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ABSTRACT

The Impact of Female Employment on Male Wages and Careers: Evidence from the English Banking Industry, 1890-1941*

The late 19th and early 20th century British labour market experienced an influx of female clerical workers. Employers argued that female employment increased opportunities for men to advance; however, most male clerks regarded this expansion of the labour supply as a threat to their pay and status. This paper examines the effects of female employment on male clerks using data from Williams Deacon's Bank covering a period 25 years prior and 25 years subsequent to the initial employment of women. It is shown that within position women were substitutes for men, although the degree of substitutability was less for older men than for juniors. In addition, the employment of women in routine positions allowed the Bank to expand its branch network, creating new higher-level positions, which were almost always filled by men.

JEL Classification: N3, J3

Keywords: clerical labour markets, female employment, spill over effects, internal labour markets

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The rapid growth in the female labour force participation rate was perhaps the most important change in the labour supply in late 19th and early 20th century Great Britain. Nowhere in the British economy were the effects of this increase greater than in the clerical sector. Men had a comparative advantage in agriculture and manufacturing because of their greater physical strength, which was reflected in correspondingly higher wages (Burnette, 2008). Clerical work, on the other hand, required little physical strength, and thus women had a comparative advantage in the sector. Clerical work was also seen to be more socially acceptable and more feminine than other types of employment, particularly for middle class women (Anderson, 1988; Webb, 1891; and Zimmeck, 1986). Thus, when clerical work was opened to women, they rapidly moved into the sector. Women comprised only 1 percent of all clerks in 1871. This increased to 11.1 percent in 1901 and 44.8 percent by 1921 (Takahashi, 1994).

Contemporary clerks and subsequent scholars have been divided on the effects of this increase in the labor supply on the wages and careers of male clerks. Increased female employment was generally met at the time with concern from established male clerks, who saw women as direct competition for jobs (Rathbone, 1917; "Quicksilver", 1920; A Junior, 1922; and Bank Officers' Guild, 1921). Female clerks were typically paid less than men, with the pay gap widening with tenure (Webb, 1891; Goldin, 1990; and Seltzer, 2011). Many male clerks feared that they would be crowded out by this cheap new source of labour. Subsequent scholars have generally, though not universally accepted that crowding out did occur and that female employment resulted in lower male salaries (See Anderson, 1976; Klingender, 1935; Lewis, 1988; and Zimmeck, 1988. Heller, 2011 takes the opposite view). However, these scholars have generally relied primarily on the published views of contemporaries and other qualitative evidence. None has directly estimated the effects using the salaries of male clerks prior and subsequent to female employment.

Perhaps not surprisingly, employers and female clerks offered a very different view, arguing that men and women were more likely to be complements than substitutes. They argued that female employment was driven by increasing demand for clerical services

and by mechanization, both of which allowed for greater division of labor within the clerical sector. The expansion of the sector and greater division of labor along with the standard workplace practice of requiring women to leave employment upon marriage created a system of dual labor markets.[1] Because the marriage bar meant that most women left after a few years, employers were reluctant to provide women with training. As a result, men and women typically did different jobs, with men entering into career tracks with opportunities for the talented to advance and most women being restricted to dead-end positions (Bank Officers' Guild, 1921; Cohn, 1985; Goldin, 1990; Jordan, 1996; Seltzer, 2011). In addition, it has been argued that female employment allowed for the expansion of the clerical sector, which according to *Census* statistics, grew more rapidly than any other service sector during the late 19th and early twentieth centuries (Heller, 2011 and Lee, 1994). The growth of the sector disproportionately created positions above the entry-level, and thus enhanced male clerks' prospects for advancement.

This paper examines the effects of female employment on male wages and promotion prospects within the banking industry, focussing on the extent to which women were net complements or substitutes to different types of male staff. Banking was among the most elite of clerical occupations, and among the last to feminize. While other clerical employers began hiring women in the 1870s, most private banks remained all male until the First World War, when the loss of men to the Services necessitated employment of women (Takahashi, 1994 and Blackburn, 1967). After the War, the banks created permanent positions for women. Although many women left in 1919 and 1920, the majority of those hired during the War remained in employment after the men returned from the Services. The retention of female staff was in part due to their successful experience during the War, when women stepped into the positions of absent men and often performed as well or better at the same jobs. However, the retention of women following the War was also necessary because of a shortage of suitable male staff. Many

[1] Marriage bars were ubiquitous throughout the clerical sector. In 1911, 114,429 of 117,057 (98 percent) of female commercial clerks in London were single (Anderson, 1988). Marriage bars were commonplace in virtually all clerical employers including the Civil Service, the Post Office, the railways, libraries, teachers, banks, and insurance companies (Parris, 1973; Cohn, 1985; Anderson, 1988; Liladhara and Kerslake, 1999; and Oram, 1996).

male staff and potential future recruits were lost during the War. Others left the banking industry upon their return. At the same time, the banks began rapidly expanding, with the number of branches in England and Wales increasing by 47.8 percent between 1917 and 1925 (Sheapheard, 1971). Unlike the War period, when women routinely held positions of responsibility, during the interwar period women were typically confined to "women's jobs", performing routine back office clerical duties.

The primary focus of this paper is on the salaries and careers prospects of male staff at Williams Deacon's Bank, a mid-sized regional joint-stock branch bank based in Manchester with a few offices in London. I examine the extent to which the employment of women from 1915 affected the male staff. The methodology of this paper is borrowed from the literature on the effects of migration on labour market outcomes of the native born (Borjas, 1999 and Card, 2001). I consider a production function in which senior and junior clerical staff were complementary inputs in the production process. Women were close substitutes for men as junior clerks, but were rarely given the opportunity to rise to senior clerical positions. In this context, female employment after 1915 can be viewed as an increase in the labour supply which had different effects across 1) different branches and 2) different types of male staff within a given branch. Within a given branch, the mix of senior and junior clerks varied little over time; however, there was considerable variation in this mix across branches. Because women were largely restricted to junior positions, the extent to which individual branches were "feminizable" varied little over time.[2] Crucially for the purposes of this paper, the extent to which the individual branches were feminizable differed little prior and subsequent to the actual employment of women. This leads to the testable predictions that 1) the salaries of junior men at female-intensive branches should have declined relative to observationally equivalent men at male-intensive branches after 1915 and 2) the extent of this decline should be less for senior men than junior men.

[2] In this context "feminizable" refers to the extent to which employment at a branch was concentrated in back office clerical positions of the sort that were routinely given to women.

The data come from Williams Deacon's extremely rich personnel records. The records cover virtually all staff between 1890 and 1936, and most through 1941. In addition to the wage data, the records contain annual data on the number of male and female staff employed in each branch. These records have been used to create an annual panel of data for the Bank's male staff extending over long periods both prior and subsequent to female employment. These data have been used to estimate the effects of female employment using a difference-in-difference methodology within the framework of Mincer regressions on the log of real male salaries.

In addition to examining salaries, this paper also looks at the effects of female employment on men's promotion prospects. Here there is less theoretical ambiguity than is the case with salaries. Female employment had two separate effects, both of which unambiguously increased men's promotion prospects. First, by making posts available to women, the Bank increased its suitable applicant pool and the number of staff it employed. Increased staff numbers were essential for the expansion of the branch network following the First World War. The new branches were universally small, employing a manager and relatively few clerks. The expansion of the branch network thus created new managerial positions and, because the new branches employed relatively few clerks, resulted in an increase in the proportion of staff in managerial positions. Secondly, because promotion to branch manager was not possible for women until well after the Second World War, when new branches were opened, the newly-created managerial positions always went to the men.

