such obstacles, as is well articulated by Rondo Cameron, include the lack of accumulation, mobilization, and efficient utilization of capital.² Financial institutions, such as banks, may ease these problems by stimulating savings, matching savers and investors, and offering business or investment advice to entrepreneurs. Alexander Gerschenkron (1962) was by no means alone in believing that the German style of finance, as represented by the large, joint-stock, universal banks, played a crucial part in overcoming all three capital-related stumbling blocks on the road to industrialization.³

Universal banks combine short-term commercial services, long-term investment banking, and brokerage activities, and are also thought to have maintained close, long-term relationships with industrial firms. Because of this involvement with industry, German banks are thought to promote stronger and more efficient industrial investment than their Anglo-American counterparts. Indeed, successful capital mobilization and the close involvement of banks in the planning and implementation of investment decisions are seen as catalysts for the high rates of capital formation that fueled the second wave of German industrialization between unification (1871) and World War I (1914).

This paper investigates the role of the German universal banks in the mobilization of capital at the turn of the last century. The paper takes an aggregate view of the problem by first measuring the growth of liabilities in the universal banking system as a whole, and then investigating cash reserve ratios maintained, the deposit taking and branching business, and the extent of interlocking directorates between banks and industrial firms. The first three pieces of evidence bear directly on the universal banks' ability or interest in mobilizing idle capital from the populace. Using aggregate volumes, and comparing such figures to GNP, allows quantification of the importance of this part of the financial system to the economy as a whole. Measuring interlocking directorates, the joint membership by the same individual on multiple supervisory or executive boards, provides insight into the distribution of financing networks throughout the economy. Such networks may have facilitated the banks' acquisition of information about sources and uses of funds: the fundamental components of capital mobilization.⁴

Historiographical questions about the role of the universal banks in the German industrialization relate closely to the more general debate in economics over the role of financial institutions in economic growth and development. The literature comprises two lines of inquiry: first, whether expansion of the financial system promotes economic growth or vice versa; and second, whether certain types of financial institutions perform the tasks of intermediation more effectively than others.⁵ This paper concentrates on the latter of these two questions, with the view that understanding the impact of financial institutions on economic growth hinges on a clearer grasp of microeconomic interactions.

The Liabilities of Universal Banks

Questions concerning capital mobilization start with the assumption that sufficient capital exists from either domestic or foreign sources. At least since the beginning of this century, historians have debated whether or not capital was deficient in Germany during industrialization. The question now seems to have been answered, if only for the first half of the nineteenth century, and Borchardt's (1963) view, that the existence of capital shortages had always been exaggerated seems to have gained general acceptance. Indeed, Brockhage (1910) mounted an early challenge to the notion of capital shortage in Prussia, claiming that, "the condition of Prussian economic life in the twenty-five years after the second treaty of Paris was such that there was continuously more capital available than was put to productive economic use."⁶ Presumably, capital would have continued to accumulate throughout the nineteenth century and would have constrained industry less and less as the century wore on.

The findings on accumulation in turn raise the question of the use of capital. While banks may be important for capital accumulation, they are fundamentally concerned with mobilization, and questions about the banks' involvement in matching savers and entrepreneurs persist. The suggestion that finance was lacking in industrial firms around the mid-nineteenth century has prompted some to assert that there was a failure to direct the country's savings toward enterprise. Whale (1930), for example, interpreted the concomitant abundance of savings and lack of industrial investment to mean that "those who had the necessary funds were for the most part neither willing nor fitted to become

progressive entrepreneurs themselves, nor would they trust their money with others who had the required qualities."⁷

If capital was abundant but inefficiently allocated at mid-century, then there should have been an important role for the new credit banks to play in channeling available funds into industrial undertakings. The available data undermine such an hypothesis. Banks mobilize capital in two stages; first, through collecting idle funds from the public, and second, through multiply expanding the assembled capital and deposits. The first step in this process entails inducing savers to purchase deposits or shares, while the second stage involves locating borrowers to use the acquired funds (and continuing to attract depositors or investors with whom to repeat the process). The magnitude of the ultimate expansion of deposits and capital relates inversely to the percentage of bank assets held in the form of reserves.

Despite the lack of an explicit reserve requirement, the German universal banks naturally held some portion of their assets in the form of cash reserves. Thus, total bank liabilities minus cash holdings offers a measure of capital mobilized by the universal banking system as a whole. Clearly, some funds will have leaked out of the universal banking system into other institutions (savings banks, for example), but one goal of the universal banks would have been to stem such leakage. Since the universal banks are thought to have been the primary providers of capital to industry, restricting attention to the universal banks makes sense.

Figure 1 plots out aggregate universal bank liabilities minus aggregate cash holdings for the period 1884 to 1913. Total liabilities less cash grew from two billion Marks in 1884 to nearly 16 billion Marks in 1913, but the growth of liabilities was significantly greater after 1893 than before.⁸ It is interesting to note that the great banks and provincial banks experienced different patterns of growth over the period. Great banks grew slightly faster than provincial banks in the post-1893 period but grew substantially slower than the provincial banks in the decade before.⁹ Figure 1 uses nominal Marks, but, not surprisingly, the deflated series produce equivalent growth rates and evidence of structural shift.¹⁰

Annual data on bank liabilities are available only after 1883, but Goldsmith (1972) provides estimates of the volume of banks' assets (and liabilities) for 1860 and 1880. These data allow some measurement of the importance of the universal banks during the end of the earlier phase of

industrialization and the beginning of the *Kaiserreich*. According to Goldsmith's estimates (Table I), joint-stock universal banks held 390 million Marks in liabilities in 1860 and 1.35 billion Marks by 1880. Thus, the volume of universal bank liabilities grew by nearly 3.5 times over these two decades. Faster growth came in subsequent periods, however, with aggregate assets increasing to nearly seven billion Marks in 1900 and over 22 billion by the start of World War I.

Part of the rapid growth of joint-stock banks resulted from the transition to the joint-stock form. Restrictions on the formation of joint-stock companies loosened considerably during the 1860s and early 1870s. Thus, prior to 1880, incorporation was significantly less common than after, and joint-stock companies became even more prevalent toward the end of the nineteenth century. It is therefore important to account for the contribution of the private banks, particularly in the period before 1880. According to Goldsmith's estimates for 1860, the private banks' assets amounted to almost four times those of the joint-stock banks, but the ratio of aggregate private bank assets to aggregate joint-stock bank assets declined substantially between 1860 and 1913. As a result, when private banks' assets are added to the universal banks' assets, and when a log-linear trend is assumed, the growth rate of bank assets becomes nearly indistinguishable across the various sub-periods. Thus, the structural break around 1894 is less clear when the private banks are included than when they are excluded.¹¹

In understanding the impact of the universal banking system on the economy, it may be more important to measure the volume of capital mobilized relative to GNP. The banks were clearly expanding relative to the economy: between 1860 and 1913, the universal banks' assets rose from approximately 3.8 percent of GNP to over 38.4 percent. Though the banks' assets clearly expanded as a share of GNP between 1860 and 1880, the growth after 1880 was faster than it had been in the previous period (see Table I). Again, it is important to include private banks in the measure. Even including the private banks, however, bank assets comprised a successively greater share of GNP in 1880, 1900, and 1913 than it had in previous periods.¹² Thus, towards the end of the nineteenth century, the universal banks were mobilizing significantly more capital both absolutely and relative to the economy as a whole than they had at mid-century.

Table I here.

While the banks could have mobilized capital either through issuing new shares or by taking in new deposits, it would be understandable if shares were more difficult to place than deposits. Equity would have probably represented a less appealing opportunity for most savers than would deposits, because shares would have presented both diversifiable risk and (not diversifiable) uncertainty and may have also been sold in denominations larger than the total amount of the average depositor's desired savings.¹³ The average saver or businessperson would likely have preferred the greater security and liquidity of a deposit contract. Furthermore, in order to maintain greater control, banks may have resisted expansion through share capital issues. Whatever the reason behind the equilibrium outcome, the fact remains that deposits grew at a faster rate than did bank shares.

Deposits might be made on term or demand, and it is difficult to disaggregate the two types for certain. The debit operations of the universal banks developed slowly in the beginning--with virtually no deposits being accepted at the outset (in the 1850's). Eventually, deposits were taken for short terms--three, six, or twelve months--and at low interest rates (averaging between one and two percent until 1906).¹⁴ The banks also offered current accounts and opened them by issuing a line of credit or by accepting a cash deposit, and interest was typically charged at one percent above the Reichsbank discount rate for debit balances and paid at one percent below the discount rate for credit balances.¹⁵ Those holding such accounts had the option of opening a checking account, but lines of credit could also be accessed using commercial paper signed by the bank.¹⁶ Since a credit on current account was immediately accessible, it can be considered the same as a demand deposit.

The Deutsche Bank was the earliest to foster the deposit business; opening its first deposit office in 1871. Growth in this direction remained meager until 1894 but increased rapidly thereafter.¹⁷ This pattern is born out by the levels of deposits accepted by universal banks, and data to this effect are reported in Table II.

Table II here: Deposits held at German universal banks

Table II gives deposits in levels and as a share of banks' liabilities as well as the number of banks included in each category. The data are given separately for the German great banks and provincial banks and are shown together in Figure 2. The figures given in Table II sum deposits and

credits to current accounts and, therefore, likely combine demand and time deposits. Deposits and credits in the German universal banks remained below 50 percent of bank liabilities until after the turn of the century and only reached 75 percent during the first world war. Both categories of banks converged to similar deposit to liability ratios with the onset of World War I. The figure also underscores the virtually identical paths of deposit ratios of the great banks and provincial banks throughout the period.

The resulting figures provide an upper bound on deposit collection (as opposed to creation), because, along with funds provided from individuals' surpluses, the measure includes deposits generated by the banks through their lending activities. Deposits alone may, therefore, provide a more accurate picture of banks' contribution to mobilization. Current account credits ranged from four to five times deposits, and deposits comprised less than ten percent of German bank liabilities, in the period before 1900. Credits fell to twice deposits in the five years following 1907 and to nearly equal levels after 1911. The expansion of both types of liabilities, in addition to the gradual shift from current account credits to deposits, meant that deposits alone nearly quadrupled as a share of liabilities between 1900 (ten percent) and 1919 (38 percent). Most of the expansion, however, came after the onset of World War I. Despite this burgeoning in the deposit business, the level and percentage of liabilities apparently remained lower than that in Great Britain, France, and the United States.

A second way to estimate deposits generated externally, is to subtract loans and credits (debits on current accounts) from deposits and credits on current account. Since the numbers are aggregated, the results apply to the universal banking system as a whole. Thus, internal drain--the transfer of loaned funds of one bank to deposits in another--causes no problems of interpretation in this context. Aggregation, however, restricts to averages conclusions about how banks covered their assets. The numbers provide a striking result in the German case; namely, that loans and credits exceeded deposits and current account surpluses for the entire period through 1914. Thus, short-term assets more than covered potential short-term claims on bank assets. Clearly, the true liquidity of both assets and liabilities is difficult to ascertain from such broad classifications, but the evidence seems to point to a minimal mismatch of maturities. After 1914, the balance reversed, and the deposit surplus reached 25 billion Marks by 1919 (equivalent to 45 percent of banks' liabilities).

Naturally, the composition of bank liabilities is related to the makeup of the banks' assets, and in the case of the universal banks, one might argue that long-term investments constrained the banks' ability to finance operations through deposits. The evidence on loans and credits compared to deposits suggests a fairly conservative approach to financing. A look at the cash reserves as a share of deposits offers further insight. For both the great banks and the provincial banks, Figure 3 plots out aggregate cash balances as a share of the sum of deposits and current account credits. The inverse of this percentage is equivalent to the deposit multiplier--the ratio that reflects the banks' influence on multiple expansion of deposits (the second stage of capital mobilization). Since deposits are likely overestimated by including the total of current accounts, the data plotted in Figure 3 represents the lower bound on the universal banks' cash-deposit ratio.

The cash-deposit ratios for both types of universal banks fluctuated considerably over the period but remained relatively high through the mid-1890s. Perhaps somewhat surprising is the realization that, in aggregate, the largest of the universal banks maintained a substantially higher cash-deposit ratio than the provincial banks. The great banks' ratio peaked at over 21 percent in 1891 and remained above ten percent until 1904. The provincial banks' ratio never rose above 15 percent (14.3 percent in 1888) but also declined considerably beginning in the mid-1890s.

The figures imply an upper bound on the banks' deposit multiplier and suggest that the universal banks created deposits at a significantly faster rate after the 1890s than before. By these figures, with no leakage, new injections of funds into the great banks would have ultimately produced five to six times the capital in the early part of the period and over 10 times the capital in the later part of the period.¹⁸ The provincial banks clearly multiplied deposits faster than the great banks in each sub-period, but the shift in the multiplier around the mid-1890s is still apparent (rising from 8.5 to 12). On average, then, the universal banks maintained substantial cash reserves against their deposits but began to adjust their portfolios toward the end of the nineteenth century. This pattern is consistent with the trend in bank liabilities, and the findings therefore help to explain the accelerating expansion of bank liabilities in the two decades before World War I.

The decline in banks' cash-deposit ratio is as yet unexplained, but a logical hypothesis would suggest increasing diversification of the underlying potential claims on banks' cash reserves.¹⁹ In particular, geographical or sectoral diversification of deposits may have changed the distribution of

expected withdrawals from the banking system and may have, in turn, permitted the banks to reduce their cash-deposit ratios. Banks could have diversified their liabilities primarily by broadening their customer base.

An obvious way to attract new customers would be to open offices in areas not already serviced by the bank. Branches aid the direct collection of deposits from small savers, and branching across regions facilitates banks' matching of surpluses in some regions with deficits in others. Furthermore, inter-regional expansion permits banks to diversify their short-term liabilities and possibly safeguard against systemic instability. Thus, the spread of universal banks' depository offices offers clues to the potential for diversification of the banks' deposits as well as to the extent of banks' mobilization efforts more generally.

Table III shows that the number of offices for all of the Berlin banks totaled a mere ten in 1885 and had grown to only 22 nine years later. By 1901 the great banks had opened 73 deposit offices, but stronger growth came in the eight years leading up to World War I. By 1913, there were still only 252 great bank branches (22 of which were foreign), yet this number represented a near tripling of the level a decade earlier. Since some share of these branches represented the conversion of pre-existing banks into branches of the great banks, the net gain in the system as a whole lies somewhere below 230. Furthermore, the new offices of the great banks were clumped in certain regions of the country. Almost all of Schaaffhausen's branches (20 of 22) and nearly half of Deutsche Bank's domestic branches (26 of 54), for example, were located in the heavily industrial Rhine Province. At the same time, four of the Berlin banks maintained no offices in the southern provinces, and one had only a single branch (in Alsace-Lorraine).²⁰

Table III here: Deposit Offices of Berlin Banks

The second part of Table III gives the number of deposit offices of each of the great banks in 1913. Given the initiative shown by the Deutsche Bank in the 1870's, it comes as no surprise that this bank led the others in branch formation. At 47 and 44 deposit offices respectively, the two other great banks that remain in business today, Dresdner and Commerz- und Discontobank, fell close behind the Deutsche's 48 branches. With the exception of the Berliner Handelsgesellschaft (with

no deposit offices), the other great banks maintained between 16 and 30 branches in 1913.