The outline for the remainder of this paper is as follows. After the introduction, the first section provides a brief historical background of the British banking industry, male careers, and the introduction of female employment to the industry. The second section provides a brief historical background of Williams Deacon's Bank and describes the rich Williams Deacon's data set. The third section outlines a simple theoretical model showing the relationship between female employment and salaries for different types of male staff. The fourth section uses the Williams Deacon's examines the effect of female employment on men's salaries and promotion prospects. The fifth section concludes.

I. The Late 19th and Early 20th Century Banking Industry

In the mid 19th century, most English banks were privately owned and operated at most a small handful of offices. The late 19th and early 20th centuries witnessed several important changes to the organization of the banking industry and its demand for labor. There was a rapid consolidation of the industry with larger joint stock banks absorbing private banks and smaller joint stock banks. In addition, the larger banks continued to open new branches. The total number of banking offices increased from 2,203 in 1890 to 10,082 in 1930 (Sheppard, 1971). The average number of branches per bank increased from 7.1 in 1870, to 14.3 in 1890, 31.5 in 1901, 67.5 in 1911, and 128.9 in 1920. By 1914, the industry was dominated by a handful of very large banks which operated hundreds or thousands of branches. Although this consolidation of the industry preceded large-scale female employment, it created the economies of scale in the back offices that later proved crucial to the creation of "women's jobs".

During the late 19th and early 20th century, male bank clerks were generally viewed as being among the "clerical aristocracy" (Lockwood, 1958 and Wilson, 1998). Banking employment was long-term, secure, and characterized by internal labor markets. A typical banking career prior to the First World War might be described as follows (Blackburn, 1968; Heller, 2011; Seltzer and Frank, 2007; Seltzer, 2010a; Seltzer, 2010b; and Seltzer, 2011). Juniors were hired shortly after completion of secondary schooling. During their first few years, they were effectively apprentices, and gradually learned the business of banking while on the job. It was fairly common for young men to leave banking employment during these first few years of employment. If a young man remained at the bank for 3-5 years and showed promise, he would be moved from branch to branch and gradually be promoted through the ranks, eventually reaching the level of manager after an average of 15-20 years. Pay was closely tied to tenure and was largely shielded from the external labor market. Within the ranks of the managers, there were substantial differences in responsibility and pay based on the size of the branch. The number of managers was strictly limited by the number of branches, and relatively few

individuals had sufficient talent to be promoted to the level of branch manager at any point of their careers. However, all staff who proved their loyalty and basic competence had secure jobs and higher pay than clerks in most other industries. Men who were not capable of advancing were typically given back office positions at the larger branches. Men who remained employed at a bank for 5 years would typically stay until either retirement or death. Pensions were unusually generous and were typically based on end-of-career salaries.

The growth of the branch networks had important effects on the organization of the internal labour markets. In the mid 19th century, the bank clerk was a generalist who, more often than not, worked alongside the general manager. This was not possible in the much larger banks of the late 19th and early 20th centuries, where most staff either worked in the ever-larger back offices of the main branches or in the increasingly numerous smaller branches. The increase in the size of the banks and the need to monitor growing branch networks resulted in a dramatic increase in routine clerical work. Much of the work in the back offices became increasingly specialized, comprising tasks such as 'secretarial work, typing, coupons, and other [similar] posts' (Williams Deacon's Bank Limited, 1928). By contrast, work at the smaller branches remained focused on customer interface.

The transformation of the banking office had a dramatic effect on female employment. In 1911 women comprised only 1.2 percent of banking staff (Takahashi, 1994).[3] Most private banks employed only men. The First World War provided the impetus for female employment in the industry. Most of the younger male staff either volunteered or were called up into the services. The loss of so many men meant that from 1915 it became necessary to bring women in as temporary replacements. During the War, women performed the jobs of the men, including some high-level positions such as cashier or acting division head (Williams Deacons Bank Limited, 1921). Following the War, most of the women were given permanent positions, though an unusually large number left in

[3] This figure compares to 24.5 percent of clerks in commerce, 8.8 percent in insurance, 20.7 percent in the Civil Service, 6.0 percent in law, and 1.3 percent at the railroads (Takahashi, 1994).

1919-20 (Williams Deacons Bank Limited, 1915-1941).[4] Unlike the War years, most women were given routine clerical work during the inter-war period, with little or no prospect for advancement.Traditionally these tasks had been done by juniors as part of their on-the-job training and by older men who lacked the ability to progress through the ranks. However, after the War the banks increasingly saw these tasks as women's work. In part this was due to a widespread perception among employers that women were temperamentally better suited to routine and repetitive tasks (Webb, 1891; Zimmeck, 1986; and Lewis, 1988). In addition, the diffusion of new technologies such as the type-writer and the adding machine meant that these tasks required relatively little time to master, which made them ideally suited to a female workforce that typically had fairly short careers because of marriage bars.[5] Perhaps most importantly, women were paid considerably less than men, particularly after several years of service.[6]

The real salaries of male bank clerks declined somewhat in the two decades prior to the First World War, and sharply during the War years (Blackburn, 1967; Lockwood, 1958 and Seltzer, 2010a).[7] The bank clerks responded to declining pay by unionizing. After a first abortive attempt in 1914, the Bank Officers' Guild (BOG) was formed in 1917. Although discussions of inflation, a fixed nominal pay scale, and declining real salaries dominated the early BOG meetings and the early issues of their trade journal *The Bank Officer*, the feminization of the industry and its impact on male staff quickly emerged as the Guild's second issue (Bank Officers Guild, 1919-1921 and Bank Officer's Guild, 1920).[8] Many male union members believed that they would be replaced or their wages

[4] In 1919 and 1920 an average of 78.5 women left the Bank each year. Between 1921 and 1936, at most 37 left the bank in any year.
[5] See Heller (2011) on mechanization and Seltzer (2011) on marriage bars and the length of female careers. Many of these positions were routine long before mechanization of the industry. The diffusion of technologies such as adding machines or typewriters simply changed the pace at which the tasks could be done and allowed for greater specialization of the workforce.
[6] Seltzer (2011) shows that women earned slightly less than men at the time of initial employment and also had lower returns to tenure. After 19 years service, women earned approximately half of what men earned, all else equal. Thus assigning routine jobs to female clerks gave the banks considerable cost savings.
[7] Seltzer (2010a) estimates that at Williams Deacon's tenure-adjusted real salaries declined by 22.0 and 10.8 percent respectively at the Bank's London and Northern branches between 1895 and 1914 and a further 42.9 and 44.7 percent between 1914 and 1918.
[8] Prices increased by 24.7 percent between 1895 and 1914 and another 141.6 percent between 1914 and 1920 (Feinstein, 1972).

would be undercut by women and opposed all female employment in the industry. One clerk stated, "Their competition cannot fail to depress the standard of living of those [men] compelled to earn in order to live" (Bank Officers Guild, 1921). Another stated that women "tend to keep down and probably further reduce the present [wage] scale of the various banks" ("A Junior", 1922). Other BOG members supported female employment (or at least accepted it as inevitable), but also sought to protect male members through the establishment of safeguards to "prevent to the utilisation of women as cheap labour" (Bank Officers' Guild, 1926). Ultimately, "equal pay for equal work" emerged as the BOG's official position; however, because many women within the Guild feared that "successful insistence on this point … would mean that very many women would lose their posts", the Guild also called for there to be "limit[s] put upon the type of work a woman can be called upon to perform" (Bank Officer's Guild, 1928).