The number of deposit offices may not be a crucial determinant in the growth of deposits to the universal banking system, since it is possible for institutions in other areas to collect funds regionally and make deposits with the universal banks in their base cities. In this way, associated banks in outlying regions might function as branches to the universal banks. Thus, growth of deposits, or liabilities less cash, in the universal banking system is a more direct measure of the banks' success in capital mobilization. Clearly, for the German universal banks, the strongest growth in both total liabilities and deposit ratios arrived on the heels of the economic expansion that began around 1894 and mushroomed during World War I.

Together, the data seem to indicate a lack of effort on the part of the credit banks in issuing shares or fostering deposits for use in industrial enterprise in the nineteenth century, but there is an alternative view. Borchardt (1963), for example, argues that the banks did not take deposits in their early years because of industry's lack of demand for new funds. This explanation, however, was developed in the context of the first half of the nineteenth century. The credit banks continued to neglect the deposit business until 1871--and to a great extent until late in the nineteenth century--but pursued it ardently thereafter. If Borchardt's hypothesis, that banks' deposit policy was a response to industry requirements of external finance, may be extended past mid-century, it would thus imply that demand for outside funds should have remained low until the mid-1890's and should have then risen continuously throughout the two decades before World War I.

In his biography of the first two decades of the Disconto-Gesellschaft, one of the largest of the universal banks, Däbritz (1931) offers insight into the question of the supply of and demand for credit in the middle of the nineteenth century. From the figures he reports, it is apparent that the Disconto-Gesellschaft maintained a generally very high but fluctuating cash-deposit ratio during this period. For example, cash amounted to 27 percent of deposits plus current account credits (158 percent of deposits alone) in 1856 and 25 percent (297 percent of deposits alone) in 1870. Yet occasionally, as in 1862, the banks' cash ratio fell as low as 2.6 percent (23 percent of deposits alone). At the same time, particularly in 1856, industry complained loudly of credit shortages, and

the bank increased its discount rate from four to six percent between May and September of that year. There was “a previously never observed general feeling that the Berlin credit institutions were not keeping step with the general development [of the economy]”²¹

Furthermore, a study of company balance sheets shows that German firms were becoming more, not less, liquid after the turn of the century. As a share of fixed assets, most German firms had higher stocks of liquid assets after 1900 than before. Table IV compares internal liquidity and net profits for two samples of German industrial firms over the period 1880 to 1912 and also reports estimated average annual growth rates of the two variables. Among long-lived German firms, median stock liquidity as a share of fixed capital rose from approximately 20 percent in 1880 to 60 percent in 1912, yielding an average annual growth rate of two percent.²²

The internal funds of newly public German firms (IPO firms) grew quite a bit faster (eight percent per year on average) than that of the more established firms, but part of this is due to the fact that the sample composition changes over the period. The IPO firms enter between 1880 and 1900, and the firms arriving in the later years of the sample held higher levels of liquidity than the earlier entering firms. Nonetheless, even counting from 1892, when at least half the sample had already entered, the liquidity ratio of the IPO firms (ten percent) fell significantly below that of the long-lived firms (32 percent). The IPO firms still lagged the long-lived firms in 1900 (36 versus 50 percent) but had caught up shortly thereafter.

The evidence on bank liabilities and industrial firms’ assets and profits suggests two possible conclusions: that firms would have made use of additional capital, but the banks failed to mobilized deposits in the nineteenth century; or that firms only needed funds after the economic upswing of the 1890's, at which point they had accumulated high levels of internal funds. In the first scenario, the banks were needed but failed; and in the second, the banks’ capital mobilization efforts were superfluous to their principle clientele. In light of the evidence, therefore, regardless of the reasons underlying the evolution of the universal banks’ liabilities, conjectures that the universal banks spurred the expansive industrial investment of the second half of the nineteenth century by mobilizing large quantities of capital seem unpersuasive. Instead, the findings here suggest that the universal banks’ liabilities expanded and changed structure largely in response to or as a result of the growth and metamorphosis of industry over the second half of the nineteenth century.

Banking and Industrial Networks

Taking deposits and issuing shares are the principle methods of funding bank operations. Yet capital mobilization requires banks' to also find productive uses for the funds they collect. Finding investors necessitates knowledge of good prospects that comes mainly through investments in information gathering. One of the benefits of the German style of banking is thought to be its emphasis on relationships with industrial firms and the resulting advantages in learning about industry's financing needs and investment opportunities.

Universal banks, particularly those in Germany, are thought to form close links with client firms, and many of these ties are apparently formalized via concurrent memberships on bank and firm boards (interlocking directorates). Because formal relationships are supposed to have eased information problems between the sources and uses of funds, many have pointed to interlocking directorates as a promoter of investment during Germany's industrialization. Furthermore, by placing individuals on multiple firm boards, the banks may have created networks of industrial firms with varying investment programs and capital requirements. Thus, financial-industrial networks would have aided capital mobilization if the involvement of the banks promoted information flows between enterprises with excess funds and firms in need of finance.

Gerschenkron is perhaps the best-known advocate of the view that the banks provided entrepreneurial advice to firms in their networks, and such consultancy services should have yielded competitive advantages to these affiliated companies. Interlocking directorates, therefore, may have also improved the efficiency of capital utilization; encouraging capital to go further in individual undertakings. Rather than directly assess the outcomes of banking relationships, this paper concentrates on describing the structure of the banking networks that had developed by the turn of the twentieth century.²³

German joint-stock companies had two separate governing bodies: a group of the firms' top managers (the executive board or *Vorstand*) and an advisory panel elected by shareholders (the supervisory board or *Aufsichtsrat*). The supervisory board took ultimate responsibility for the major decisions of the firm, but the executive board, though appointed by the supervisory board, had control over day to day operations. Given the legal structure of corporate governance institutions,

interlocking directorates took four possible forms: executive board to supervisory board, supervisory board to executive board, supervisory board to supervisory board, or executive board to executive board. Presumably, the placement of bank directors on firms' supervisory boards had the strongest implications for the banks' influence on firm, yet indirect links through supervisory boards may have been equally important for information flows between banks and firms.²⁴

While restricting attention to interlocking directorates ignores informal channels of bank-firm interaction and abstracts from the qualitative side of relationship banking, the tactic has the obvious advantage of providing a quantitative measure that can be compared internationally and inter-temporally.²⁵ Furthermore, formalized relationships constitute a principal identifying characteristic of German-style universal banking and are repeatedly emphasized in the literature.²⁶

In order for interlocking directorates to have facilitated capital mobilization during industrialization, universal banks would have had to have built their networks early in the development process. Interlocking directorates could be formed only among joint-stock corporations, since these are the only type of firm required to maintain supervisory and executive boards. This institutional structure implies inherent limits on the ability of banks to mobilize capital through formal networks.²⁷

Given their small numbers throughout the first half of the nineteenth century, joint-stock companies, and interlocking directorates among such firms, played a minimal role in the early stages of industrialization in Germany. The number of joint-stock firms remained low until the post-unification boom of the early 1870's. Many of those early companies failed, and the number of joint-stock flotations fell to between 50 and 100 annually for most of the 1870's and the early 1880's.²⁸ The late eighties and late nineties brought two further booms in company flotations, but the growth was punctuated by severe stock market crises in the early nineties and 1901. Thus, joint-stock firms formed in large numbers during the later phases of industrialization in Germany, and it is therefore difficult to determine the predominant direction of causality between industrial growth and the flourishing of share companies. Even among German joint-stock companies, interlocking directorates arose on a significant scale only after the first stages of industrialization and, as is

demonstrated in the preceding section, after firms had begun to accumulate internal liquidity.²⁹ Thus, even ignoring the problem of limited potential, interlocking directorates seem to have played a proscribed role until the very last stages of industrialization.

The question remains how widely the impact of universal banking networks was felt once interlocking directorates began to form. The historical literature has tended to either take extreme positions on the extent of bank influence or ignore the issue all together.³⁰ This paper approaches the problem by estimating both the proportion of firms and the percentage of economy-wide share capital involved in formalized banking relationships of various types as well as by examining the sectoral distribution of bank networks.

Table V presents data on the makeup of supervisory and executive boards of a random sample of 400 joint-stock companies in 1905. The data come from the *Handbuch der deutschen Aktiengesellschaften*; a source that reported on every joint-stock company in Germany. The figures are disaggregated into five bank-attachment categories: interlocking directorates with no banks, private banks only, provincial (small) banks only, great banks only, or a combination of provincial and great banks.³¹ The variables include the average size of the executive and supervisory boards, the number of banks and non-bank joint-stock firms associated with the firm, the percentage of each board's seats filled by concurrent bank board members, as well as several variables quantifying the direction of representation (firm to bank or bank to firm) and positions held by concurrent bank-board members. The last five columns provide a one-way analysis of variance (ANOVA) and several t-tests on the differences in means.

Table V here: Data on Interlocking Directorates in Germany, 1905

Statistically significant differences arise among the categories of firms for every variable in Table V. Clearly, firms with combined-bank attachment maintained the largest executive and supervisory boards. Yet such firms were also the largest, and the correlation between firm size, especially when measured by share capital or net worth, and executive and supervisory board size hovers around 43 percent in the sample as a whole. When broken down by bank-attachment status, the firms with no affiliation or only private- or small-bank affiliation show greater correlation

between firm size and board size than do companies with great-bank or combined-bank attachment. The size of firms' boards (usually a range) was set out in the company by-laws, but that range could be adjusted with a vote of the general assembly. Typically, the number of board members grew as the firm developed, but there was no linear relationship. Thus, there may be a maximum efficient scale for executive and supervisory boards, and that limit may have been reached more frequently by the larger, bank-attached firms.

Firms affiliated with a combination of banks received the largest number of concurrent bank-board members (from both small and great banks) and also maintained the highest percentage of bankers on their supervisory boards. Clearly, firms with representation from several different banks are likely to have a larger number of bankers sitting on their boards than would firms with fewer banks. However, while the high magnitude of representation might be seen as a size effect, the percentage of representation is not obviously related to size. Indeed, the number and percentage of interlocked supervisory board seats correlate positively in the full sample (at 20 percent) but negatively in each of the bank-attachment sub-samples.

Table V also provides data on the presence of banks' supervisory and executive board members in the various positions on firm boards. Of firms with attachments to a joint-stock bank, 67 percent had concurrent bank-board members (either executive or supervisory) in the chair or vice-chair position and 78 percent received representation among the regular members of the supervisory board. The general absence of interlocking directorates via the executive boards of industrial companies is striking. Only 11 percent of firms with joint-stock-bank representation maintained representation (either to or from a bank) through their executive boards. Not surprisingly, given the continual demands on executive board members of any kind of firm, in only four percent of attached firms did a bank director (member of a bank executive board) sit on the firm executive board. Furthermore, while nearly half of the bank-attached firms received supervisory board representation from a bank director, only nine percent of attached firms sent a director to the supervisory board of a bank.

Bank board members clearly participated most heavily in the formation of interlocking directorates. Nonetheless, cases in which bank executive board members sat on a firm's supervisory board without any concurrent bank-firm supervisory board representation comprise only 15 percent

of the sample of joint-stock-bank attached firms. The share falls to nine percent when only firms with banker-held chair or vice-chairmanships are considered. Thus, one-sided bank representation appears to have occurred infrequently.

One also cannot ignore the prevalence of interlocking directorates among non-bank firms. Ninety percent of bank-attached firms also received representation from other non-bank firms, and all but one firm with great-bank or combined-bank attachment were involved with other non-bank firms. The large standard deviations given in Table V indicate the high degree of variation in the number of non-bank firms attached to the firms in the sample. Nonetheless, the difference in means tests show that there is significant variation across bank-attachment categories. The non-bank attachments of firms with both great- and small-bank attachment are particularly impressive: the average number of represented firms was 38, and the 25th, 50th, and 75th percentiles were 11, 24, and 46, respectively. The firm with the most non-bank firm representation had 220 other firms represented on its supervisory and executive boards. Although they did so at a lower rate (25 percent) than bank-attached firms, even firms without bank representation engaged in interlocking directorates with other industrial firms. Among these firms, the number of other non-bank firms represented ranged from one to 36, with a median of two.

Finally, it is important to point out the shares of firms falling into the bank-attachment categories. Approximately 31 percent of joint-stock firms were involved only with small or private banks. While 20 percent of joint-stock firms had formalized relations with a great bank, only two percent of the sample interlocked only with great banks. The small share of firms engaged in interlocking directorates with only a great-bank is particularly notable, since it underscores the near absence of exclusive relations between the great banks and industrial firms.

Nonetheless, while approximately half of joint-stock firms engaged in interlocking directorates with any type of universal bank, approximately 88 percent of the economy's share capital was invested in companies that had interlocking directorates with banks. While 23 percent of firms had bank executive board members on their supervisory boards, these firms accounted for 40 percent of the economy's share capital. Naturally, the gap in percentages varies by sector. In mining and electro-technical, for example, 85 to 90 percent of firms had bank affiliations, but 99 percent of the sector's share capital was linked to banks through interlocking directorates. At the same time, 37

percent of mining firms had a bank director on their supervisory boards, but the capital of these firms represented only 31 percent of mining share capital. Furthermore, while less than 12 percent of the population had a great-bank director on its board, these firms accounted for 31 percent of the economy's share capital. Thus, the pervasiveness of bank-firm relationships via interlocking directorates is impressive, not so much because of the numbers of firms affected, but because of the proportion of the economy's share capital involved.

The sectoral concentration of the great banks arises frequently in the literature on industrialization. Some have seen the banks' practices as focusing resources where they would receive the highest returns, yet others have suggested that the universal banks created lopsided growth of the German economy.³² Despite the contradictory findings on the ultimate effects of the banking system on economic growth and development, the literature has yielded the nearly unanimous observation that the great banks focused their attention on a small number of sectors.

Table VI breaks down the shares of joint-stock firms in each sector and for each sector gives the average share capital, the percentage of great bank representatives, and the share capital relative to the economy-wide average in 1910. According to these estimates, mining, electrical, machinery, and transportation firms were the most likely to have interlocking directorates with the great banks; absorbing 63 percent of all representatives placed by these nine banks. With the exception of machinery firms, the bank-dominated sectors were also the largest and had share capitals ranging between two and five times the average for joint-stock firms. These same sectors, however, made up only 30 percent of the population of German companies.³³ Table VI does not reveal the additional information that such firms were also highly likely to involve themselves with multiple banks.

Table VI here: Number and Size of Firms with Great Bank Representation, Germany, 1910.

On the other end of the spectrum, textile, paper, rubber, wood, stoneware, printing, and food companies made up over half the population of non-commercial joint-stock companies but accounted for less than 17 percent of great bank representatives. The food and beverage sector alone constituted over a quarter of non-commercial share companies but took only six percent of great bank representatives. All of the neglected industries were comprised of relatively small firms: most

had share capital in the range of 50 to 70 percent of average capitalization for non-commercial firms. Only textile companies came close to the size of great-bank firms, and at 90 percent of mean share capital, these undertakings fell far below the capitalization of mining, transport, electro-technical, and steel making firms.

The sectoral breakdown supports the traditional notion that the great banks concentrated their efforts in a small number of industries. Far less attention has been paid to the clientele of the smaller universal banks. The provincial banks maintained much the same financial structure as their Berlin counterparts but seem to have served a more diversified portfolio of industrial companies. Recent research demonstrates marked sectoral differences between the network membership of the great banks and the provincial universal banks. Textile and chemical firms, for example, appear to have been more commonly involved with provincial banking networks than with the great-bank networks. Firms in construction and food products (including beer brewing) tended to remain independent of banking affiliations.