Employers and some female clerks believed that the BOG's view of the effects of female employment on male staff was fundamentally flawed. They instead argued that because most women were limited to routine back-office duties, they were not close substitutes for men. Instead female employment reduced the need for men to perform routine duties, which meant that more could be assigned to positions of responsibility. One female clerk wrote, "If a junior is capable he will get promotion because the women are not officially considered to be … making banking a life job, … , [and] few of the women obtain promotion" (Sulthorp, 1922). Similarly, a 1918 Williams Deacon's Bank internal memo stated, "[o]ur men may justly welcome [female clerks] retention as offering to them – the men – the greater chances of responsible posts and less of that routine which to many active minds spells monotony" (Williams Deacon's Bank Limited, 1918).

A second argument put forth by advocates of female employment was that it facilitated the growth of the branch network, and thus the creation of new managerial positions. At the end of the War, the Banks were short-staffed and needed to retain women in order to continue to expand the networks. A 1918 Williams Deacon's internal memo stated, "we are still lamentably short of staff in spite of our utmost endeavours to find and take suitable juniors." Another memo from later in 1918 stated, "Even if we get all these new-

comers, as well as our demobilised men, we shall still need the help of many of our women clerks" (Williams Deacon's Bank Limited, 1918). Later scholars have noted the existence of an "age bulge" whereby promotion opportunities increased shortly after the War (Blackburn, 1967 and Lockwood, 1958). For example, Lockwood (1958) argued that: "Many opportunities of promotion at quite early ages were provided by … the post-war expansion in banking which persisted until the middle and late 1920s."

II. Williams Deacon's Bank

Williams Deacon's was the product of the 1890 merger between the London-based Williams, Deacon & Co. and the Manchester-based Manchester and Salford Bank (Allman, 1971). During the period of this study, the Bank maintained a moderate size (57 branches in 1891 and 206 in 1939) and largely Northwestern focus. After running into troubles because of the decline of the Lancashire textile industry, it was absorbed by the Royal Bank of Scotland in 1930, but continued to trade separately under its own name until 1969.

Similar to the rest of the industry, approximately 45 percent of Williams Deacon's male staff received Service Leave during the First World War. From August 1915, the Bank began to appoint women on a temporary basis. R. T. Hindley was appointed as the Bank's General Manager in 1917, and he immediately set out plans for branch expansion after the end of the War. The expansion of the network (from 120 branches in 1918 to 200 in 1927) required an increase in the size of the workforce, and with the Bank losing 46 men in the War and another 178 to resignation or retirement between 1915 and 1921, it became apparent that women would have to be appointed on a permanent basis, a policy which was formalized in July 1920 (Williams Deacon's, 1920).[9] The number of female staff dropped sharply after the War, due to large numbers of resignations in 1919-21 and a virtual cessation of female appointments until 1928. The Bank resumed regular

[9] Seltzer (2011) shows that the voluntary exit rate for men was much higher in 1919-21 than any other time between 1890 and 1940.

appointment of women in the 1930s, and increased the number of these appointments after 1938, due to the mobilization of younger male staff for the Second World War. The trends in the number of branches and staff at the Bank over the sample period are shown in Figure 1.

The primary source of data is Williams Deacon's personnel records, collected from the Royal Bank of Scotland Group Archive in London and Edinburgh (Williams Deacon's Bank Limited, 1890-1941). The records, which are organized by branch, list virtually every employee at the Bank between 1890 and 1936, and all Northern branches between 1890 and 1941, except for the Head Office.[10] For each employee, the records contain dates of birth, entry to the bank, entry to the branch, and exit from the branch; reason for exit (resigned, died, retired, dismissed, transferred to another branch, and "left"); and continuous information about nominal wages. I have recorded wages on an annual basis and deflated them using Feinstein's (1972) price series.[11] It is also possible to use the records to infer the number staff employed at each branch and the staff member who was the branch manager.[12]

The records have been used to construct an individual-level annual panel data set which contains 34,977 observations of 2,117 male staff. Of these observations, 12,171 are from 1890 to 1914 and 19,381 are from 1920-41. The War years, which contain the remaining 3,425 observations, were atypical in several ways and in the analysis I either control for

[10] The only missing observations are for staff who left between 1890 and 1895. The turnover among male staff averaged only 3.43 percent per year between 1896 and 1936, and was likely lower during the depression of the 1890s, and thus it is likely that only a very small number of observations are missing.

[11] Wages and branch of employment were recorded for every employee present for any part of a calendar year. Normally, this information was recorded as of October 1 for the year. If the employee was not present on October 1 (i.e. first year employees entering after October 1 or last year employees who departed before October 1), the information was recorded as of the last available date.

[12] It can be assumed that the first member of staff listed at each branch was the manager at the start of the record period. If he left during the record period, the new manager was identified in the following manner. In most cases, a fairly senior and highly paid member of staff transferred into the branch around the same time as the old manager left. In those cases, I have assumed that this new arrival became branch manager. If there wasn't any such new arrival, I assume that the new manager was appointed by internal promotion, and use the structure of salaries to identify the new manager. Williams Deacon's Bank Limited (1890-1940) lists all branch managers for the period 1890-1901, and the approach described above perfectly identifies every branch manager for this period.

these years using a dummy variable for 1915-1919 or omit these years altogether.[13] The records also contain 1,805 observations for 604 women between 1915 and 1919 and another 5,970 observations for 1,048 women from 1920-41.

In addition to the wage records, the Royal Bank of Scotland Archive contains records on the branches, which provide information about the age of the branch, the value of advances and deposits, and number of accounts and staff (Williams Deacon's Bank Limited, 1890-1940). The Archive also contains numerous memos, minutes, job descriptions, etc. that provide rich institutional information about the Bank and its policies with regard to staff (Williams Deacon's Bank Limited, 1918; Williams Deacon's Bank Limited, 1920; Williams Deacon's Bank Limited, 1921; Williams Deacon's Bank Limited, 1928; and Williams Deacon's Bank Limited, 1929).

III. A Model of Labor Supply Shocks

The empirical approach used in this paper is borrowed from the literature on migration (Card, 2001; Borjas, 1999). In the stylized migration model, migrants and the native born are substitutes in production. Cities in the destination country are treated as "islands" with separate labour markets. Migrants are more likely to go to cities that are geographically close to their home country. This implies, for example, that cities like Miami or Houston will have larger labor supply effects from immigration than cities like Seattle or Cleveland. Importantly, this geographic effect is exogenous and is not dependent on differences in local labor market conditions in potential destination cities. The effects of migration on the native born is estimated by comparing wage changes across cities of varying distance to the source countries following changes in the overall immigration rate. One caveat to this approach is that there may be a general equilibrium effect whereby natives migrate between cities in response to immigration, reducing the

[13] The dummy variable covers the period 1915-19 rather than the War years *per se* (1914-1918) because men did not begin enlisting until late in 1914 and because demobilization and the temporary employment of women continued through 1919. Thus 1914 salaries were not affected by the War, whereas 1919 salaries probably were affected by demilitarization.

extent of relative earnings differences. Thus there may be "global" effects of migration that are not picked up by changes in relative earnings (Borjas, 1999).[14]

This approach can be easily modified to the case of female labour supply at bank branches. In this case, the islands analogy is perhaps cleaner than in the immigration literature. Bank staff were assigned positions by their employers and individual men did not have the right to move between branches in response to the arrival of female staff. The idea of the model is that female employment created a shock to the labor supply. The extent of this shock differed across branches, depending on the extent to which they were feminizable.

Consider a bank with several branches, each of which use three inputs, "senior" labour (S), "junior" labour (J), and capital (K). The terms senior and junior are in quotation marks because they reflect a hierarchy of positions, rather than the more standard seniority in terms of length of service. Capital is supplied perfectly elastically and can be moved costlessly between branches, but labour has branch-specific skills (for example, knowledge of the customer base) and there is a cost to transferring workers between branches.

The production function for an individual branch is given by:

$$Q = \Phi(K, S, J) = \Phi[K, bM + \beta F, (1- b)M + (1 -\beta)F]$$

Where Q denotes output

K denotes capital

S denotes senior staff (managers, accountants, division heads, etc.)

J denotes junior staff (most clerks)

[14]The importance of this effect depends on the cost of moving for the native born. If moving is costless, then migration will result in displacement of the native born such that the labor supply will increase at the same rate across cities, regardless of proximity to the source country. On the other hand, if moving were infinitely costly, the differences in migration rates across cities would almost perfectly correspond to the relative labor supply shock (there may be small differences due to withdrawal from the labor force in response to the wage effects of immigration).

b denotes the proportion of male staff who are senior

M denotes the number male staff

β denotes the proportion of female staff who are senior

F denotes the number female staff

The production function has the standard properties, being twice differentiable with $\Phi_K>0$, $\Phi_S>0$, $\Phi_J>0$, $\Phi_{KK}<0$, $\Phi_{SS}<0$, and $\Phi_{JJ}<0$. For simplicity, I assume that only men were promoted to senior positions, and thus $\beta=0$ and the production function becomes:[15]

$$Q = \Phi(K, S, J) = \Phi[K, bM , (1- b)M + F]$$

The factors S, J, and K have prices determined by marginal productivity, denoted W_S, W_J, and r, respectively. The branches differ from each other in terms of the production function, Φ. Those with large back offices required large numbers of junior staff to handle the routine chores. The smaller branches had relatively few routine chores and required fewer junior staff.[16]

Individual employees have a two period career. Both male and female staff are assumed to be juniors in period 1. All female staff remain as juniors in period 2. Some proportion of male staff (b) are promoted to senior levels in period 2. This proportion depends on the total number of staff: b=b(M+F), where b'>0. This assumption is not intuitive and its empirical basis will be examined in the next section. The logic behind this assumption comes from the nature of the banks' expansion during the interwar period. Increases in total staff corresponded to the opening of new branches which disproportionately created managerial and other high-level positions.

[15]In reality, a few elite female clerks were promoted to senior clerical positions during the interwar period (Blackburn, 1967 and Seltzer, 2011). However, the promotion rate for women was much lower than for men and thus the simplifying assumption that all women were in junior positions is broadly historically accurate and greatly simplifies the model. Glass ceilings at the level of branch manager were universal throughout the inter-war period and remained prevalent well into the postwar period. There were no women branch managers in all of the United Kingdom until 1958 (Barclays, 2010). As late as 1986 women still accounted for less than 2 percent of branch managers (Woodward and Özbilgin, 1999).

[16] The basis for this assumption comes from difference in the rates of female employment at the different types of branches. In 1922, women comprised only 11.8 percent of staff at branches with 4 or fewer staff, but 32.9 percent at branches with 15 or more staff (Williams Deacon's Bank Limited, 1890-1941).

The model is not yet finished. Nevertheless, I expect that it will have three empirically testable implications, namely:

H1. The proportion of male staff promoted to positions of responsibility is an increasing function of the total number of staff.

H2. In the period after 1919, there should be a decline in the salaries of younger men in highly "feminizable" branches, relative to younger men in less "feminizable" branches.

H3. In the period after 1919, the decline in the salaries of younger men in highly feminizable branches should have been greater the decline in the salaries of older men at the same branches.

IV. Empirical Analysis

The model from the previous section offers several testable predictions about the effects of female employment on male salaries. This section examines these hypotheses.

A. Female Employment and Male Careers

The first hypothesis, that men should be more likely to advance to positions of responsibility after 1914, is a basic assumption (rather than conclusion) of the model. In addition to being a test of the modelling framework, it is a test of an important labour market outcome, as opportunities for promotion have long been viewed by bank clerks and subsequent scholars as one of the major attractions of banking employment for men (Rae, 1885; Blackburn, 1967; and Heller, 2011).

The William Deacon's data are not sufficiently detailed to distinguish between back-office clerical positions which specialized in routine tasks and higher-level positions of responsibility. However, there are reasonably good proxies for the two types of positions

in the data. I use the percentage of staff at the level of branch manager as a proxy for staff in positions of responsibility and the percentage in clerical positions at the larger branches (20+ staff), henceforth LB, as a proxy for staff in routine back office jobs.

Figure 2 shows the percentage of male and all staff in managerial and LB positions between 1890 and 1936, where the percentage is measured using three different denominators: the total number of male staff, the total number of staff, and the total number of staff at branches opened before 1915. Managerial positions, shown in the top panel, are expressed as a percentage of all staff with at least 10 years service (about the minimum needed to be considered for promotion); whereas LB positions, shown in the lower panel, are expressed as a percentage of staff of any tenure. The *male staff* series can be thought of as the actual percentage of men holding managerial and LB positions, given the Bank's opening of new branches and employment of women. The *all staff* and *pre-1915* series can be thought of as showing counterfactual percentages in managerial and LB positions under different assumptions about the Bank's expansion.[17] The *all staff* series essentially assumes that the Bank expanded in exactly the way that it actually did, with the exception of hiring only men after 1915. The *pre-1915* series assumes that the Bank did not open any new branches after 1914, but expanded existing branches the way that it actually did and continued to only employ men. By construction, the three series are the same before 1915, but they diverge after the Bank began employing women from 1915 and opening new branches from 1919. In the case of the managerial positions in the top panel, the *male staff* and *all staff* series are, by construction, the same until 1925, when it first became possible for women to have 10 years service.

It can be seen from Figure 2 that both branch expansion and female employment had important implications for male careers. It is evident from the *male staff* series that men were more likely to be in managerial positions and less likely to be in LB positions after 1915. Comparisons between the *male staff*, the *all staff*, and the *pre-1915* series show

[17] In the case of managerial positions, the *all staff* and *pre-1915* series can be thought of as showing lower bound effects of the employment of women because women had much higher exit rates than men. The denominator in these series includes only staff with at least 10 years of service, and had the Bank continued to employ only men from 1915, it is likely that from 1925 the number of staff with at least 10 years service would have been greater than is the case in the actual data.

that this was due to both the expansion of the branch network and the employment of women in back office positions. The gap between the *male staff* and *all staff* series shows the effects of occupational segregation on the career prospects of male staff. From 1915, the prevalence of women in the larger back offices meant that fewer men were assigned these positions. From 1925 (the first year that any women would have had sufficient seniority to be considered for promotion), the absence of women in managerial positions had a discernable positive effect on men's promotion opportunities. The larger gap between the *all staff* and *pre-1915* series shows that branch expansion had an even more important effect on men's opportunities. The *pre-1915* series shows that managerial opportunities in the existing branches were declining after 1915, as the number of managers in existing branches remained constant and the number of men of promotable age in these branches continued to grow. In addition, much of the employment growth in the existing branches after 1915 was in the large back offices, and, but for the opening of new branches, the proportion of staff in these positions would have increased relative to pre-war levels.