Part of the apparent sectoral discrimination is certainly due to size. The largest firms became affiliated with the great banks, and certain industries naturally lend themselves to production on a large scale. Furthermore, regional specialization of industry may have meant that provincial banks provided financial services to the branch of industry in their region, and those banks that served regions with small-scale industry never needed to grow to the scale of the great banks. Perhaps because of the opportunities left to them, the provincial universal banks covered many of the branches of industry not included in the great banks' networks. Whatever the reasons behind the sectoral distributions of banking networks and the apparently poor diversification by the great banks, the current results suggest that the universal banking system as a whole enveloped a broad swath of German industry by the beginning of the twentieth century.³⁴

Concluding Remarks

This paper has offered evidence on the universal banks' role in capital mobilization during the later stages of the German industrialization, and several conclusions arise from the research presented here. The universal banks gathered little capital through branching, deposit taking, or

share issue until the latest phases of industrialization. The banks also maintained on average conservative (high) cash-deposit ratios, and therefore failed to multiply expand their liabilities to the greatest extent possible, until the turn of the twentieth century.

This paper also investigates the breadth and extent of formalized relationships between universal banks and industrial firms in order to address the issue of the universal banks' supposed superiority in obtaining information about the sources and uses of financial capital. Like the banks themselves, interlocking directorates seem to have burgeoned in the last decade of the nineteenth century, and, even once bank-firm networks did become prevalent, they could only reach those firms that became joint-stock firms. Nonetheless, the pervasiveness of formal networks by the beginning of the twentieth century is impressive. The evidence on bank-firm networks reveals that interlocking directorates were maintained largely through joint membership on supervisory boards; direct placement of bank directors on firms' supervisory boards was much less common, and one-sided representation by the great banks was clearly unusual. On a positive note, while the common claim that the great banks maintained a narrow focus on a limited number of sectors, the findings here also show that the provincial universal banks' networks enveloped a wide variety of different firms.

While this paper establishes the existence of apparent potential for information transmission between banks and firms, at least by the end of the nineteenth century, it does not address the actual effectiveness of the banks in exploiting such opportunities. Questions about the investment patterns and financing costs of German industrial firms are beginning to be addressed in the literature, but more work is needed.³⁵

Whether the universal banks' role from the 1850s to the mid-1890s was proscribed by external forces is yet another important question that cannot be addressed directly with the current evidence. The regulation of the joint-stock banks was probably tighter in the early 1850's than it was after 1870, and, perhaps for this reason, the joint-stock banks accounted for a smaller share of the economy earlier than later.³⁶ The private banks, institutions not subject to joint-stock banking laws, prevailed over joint-stock banks in the 1850s and 60s. Yet, perhaps because of their corporate structure, they probably behaved more conservatively than did the joint-stock banks. A critical question, for applying the historical experience to modern problems, is whether the joint-stock universal banks would have performed any differently in the absence of regulation. Company law

had loosened dramatically by 1870, and thereafter firms, including banks, were essentially free to incorporate and engage in interlocking directorates. The current findings, that the joint-stock banks continued to operate relatively conservatively until the mid-1890s, suggest that regulatory constraints were not binding on the universal banks.

The findings of this paper casts doubt on the generally-accepted view that the specific features of universal banking solved the capital mobilization problems and thereby promoted the strong economic growth of Germany in the second half of the nineteenth century. Indeed, because of the late development of some characteristics of the universal banks, it is difficult to discern the direction of causality between the development of universal banking practices and economic growth. Rather than acting as catalysts, as is often supposed, the growth of bank liabilities, branch offices, deposit multipliers, and bank-firm networks may well have resulted from the expansion and changing structure of the German economy towards the end of the nineteenth century.

This paper should be seen, not as condemnation of the German financial system, but rather as a challenge to the idea that the Germans' way of structuring industrial finance was superior to that of others. Given recent research on the British and American financial systems, it is unclear how significantly the continental banks diverged from their British and American counterparts, and it is also difficult to ascertain whether the German economy could have sustained or benefitted from an alternative system of finance and corporate governance.³⁷ At a minimum, it is clear from the current analysis that the relationship between financial institutions' structure and economic growth is both complicated and demanding of further evidence.

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2. Cameron (1967), p. 292.

3. See, for example, Eiert (1970), Gerschenkron (1962), Schumpeter (1939). For measured accounts see Cameron (1967) and Tilly (1965, 1991). For contemporary accounts, see Jeidels (1905), Riesser (1910), and Sombart (1909). Nine of the universal banks, because of their extreme size, earned the name Great Bank. The great banks were Berliner Handelsgesellschaft, Commerz- und Discontobank, Darmstädter Bank, Deutsche Bank, Discontogesellschaft, Dresdner Bank, Mitteldeutsche Creditbank, Nationalbank für Deutschland, and A. Schaaffhausen'scher Bankverein.

4. Interlocking directorates also may have offered banks a means of oversight and control of firms they financed, and evidence on pervasiveness therefore also illuminates the role of the universal banks in ensuring the efficient utilization of capital. For more on the investment patterns of German firms, see Fohlin (1997).

5. See Ross Levine (1996).

6. Brockhage (1910), p. 182, as cited in Whale (1930), p. 11.

7. Whale (1930), p. 11.

8. Using a regression of the log of liabilities less cash on a time trend yields growth rates of 5.1 percent from 1884 to 1893 and 8.6 percent from 1894 to 1913. The difference is statistically significant at far greater than one percent confidence level, and the adjusted-R² is 99 percent. The growth rate for the full period, without estimating a break-point, is 7.9 percent, and the adjusted-R² is 98 percent. The 1894 breakpoint makes sense, given the growth of the German economy after 1894 compared to before.

9. The great banks' liabilities less cash grew at 4 percent per year through 1893 and 8.6 percent thereafter. The provincial banks grew at 6 percent and then 8.3 percent in the same sub-periods. All estimates are highly statistically significant (far better than one percent).

10. It is not surprising, because the banks are among the primary sources of money growth in the economy. Multiply expanding deposits will be related to increases in the money supply and thus to the price level.

11. Of course, there is no particular reason to believe that assets grew evenly between 1860 and 1880, so it is possible that bank assets did grow more slowly during most of that period and shifted upward in a short period around 1880. Since Goldsmith does not report cash holdings of the universal banks (or private banks), the full level of liabilities is given here. Cash represented approximately five percent of total assets.

12. Universal plus private bank assets divided by GNP was .18, .21, .30, and .45 for 1860, 1880, 1900, and 1913, respectively.

13. Face value of joint-stock bank shares typically ranged from 400 to 1200 Marks in the nineteenth and early twentieth century. Market value would normally have been higher. The Disconto-Gesellschaft grew from 1163 members at its founding in 1852 to 1675 four years later. The average stake of the members ranged from 3,000 Thaler (9,000 Marks) to over 4,000 Thaler (12,000 Marks) during these early years. See Däbritz (1931) for further details. Even by 1876, 95 percent of those counted in the census earned less than 2,000 Marks (presumably per annum). See Sombart (1903). It is possible that groups of individuals may have purchased shares, but, because joint-stock companies were not required to reveal the identities of their shareholders, there is virtually no data available that would permit investigation of such a phenomenon.

14. See Motschmann (1915) for an exhaustive survey of the deposit business of the Berlin banks.

15. The banks provided a wide range of services to holders of current accounts. For a description, see Riesser (1911).

16. Though the universal banks went largely unregulated during the nineteenth and early twentieth centuries, they were not permitted to issue their own banknotes.