These effects are fairly large. For example, a comparison of the actual percentage of men in managerial and LB positions (the *male staff* series) and the counterfactual percentages (the *all staff* and *pre-1915* series) for 1928 shows the following. The actual percentages of men in managerial and LB positions were 30.8 and 36.2, respectively. The percentages of all staff in these positions were 24.5 and 40.8, respectively. The percentages of all staff in the older branches were 16.9 and 49.9, respectively. In other words, male staff would have been about 20 percent less likely to be in managerial positions and 11 percent more likely to be in LB positions if the Bank had expanded as it did but only employed men than was actually the case. In addition, male staff would have been nearly 50 percent less likely to be in managerial positions and 40 percent more likely to be in LB positions if the bank had expanded the existing branches in the way that it did, not opened any new branches, and continued employing only men than was actually the case.

Table 1 provides a more detailed analysis of the changes in promotions to branch manager over time. The proportion of men of "promotable" seniority (tenure between 10

and 30 years) receiving promotion increased sharply and the average age of first promotion to manager decreased slightly after 1919. The change in average age understates the increase in promotion opportunities because it reflects two opposing trends. First, promotion before age 30 was extremely rare before 1915 (1.5 percent of promotions), but fairly commonplace after 1919 (20.8 percent of promotions). Second, there was a slight increase in promotion rates among older men (from 14.9 percent of promotions between 1890 and 1914 to 23.5 percent between 1920 and 1936). Thus improvements in career prospects occurred at two different margins: the most talented men were promoted through the ranks faster after 1919 and some marginally talented men who would not have been promoted in the earlier period received late-career promotions in the later period.

B. Female Employment and Male Salaries

To examine the effect of female employment on the relative pay of of male staff, I analyze male salaries prior and subsequent to 1915. The underlying approach is to estimate difference-in-differences within the well-known framework of the Mincer wage regression (Mincer, 1958 and Mincer, 1974). I examine the determinants of real male salaries using regressions of the following form:

1. $\text{Ln(real wage}_{i,t}) = a + \beta X_{i,t} + b_1 POST1914_{i,t} + b_2 AVGFEM_{i,t} + b_3 POST1914*AVGFEM_{i,t} + b_4 POST1914*AVGFEM*TENURE_{i,t} + \varepsilon_{i,t}$

where i,t denotes individual i and time period t

X is a matrix of control variables

POST1914 is a dummy if the observation is from 1915-1941

AVGFEM is the percentage of female staff at the branch averaged between 1919 and 1936

POST1914*AVGFEM and POST1914*AVGFEM*TENURE are interactions

The control variables included in the regression are a fairly standard set of personal and workplace characteristics. These are: TENURE (and $TENURE^2$, $TENURE^3$, and $TENURE^4$); ENTRY AGE (and its square); LONDON, a dummy for whether the individual was employed at a London branch; HEAD OFFICE, a dummy for whether the individual was employed at the Bank's head office on Mosley St., Manchester; WWI, a dummy for the years 1915-1919; INFLATION, the national inflation rate; MANAGER, a dummy for whether the individual was the branch manager; STAFF, the number of staff at the branch; and the interaction of MANAGER and STAFF.

The effect of female employment on different types of male clerks is identified by the difference-in-difference, which is given by POST1914, AVGFEM, and the two interaction terms. The logic of the approach is as follows. The variable AVGFEM acts as a proxy for the nature of the work at the different branches. The underlying assumption is that the individual branches performed essentially the same sort of work, and thus had a fairly constant composition of positions throughout the period of this study. Because women were assigned exclusively to back office positions, a constant composition of positions over time would imply that the extent to which individual branches were feminizable was also essentially constant over time. The Appendix to this paper examines this assumption in detail. The time dummy, POST1914, identifies all time-specific effects, including those unrelated to female employment such as the unionization of the banking labor force, changes in the male labour supply due to the First World War, and broader changes in the British economy. Because the time dummy potentially captures the effect of several different factors, I do not interpret its coefficient, b_2, as an effect of feminization.

The difference-in-difference is given by the two interaction variables. The interaction of AVGFEM and POST1914 identifies an effect of female employment that is the same across all male staff at a given type of branch. The interaction of AVGFEM, POST1914, and TENURE identifies the extent to which the effects of female employment varied across men with different levels of tenure. As noted in the previous discussion, younger men often held the same positions as women and thus it is likely that female employment

reduced their earnings through the standard labor supply effect. Thus one would expect a negative value for the coefficient b_3. On the other hand, because women faced glass ceilings, they did not directly compete with senior men for positions of responsibility. Consequently, one would expect that the effect of feminization would be less for senior men than junior men, and thus a positive value for the coefficient b_4.[18]

Table 2 shows summary statistics for the regression variables over the periods 1890-1914, 1920-41, and 1890-1941. A few of these variables deserve further comment.[19] Real wages were slightly higher in the later period, but tenure, the main determinant of wages in the clerical sector was also higher, and thus whether real wages increased in the latter period *ceterus paribus* is unclear from the raw data. The effects of the expansion of the branch network and the resulting changes in male careers are evident from the decline in STAFF and the increase in MANAGER between 1890-1914 and 1920-41. Table 2 also shows the expected signs of the independent variables in a regression on log real salaries, all of which are drawn from the basic model of human capital. Pay in the clerical sector was strongly attached to tenure and one would expect salaries to increase at a decreasing rate with TENURE. London had a higher cost of living than the north, and thus one would expect a positive coefficient on LONDON. The Head Office had more staff in routine clerical positions than the branches, but also more staff in positions of responsibility such as division heads, and thus it is ambiguous as to whether it had higher or lower salaries than the branches. Finally, in line with tournament theory, one would expect a managerial premium that was increasing in branch size, and thus positive coefficients on MANAGER and MANAGER*STAFF.

[18] There are two types of long-tenured male clerks in the data: those with insufficient talent to be promoted and those in positions of responsibility (such as division heads). The model from the previous section implies that women would be close substitutes for the first type, but not the second. It is likely that the proportion of male clerks in positions of responsibility increased with tenure, and hence the positive expected coefficient for b_4. However, the mix of the two types is not observable in the data and hence it is ambiguous whether the net effect of b_3 and b_4 will be positive or negative at any given tenure.

[19] The absence of data on specific measures of education and previous employment is much less of a concern for the empirical analysis in this paper than would normally be the case for a Mincer-type wage regression because new entrants to the banking sector were remarkable homogeneous. Approximately 95 percent of sample staff were under 21 at the time they entered the Bank. All would have completed their secondary education and passed standardized banking exams. Moreover, to the extent that there were differences in the level and quality of education or prior experience, these would be captured in the regressions by the individual fixed effects.

The regression results are shown in Table 3. In order to provide sensitivity analysis the regressions were run in columns 1 and 2 with and without the 1915-19 observations. All of the regressions include individual fixed effects. The regressions are strongly significant, the signs on the control variables are generally as expected, and most of the coefficients are strongly statistically significant and robust to specification. The most important results concern the two interaction terms POST1914*AVGFEM and POST1914*AVGFEM*TENURE.[20] The coefficients on both of these variables have the expected signs and are strongly significant. To put these results into perspective, the coefficients from the first specification (full sample) imply that, relative to the earlier period, between 1915 and 1941 a newly hired clerk at a branch with no women earned approximately 4.8 percent more than an otherwise similar clerk at a branch which was 30 percent female (about the 66th percentile of the distribution). However, for clerks with 30 years tenure, this gap was 3.2 percent. These values are relatively large and show that women were substitutes for men and lowered the salaries of men at the female-intensive branches. Another important result concerns MANAGER and MANAGER*STAFF. The coefficients from the first specification imply that a manager of a branch with 2 staff earned about 21.8 percent more than an otherwise similar clerk, whereas a manager with a branch with 10 staff earned about 29 percent more than an otherwise similar clerk. For talented junior staff, the positive salary consequences of faster promotion would have greatly outweighed the negative consequences of direct competition from women early in the career.