17. This point is made in Fohlin (1994) as well as in Edwards and Ogilvie (1996).
18. These multiplier figures are estimated by taking the inverse of the average cash ratio over the two sub-periods (1884-1894 and 1895-1913).
19. Recall that the joint-stock universal banks were not bound by a legal reserve requirement. There was considerable debate over the issue at the turn of the century, and it is possible that the central bank, as in England, pressured the banks to maintain a given ratio. Given the significant fluctuations in cash ratios in the early period and the gradual trend toward substantially lower ratios over the later period, it seems unlikely that the central banks' pressure dictated the actions of the universal banks.
20. The southern provinces include Bavaria, Württemberg, Baden and the Palatinate, Hessen, and Alsace-Lorraine. Lacking population data at this time, it is impossible to compare the more important measure of branches per capita.
21. Translated from Däbritz (1931), p. 24.
22. Data for the sample of long-lived firms were compiled by Rudi Rettig and were provided by Richard Tilly. See Rettig (1978) and Fohlin (1996, 1997c) for further details on these data.
23. Efficient capital utilization is an important topic, but space constraints prohibit extensive discussion here. See Fohlin (1997a, c) on firms' investment patterns in Germany and Italy.
24. Fohlin (1997b) offers further discussion of the institution of interlocking directorates as well as direct tests of the differences between types of interlocking directorates.
25. There is also the question of geographic concentration of bank involvement. While this issue is not addressed in this paper, I am currently compiling data on the regional distribution of banking networks.
26. See Jeidels (1905) and Gerschenkron (1962) or quotations thereof in Fohlin (1997b).
27. Edwards and Ogilvie (1996) estimate the share of joint-stock companies in the capital stock of Germany. Their numbers are based on Hoffman (1960).
28. *Deutscher Ökonomist* as cited in Riesser (1910). Compare to an annual average of 258 new joint-stock companies founded from 1895 to 1900, and an annual average of 180 over the period 1884 to 1911.
29. Fohlin (1996c). That paper also gives an in-depth discussion of the ways in which banks and firms may have formed interlocking directorates, characteristics associated with bank-affiliated firms, trends in the formation of bank networks, and alternative hypotheses about why formalized relationships arose in Germany at the end of the nineteenth century.
30. See Edwards and Ogilvie (1996) on the lack importance of universal banks, Wellhöner (1989) on the exaggerated claims of importance made by Hilferding (1910), as well as Eistert (1970) and Neuberger and Stokes (1974) on the macroeconomic effects of bank policies. See also Herrigel (1996) who criticizes the unitary approach to studying German economic history as well as Pollard (19xx) on regional variation. Tilly (1965) offers a balanced view.
31. The data come from *Handbuch der deutschen Aktiengesellschaften* (1905). See Fohlin (1997b) for further discussion of the sources, sampling methods, determination of bank affiliations, and firm characteristics.
32. Tilly (1985) addresses the diversification of the universal banking system.
33. The data in Sombart (1913) exclude transport and construction firms, so the share of these firms in the population are missing. Share capital for these sectors is estimated from Wagon (1903). I have excluded commercial and financial services companies from the calculation.
34. As Edwards and Ogilvie (1996) note, joint-stock companies comprised a modest share of Germany's productive capital. Further research is required, however, to determine the extent to which the universal banks developed relationships with private companies.

35. See Calomiris (1995) on underwriting costs and Fohlin (1997c) on investment and liquidity constraints.

36. The effect of liberalization would have had the direct effect of allowing more joint-stock banks to form as well as the indirect effect of increasing the clientele of the banks (that is, more industrial joint-stock companies).

37. See Collins (1991) for a comprehensive review of the British financial system between 1800 and 1939. Also see Michie (1988) comparing the British capital market to those on the continent (notably Germany) and Calomiris (1995) comparing the underwriting costs of German and American firms. Fohlin (1997d) compares securities holdings of British and German banks.

Table I
German Financial Institutions' Assets

	1860	1880	1900	1913
Total assets of joint-stock universal banks (billions of Marks)	0.390	1.350	6.960	22.040
Total assets of joint-stock and private banks (billions of Marks)	1.890	3.850	10.460	26.040
Joint-stock universal banks/total financial institutions' assets	0.094	0.102	0.175	0.243
Joint-stock & private banks/total financial institutions' assets	0.455	0.292	0.263	0.287
Assets of all financial institutions/GNP	0.400	0.730	1.140	1.580
Joint-stock banks' assets/GNP	0.038	0.075	0.199	0.384
Joint-stock & private banks/GNP	0.182	0.213	0.299	0.454

Source: Calculated from Goldsmith (1969).

Table II
Deposits Held at German Universal Banks

Year	German Great Banks:			German Provincial Banks:		
	Number	Levels (millions)	Share of Liabilities	Number	Levels (millions)	Share of Liabilities
1885	7	478	0.45	71	484	0.42
1890	7	567	0.41	92	719	0.40
1895	8	902	0.42	94	867	0.48
1900	9	1,455	0.44	118	1,673	0.46
1903	9	2,015	0.51	124	1,695	0.47
1905	9	3,042	0.55	137	2,256	0.53
1910	9	4,882	0.63	165	4,241	0.58
1915	8	6,856	0.73	148	4,913	0.66
1917	8	15,210	0.86	127	7,971	0.78
1918	8	19,696	0.87	120	10,285	0.83
1919	8	39,141	0.89	115	15,460	0.84
1920	8	62,566		105	21,960	

Notes: Deposits are calculated as the sum of deposits and current account credits. Levels are given in Marks.

Sources: Calculated from Deutsche Bundesbank (1976).

Table III
Deposit offices of Berlin banks

<i>Deposit Offices and other affiliated institutions</i>			<i>Deposit Offices in 1913</i>	
Year	Deposit offices	All affiliated institutions	Bank	Number
1885	10		Deutsche Bank	48
1894	22		Dresdner Bank	47
1895		59	Commerz- u. Discontobank	44
1896		63	Darmstädter (BHI) Bank	30
1900		99	Discontogesellschaft	26
1901	73		Nationalbank f. Deutschland	21
1902		147	Schaaffhausen'scher	20
1905	124	241	Bankverein	16
1908		442	Mitteldeutsche Creditbank	0
1913	252		Berliner Handelsgesellschaft	

Source: Deposit offices compiled from Motschmann (1915), pp 54-9, and total institutions from Riesser (1911), p. 1008.

Table IV
Liquidity and Profitability of German Firms, 1880-1912

Year	Median Stock Liquidity/Fixed Assets:		Median Net Profits/Fixed Assets:	
	Long-Lived German Firms	German IPO Firms	Long-Lived German Firms	German IPO Firms
1880	0.19		0.06	0.05
1882	0.24	0.05	0.09	-0.01
1884	0.31	0.05	0.09	0.03
1886	0.30	0.09	0.03	0.01
1888	0.33	0.06	0.01	0.02
1890	0.39	0.11	0.02	0.03
1892	0.32	0.10	0.03	0.03
1894	0.35	0.15	0.03	0.06
1896	0.38	0.20	0.06	0.08
1898	0.45	0.29	0.08	0.11
1900	0.50	0.36	0.11	0.05
1902	0.34	0.30	0.05	0.07
1904	0.35	0.38	0.07	0.08
1906	0.40	0.52	0.08	0.09
1908	0.39	0.62	0.09	0.06
1910	0.49	0.50	0.06	
1912	0.60			
Growth rate	0.02** <i>0.00</i>	0.08** <i>0.01</i>	0.01* <i>0.00</i>	0.06* <i>0.01</i>
Adjusted R ²	0.63	0.87	0.13	0.47
F-statistic	56.59**	184.06**	5.85*	24.54*

Notes: Growth rates are estimated as the coefficient in an OLS regression of the log of median liquidity or profits on a constant and a time trend. Standard errors are in italics below coefficient estimates. (**, *) indicate statistical significance at better than one percent and five percent, respectively.

Sources: Saling's Börsen-Jahrbuch (various years).

Table V
Firm Board Variables by Bank-Attachment Category

Variable	Attachment with:					Oneway ANOVA	P-Value of T-test:			
	No banks	Private banks	Small banks	Great banks	Mixed		NOB v. Banks	NOB v. PB	GB v. SMGB	SMB v. GB
Number of <i>Vorstand</i> members	1.77 <i>1.27</i>	1.53 <i>0.77</i>	2.07 <i>1.62</i>	1.44 <i>0.88</i>	3.07 <i>4.31</i>	0.00	0.01	0.24	0.01	0.08
Number of <i>Aufsichstrat</i> members	4.86 <i>2.22</i>	5.32 <i>1.70</i>	6.12 <i>3.14</i>	5.22 <i>1.48</i>	7.99 <i>4.51</i>	0.00	0.00	0.29	0.00	0.14
Number of private banks attached	0.00 <i>0.00</i>	1.05 <i>0.23</i>	0.39 <i>0.73</i>	0.22 <i>0.44</i>	1.00 <i>1.08</i>	0.00	n/a	n/a	0.00	0.33
Number of small banks attached	0.00 <i>0.00</i>	0.00 <i>0.00</i>	2.30 <i>3.20</i>	0.00 <i>0.00</i>	6.07 <i>5.46</i>	0.00	n/a	n/a	n/a	n/a
Number of Great banks attached	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.00 <i>0.00</i>	1.56 <i>1.13</i>	2.70 <i>2.49</i>	0.00	n/a	n/a	0.03	n/a
Percentage of <i>Vorstand</i> attached	0.00 <i>0.00</i>	0.00 <i>0.00</i>	7.77 <i>22.39</i>	0.00 <i>0.00</i>	3.98 <i>15.56</i>	0.00	n/a	n/a	n/a	n/a
Percentage of <i>Aufsichstat</i> attached	0.00 <i>0.00</i>	23.14 <i>11.01</i>	30.17 <i>18.47</i>	26.20 <i>16.35</i>	53.25 <i>24.00</i>	0.00	n/a	n/a	0.00	0.51
Number of non-bank firms attached	1.28 <i>3.89</i>	6.79 <i>7.18</i>	11.91 <i>18.93</i>	8.00 <i>9.50</i>	37.87 <i>39.13</i>	0.00	0.00	0.00	0.00	0.30
Listed on a German stock exchange	0.16 <i>0.37</i>	0.42 <i>0.50</i>	0.57 <i>0.50</i>	0.78 <i>0.44</i>	0.63 <i>0.49</i>	0.00	0.00	0.04	0.40	-
Listed on Berlin stock exchange	0.05 <i>0.21</i>	0.37 <i>0.50</i>	0.32 <i>0.47</i>	0.33 <i>0.50</i>	0.43 <i>0.50</i>	0.00	0.00	0.01	0.58	0.96
Bank director on firm S.B.	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.43 <i>0.50</i>	0.44 <i>0.53</i>	0.60 <i>0.49</i>	0.00	n/a	n/a	0.42	0.92
Firm director on bank S.B.	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.09 <i>0.29</i>	0.00 <i>0.00</i>	0.09 <i>0.28</i>	0.00	n/a	n/a	n/a	n/a
Same person on bank and firm E.B.	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.05 <i>0.21</i>	0.00 <i>0.00</i>	0.04 <i>0.20</i>	0.04	n/a	n/a	n/a	n/a
Same person on bank and firm S.B.	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.71 <i>0.45</i>	0.78 <i>0.44</i>	0.97 <i>0.17</i>	0.00	n/a	n/a	0.23	0.68
Bank director on firm S.B. only	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.23 <i>0.42</i>	0.22 <i>0.44</i>	0.03 <i>0.17</i>	0.00	n/a	n/a	0.23	0.95
Chair of S.B. attached	0.00 <i>0.00</i>	0.32 <i>0.48</i>	0.47 <i>0.50</i>	0.44 <i>0.53</i>	0.57 <i>0.50</i>	0.00	n/a	n/a	0.51	0.88
Vice-chair of S.B. attached	0.00 <i>0.00</i>	0.11 <i>0.32</i>	0.19 <i>0.39</i>	0.22 <i>0.44</i>	0.47 <i>0.50</i>	0.00	n/a	n/a	0.15	0.81
Regular member of S.B. attached	0.00 <i>0.00</i>	0.68 <i>0.48</i>	0.69 <i>0.47</i>	0.44 <i>0.53</i>	0.94 <i>0.23</i>	0.00	n/a	n/a	0.02	0.22
Executive board member attached	0.00 <i>0.00</i>	0.00 <i>0.00</i>	0.12 <i>0.33</i>	0.00 <i>0.00</i>	0.10 <i>0.30</i>	0.00	n/a	n/a	n/a	n/a

Notes: The five categories of bank attachment are mutually exclusive and exhaustive. "Mixed" refers to affiliation with a combination of great banks and small or private banks. NOB, PB, SMB, GB, and SMGB refer to firms with attachments to no banks, private banks only, small banks only, great bank only, and a combination of banks, respectively. S.B. and E.B. refer to supervisory board and executive board, respectively. The oneway ANOVA tests for differences in means among the five attachment categories, while the T-test tests for differences of means between the two given categories. Standard errors are in italics.

Source: *Handbuch der deutschen Aktiengesellschaften.*

Table VI
Share Capital and German Great-bank Representation by Industry, 1910

Sector	Share of firms	Average share capital	Share of bank reps. ^a	Industry K/ average K
Transport ^b	***	10.9	0.15	4.7
Iron & steel	.04	9.1	0.24 ^c	3.9
Electrotechnical	.05	6.1	0.24 ^d	2.6
Coal & coke	.03	5.8	---	2.5
Salt & potash	.01	5.4	---	2.3
Construction ^b	***	3.3	0.02	1.4
Chemical	.05	2.5	0.05	1.1
Textiles	.10	2.0	0.04	0.9
Machine-heavy	.12	1.8	---	0.8
Metal	.05	1.7	0.06	0.7
Paper	.03	1.7	0.01	0.7
Rubber	.01	1.7	0.004	0.7
Ice & water	.01	1.7	***	0.7
Oil, gas, & petrol.	.06	1.6	***	0.7
Leather	.01	1.6	***	0.7
Food & drink	.27	1.4	0.06	0.6
Stones & earth	.09	1.3	0.04	0.6
Machine-light	.02	1.2	---	0.5
Wood	.02	1.2	0.002	0.5
Printing	.04	0.6	0.01	0.3

^a Excluding trade and foreign firms.

^b Average capital based on 1900 data.