As a check for the robustness of the results in columns 1 and 2, columns 3 and 4 shows the results of regressions which are split by time period (1890-1914 and 1915-1941). The

[20] One caveat of the difference-in-difference technique is that the estimated outcome in the post-intervention period may, in fact, be a continuation of pre-existing trends from the earlier period. In the context of the current analysis, there is a fundamental assumption that there was not a greater relative decline in wages at the more feminizable branches prior to the employment of women. To test this possibility, I have run a separate regression for the 1890-1914 observations of LNRW on the control variables, a time trend, AVGFEM, and PRETREND (the interaction of the time trend and AVGFEM). The coefficient on PRETREND is reported in Table 3, and is *positive* and statistically significant at the 1 percent level. Thus relative wages at the female-intensive branches were *increasing* prior to the actual employment of women, and thus the regression results reported in Table 3 may, in fact, *understate* the impact of female employment on male salaries.

control variables are the same as in the first two specifications, with the obvious exception of omitting POST1914 (and correspondingly changing the interaction variables). The results on AVGFEM and AVGFEM*TENURE are somewhat weaker than the first two regression specifications, but are nonetheless broadly consistent with the other results. The coefficient on AVGFEM is statistically insignificant in the earlier period, but significant at a 1 percent level in the later period. Both coefficients are slightly larger in absolute value in the post-1914 period than in the earlier period. These coefficients imply that juniors were paid relatively more in the more feminizable branches in the earlier period, whereas senior staff were paid relatively more in the more feminizable branches in the later period. However, the estimated effects are small. The coefficients imply that the difference in salary between a newly hired clerk in a branch which was 30 percent female and one that was 0 percent female was about 0.5 percent higher in 1890-1914 than in 1915-41, whereas for a clerk with 30 years of service this difference was about 0.5 percent lower in 1890-1914 than in 1915-41.

V. Conclusions

Contemporaries were divided on the impact of female employment in the clerical sector on male salaries and careers. Rank-and-file male clerks perceived women to be a considerable threat to their own positions and used their trade unions to lobby against female employment and later for equality of wages. Female staff and employers argued that women typically did very different jobs than men, and thus posed little direct competition to them, particularly for high-pay, high-prestige positions.

This paper examines the impact of the employment of women in back-office clerical positions in the British Banking industry after 1915. It utilizes an extremely rich micro-data set from Williams Deacon's Bank covering virtually all male employees at the Bank between 1890 and 1936, all female employees between 1915 and 1936, and most male and female employees between 1937 and 1941. These data are use to examine changes in the

career outcomes of men after 1915 and to estimate the effects of female employment at different branches on the salaries of men at different points in their career.

The results suggest that the effects of female employment were different for different types of male staff. Women typically held the same jobs as junior male staff, and the results show that after 1915, the salaries of junior men in the more female-intensive branches declined by about 5 percent relative to otherwise similar junior men at exclusively male branches. There was a smaller, but still significant decline for older men who had failed to progress beyond the level of clerk. However, female employment also created opportunities for male clerks. The employment of women was necessary for the expansion of the branch network, which created new managerial openings and resulted in an increase in the proportion of man in managerial positions. For talented men, the effects of enhanced promotion opportunities outweighed the costs of lower salaries during the early years of employment.

Appendix: Measuring Feminzability

The identification strategy of this paper rests heavily on the assumption that the femizability of the individual branches was essentially constant over time and is reasonably measured by the variable AVGFEM. This appendix examines these assumptions.

The basis for the assumption of essentially constant branch-level feminizablility is that most women were restricted to routine clerical tasks and the distribution of the different types of tasks was fairly constant at the branch-level over time. It thus follows that women would be more likely to be assigned to branches which had large back offices and a large volume of clerical work. This definition of feminizability does not rely on the employment of women at a given point in time, rather it is essentially a characteristic of the nature of work at individual branches. If the mix of tasks was constant over time at a particular branch, then so to was the inherent feminizability of the branch.

The data do not provide any direct evidence about the mix of work being done at the individual branches, so it is necessary to measure feminizability in a different way. The measure used in this paper is the proportion of branch staff who were women, averaged over 1919-36 (AVGFEM). I do not use the period 1915-18 in constructing the variable because women during this period were employed as replacements for men in the services, rather than as clerks for routine tasks. It is likely that the percentage of female staff at a given branch during these years was more a characteristic of the age distribution of the male staff (with younger men being more likely to volunteer or be called up) than the nature of the work at the branch. I also do not use the period 1937-41 in constructing the variable, as there is no data on the London branches or the Head Office for these years.

The use of AVGFEM to measure feminizability in the regressions can only be justified if 1) at the branch level it was fairly constant over time and 2) its variation across branches was driven by branch-level characteristics that were similar before and after 1915. To

address the first of these assumptions, table A1 shows a matrix of correlation coefficients for AVGFEM over the period 1919-36. The average of the 153 correlation coefficients is .664 and every correlation is positive and significant at the 1 percent level. The correlations decline somewhat as the time between years of observation increases; however, even comparing 1919 to 1936 shows a strong positive correlation. I have run a regression of AVGFEM on a series of dummy variables for branch. The adjusted R^2 for the regression is .526, confirming that branch alone explains much of the variation of AVGFEM. This evidence strongly suggests that AVGFEM is, at least in part, picking up branch-level characteristics that change relatively little over time.

To test the second assumption I have run regressions of AVGFEM on a vector of branch characteristics for the period 1915-36 to determine whether a few observable characteristics explain much of the cross-branch variation in AVGFEM. The independent variables are the available branch characteristics: total employment at the branch and its square, age of the branch, a dummy for London, and the number of accounts. Table A2 shows the regression results for a specification with just these variables, a specification with these variables and year dummies, and for a specification including year and branch dummies (and excluding the London dummy). The results show that much of variation in AVGFEM can be explained by the branch characteristics. In addition, the strong significance of the year dummies suggests that much of the variation in AVGFEM occurring over time within branches can be explained by changes in the Bank's overall policies concerning female employment, rather than year-to-year changes at the branch level. To test whether these branch characteristics were relatively constant over the entire period of this study, I have calculated the predicted values from the second regression specification for all years between 1891 and 1936. I then calculated the correlation coefficients of the predicted values from each year from 1891 to 1914 with each year from 1915 to 1936. The correlations ranged from 0.49 to 0.99 and averaged 0.94, strongly suggesting that feminizability as measured by AVGFEM is fairly constant over time within the individual branches.

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Table 1: Age and Tenure at the Time of First Promotion to Branch Manager

Year	Promotions (% of eligible)	Age at first promotion	Tenure at first promotion	Percent less than age 30	Percent greater than age 45
1890-1899	13 (6.4%)	36.83	17.50	0.00	0.00
1900-1904	13 (6.2%)	37.17	19.00	7.69	15.38
1905-1909	20 (6.8%)	40.74	22.19	0.00	20.00
1910-1914	21 (7.0%)	39.46	21.92	0.00	19.05
1915-1919	32 (10.0%)	38.78	21.64	3.13	25.00
1920-1924	55 (18.1%)	37.31	19.53	20.00	21.82
1925-1929	43 (14.0%)	34.15	16.82	32.56	11.63
1930-1936	51 (8.1%)	37.80	19.78	11.76	35.29

Note: Column 2 shows the number of staff promoted to branch manager and the percentage of staff in non-managerial positions with tenure between 10 and 30 years who were promoted to branch manager.

Sources: Williams Deacon's Bank Limited (1890-1941) and Seltzer (2010a).

Table 2: Summary Statistics and Predicted Signs of Variables

	Mean (1890-1941)	Mean (1890-1914)	Mean (1920-41)	Expected Sign
Ln(REAL WAGE)	4.81 (0.84)	4.76 (0.88)	4.93 (0.77)	
TENURE	15.18 (11.94)	13.86 (11.47)	15.83 (12.04)	+ (increasing at a decreasing rate)
ENTRY AGE	17.68 (2.86)	18.23 (3.44)	17.37 (2.31)	+ (increasing at a decreasing rate)
HEAD OFFICE	0.13 (0.34)	0.17 (0.38)	0.10 (0.30)	+
LONDON	0.17 (0.38)	0.22 (0.42)	0.13 (0.34)	+
INFLATION	2.05 (8.00)	0.80 (2.08)	0.36 (8.32)	?
MANAGER	0.14 (0.34)	0.11 (0.31)	0.16 (0.36)	+
STAFF	34.38 (39.78)	40.51 (38.68)	28.84 (38.29)	?
MANAGER*STAFF	1.05 (6.09)	1.05 (6.62)	1.06 (5.64)	+
POST1914	0.65 (0.48)	0.0 (0.0)	1.0 (0.0)	?
AVGFEM	0.24 (0.10)	0.27 (0.08)	0.22 (0.11)	?
POST1914*AVGFEM	0.15 (0.14)	0.0 (0.0)	0.22 (0.11)	-
POST1914*AVGFEM *TENURE	2.46 (3.50)	0.0 (0.0)	3.66 (3.69)	+
Sample Size	34976	12171	19380	

Source: Williams Deacon's Bank Limited (1890-1941).

Table 3: The Determinants of Log Real Salary

Sample	ALL	Ex WWI	ALL	ALL
Period	1890-1941	1890-1941	1890-1914	1915-1941
TENURE	0.22*	0.22*	0.24*	0.20*
	(177.8)	(177.5)	(127.8)	(157.46)
$TENURE^2*100$	-0.94*	-0.95*	-1.23*	-0.78*
	(81.6)	(82.5)	(70.3)	(65.84)
$TENURE^3*1000$	0.20*	0.21*	0.29*	0.17*
	(52.5)	(53.6)	(47.8)	(41.9)
$TENURE^4*10000$	-0.016*	-0.017*	-0.025*	-0.014*
	(39.4)	(40.5)	(36.6)	(31.3)
HEAD OFFICE	0.013	0.022	0.018	-0.10*
	(1.4)	(2.1)	(1.2)	(9.13)
LONDON	0.18*	0.23*	0.35*	0.09*
	(11.1)	(13.6)	(15.1)	(3.5)
INFLATION	-0.014*	-0.014*	-0.006*	-0.012*
	(81.1)	(76.6)	(7.6)	(3.51)
MANAGER	0.20*	0.20*	0.07*	0.13*
	(33.4)	(34.1)	(6.9)	(19.9)
STAFF	0.0007*	0.0007*	0.0005*	0.0014*
	(8.5)	(7.3)	(3.7)	(14.9)
MANAGER*STAFF	0.009*	0.009*	0.007*	0.004*
	(31.2)	(32.9)	(16.6)	(12.0)
POST1914	-0.18*	-0.18*		
	(16.6)	(15.1)		
AVGFEM	-0.06	-0.03	-0.067	-0.084*
	(1.7)	(0.9)	(1.3)	(3.6)
POST1914*AVGFEM	-0.16*	-0.24*		
	(3.9)	(5.5)		
POST1914*AVGFEM *TENURE	0.018*	0.024*		
	(18.9)	(22.6)		
AVGFEM *TENURE			0.009*	0.010*
			(3.64)	(7.66)
WWI	-0.25*			-0.29*
	(50.1)			(52.82)
Constant	3.38*	3.38*	3.36*	3.26*
	(308.5)	(300.5)	(205.28)	(394.26)
PRETREND	0.02*			
	(6.12)			
R^2	.899	.903	.855	.880
F	19,511.9*	19,673.7*	5460.49*	20946.95*
Sample Size	34,976	31,541	12,171	22,805

Source: Williams Deacon's Bank Limited (1890-1941).
Note: All regressions include individual fixed effects.

Table A1: Correlation matrix for AVGFEM

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
1919	1.00																	
1920	0.76	1.00																
1921	0.71	0.88	1.00															
1922	0.66	0.82	0.93	1.00														
1923	0.68	0.77	0.87	0.92	1.00													
1924	0.63	0.72	0.80	0.86	0.93	1.00												
1925	0.62	0.70	0.75	0.79	0.87	0.92	1.00											
1926	0.57	0.63	0.66	0.71	0.78	0.82	0.91	1.00										
1927	0.45	0.54	0.57	0.62	0.72	0.77	0.86	0.93	1.00									
1928	0.44	0.57	0.56	0.63	0.70	0.74	0.82	0.90	0.96	1.00								
1929	0.43	0.49	0.50	0.56	0.63	0.63	0.70	0.79	0.85	0.89	1.00							
1930	0.44	0.50	0.51	0.56	0.64	0.63	0.69	0.76	0.81	0.85	0.93	1.00						
1931	0.46	0.52	0.51	0.57	0.64	0.61	0.70	0.75	0.78	0.80	0.91	0.96	1.00					
1932	0.44	0.45	0.44	0.51	0.55	0.56	0.62	0.67	0.67	0.69	0.78	0.84	0.87	1.00				
1933	0.48	0.50	0.50	0.56	0.62	0.63	0.69	0.71	0.71	0.70	0.75	0.79	0.81	0.92	1.00			
1934	0.43	0.46	0.47	0.53	0.58	0.60	0.68	0.69	0.68	0.67	0.70	0.77	0.79	0.88	0.92	1.00		
1935	0.37	0.35	0.37	0.45	0.48	0.49	0.55	0.55	0.53	0.55	0.59	0.63	0.65	0.76	0.78	0.85	1.00	
1936	0.38	0.36	0.37	0.45	0.48	0.50	0.59	0.58	0.54	0.57	0.58	0.64	0.66	0.73	0.75	0.80	0.92	1.00

Source: Williams Deacon's Bank Limited (1890-1941).