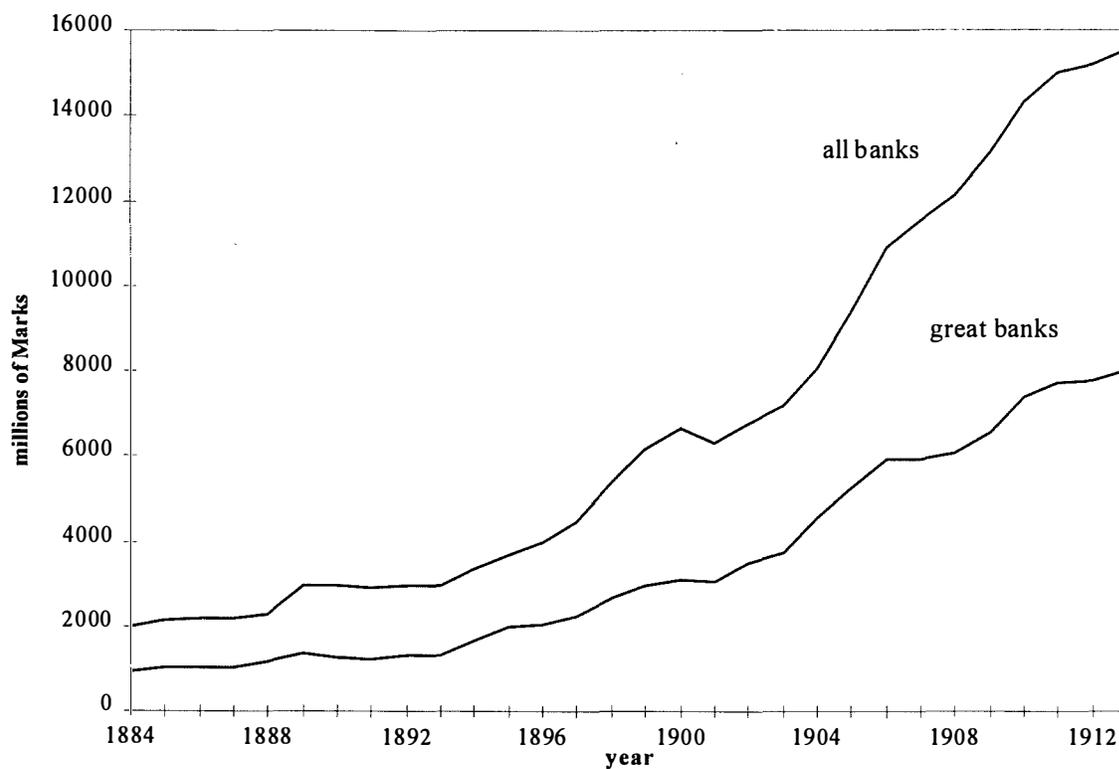
^c Includes coal & coke and salt & potash.

^d Includes machine.

Notes: Share of firms indicates the number of the given sectors' firms as a share of all firms. Share capital is given in millions of Marks. Share of bank reps. indicates the number of great banks' representatives to the given sector as a share of all great bank representatives to joint-stock firms.

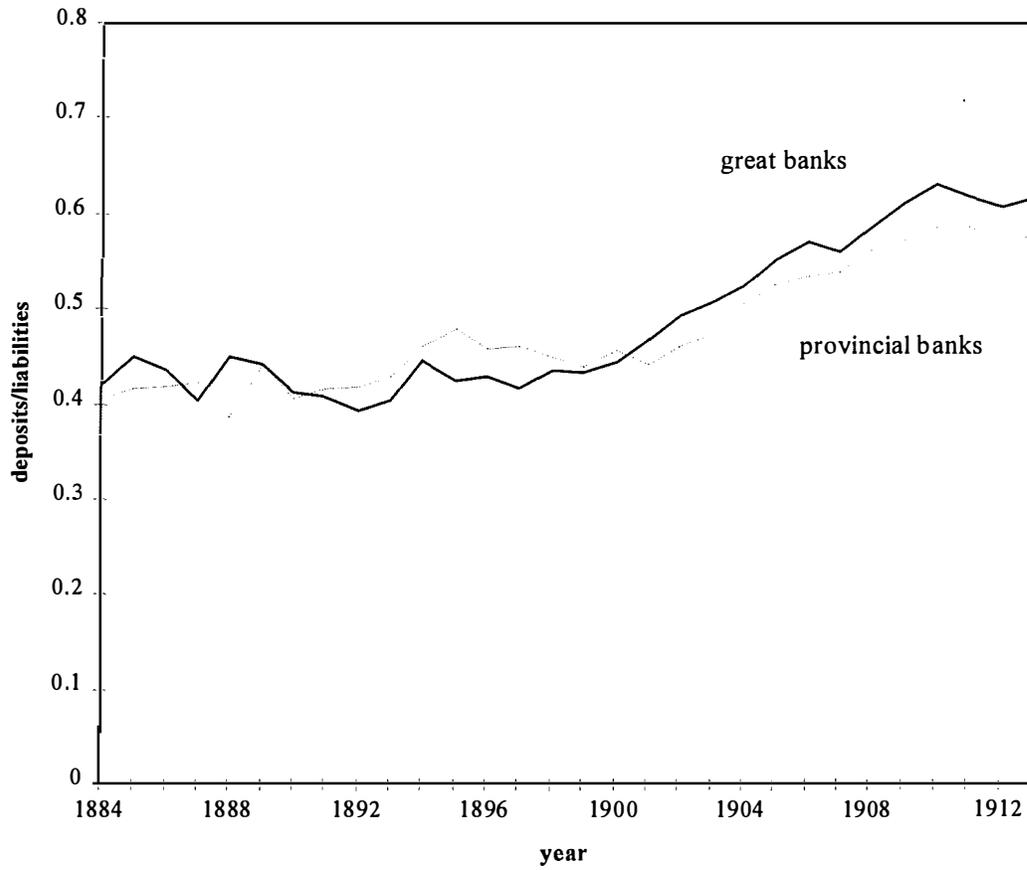
Source: Calculated from Sombart (1913), p. 488, 501-4. Transport and Construction are calculated from Wagon (1903), statistical appendix.

Figure 1
Liabilities Less Cash Held in Universal Banks
1884-1913



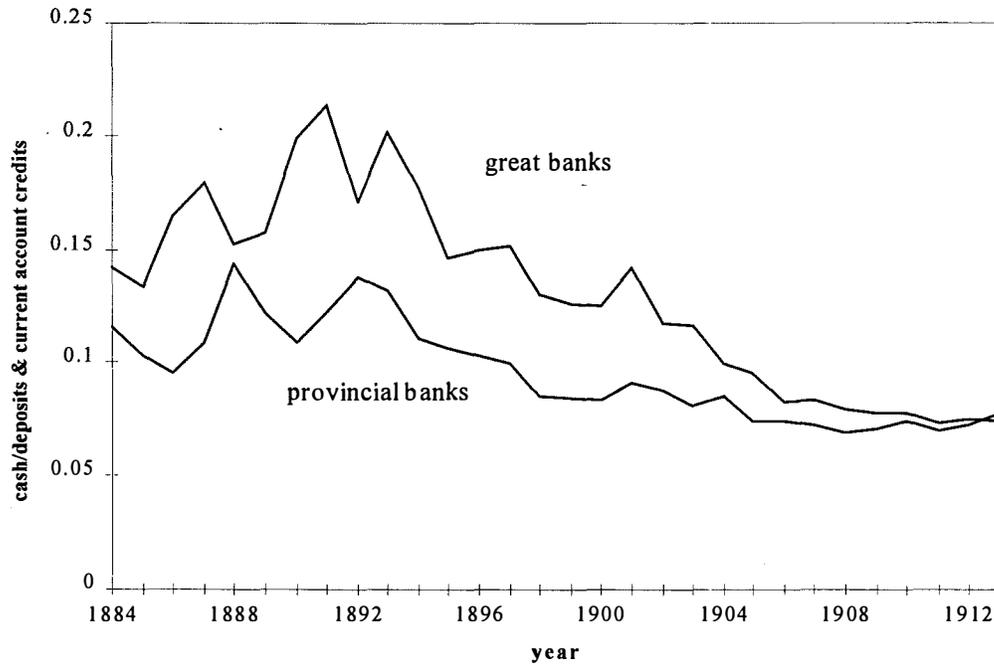
Source: Deutsche Bundesbank (1976).

Figure 2
Deposits as a Share of Universal Bank Liabilities
1884-1913



Notes: Deposits includes credits on current account.
Source: Deutsche Bundesbank (1976).

Figure 3
Cash-Deposit Ratio of Universal Banks
1884-1913



Note: The cash-deposit ratio is defined as total cash at universal banks divided by the sum of total deposits and current account credits held in the same banks.

Source: Deutsche Bundesbank (1976).