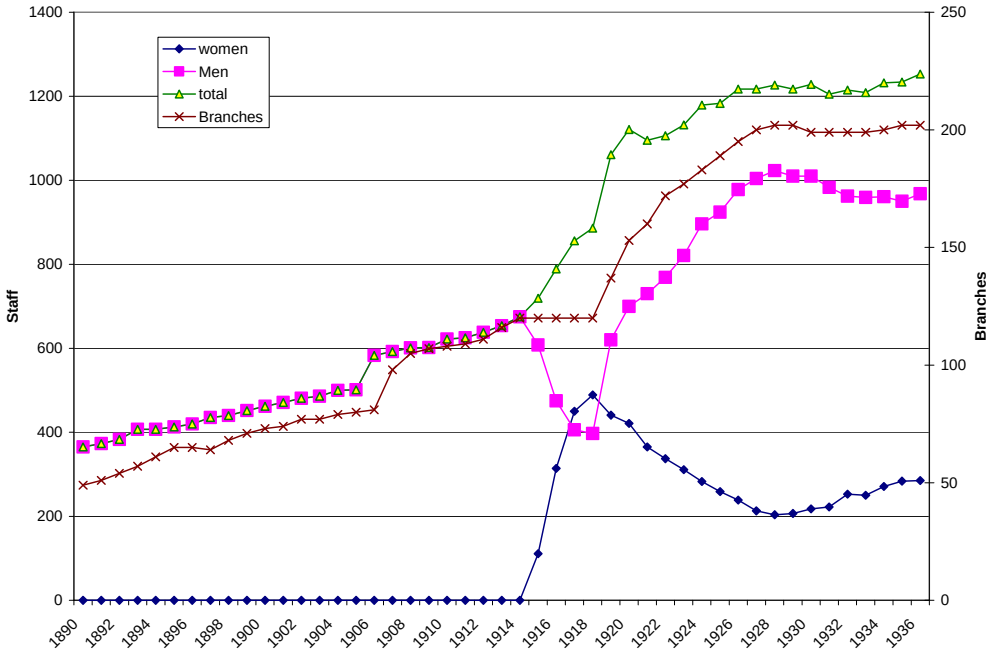
Table A2: The Determinants of AVGFEM

	1	2	3
STAFF	0.012* (9.54)	0.004* (3.45)	0.016* (9.33)
$STAFF^2$	-0.00006* (9.22)	-0.00002* (3.87)	-0.00006* (5.79)
BRANCH AGE	0.0018* (9.76)	0.0022* (13.28)	-0.0004 (0.48)
LONDON	0.104* (5.96)	0.107* (7.07)	
ACCOUNTS	-0.00004* (5.33)	-0.000005 (0.64)	-.000008 (0.63)
Constant	0.072* (14.52)	0.057* (4.61)	-0.030 (0.43)
Year dummies	NO	YES	YES
Branch dummies	NO	NO	YES
F	126.74*	64.86*	35.56*
Adjusted R^2	0.195	0.390	0.692
N	2598	2598	2598

Notes: t-statistics in parentheses
* indicates significance at a 1% level

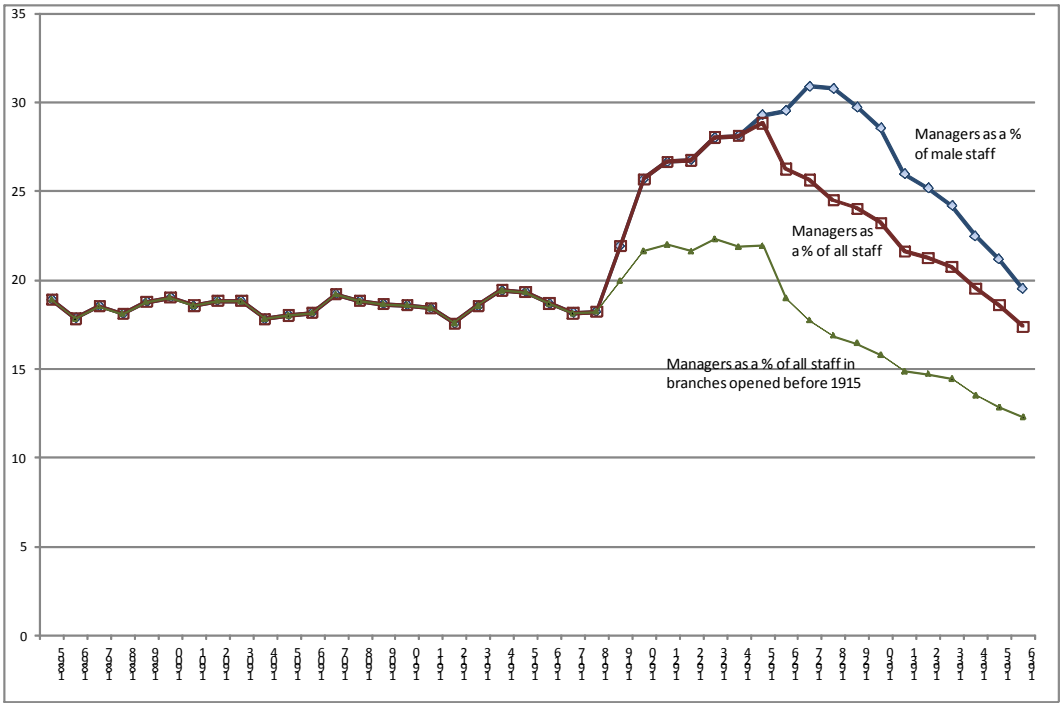
Source: Williams Deacon's Bank Limited (1890-1941).

Figure 1: Number of Branches and Staff at Williams Deacon's Bank, 1890-1936

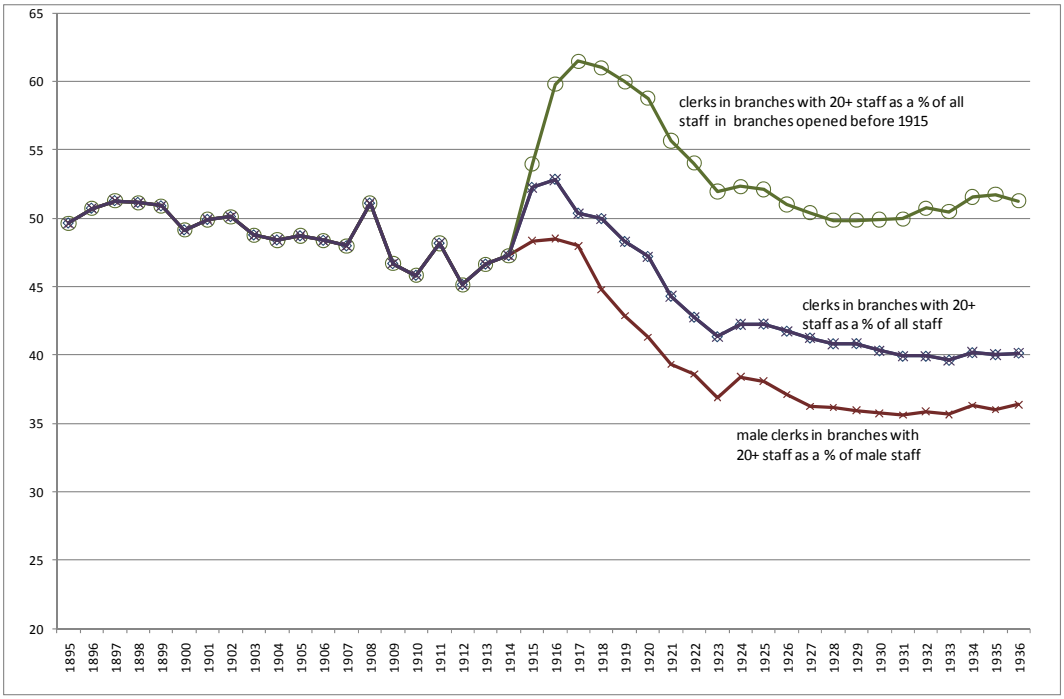


Sources: Williams Deacon's Bank Limited (1890-1941) and Williams Deacon's Bank Limited (1890-1940).

Figure 2: Staff in Managerial and Large Branch Clerical Positions



a. Managerial positions



b. Large branch clerical positions

Source: Williams Deacon's Bank Limited (1890-1941).