



Discussion Paper Series

2004 – 21

Department of Economics
Royal Holloway College
University of London
Egham TW20 0EX

©2004 Andrew Seltzer. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit including © notice, is given to the source.

White-Collar Labour Markets, 1890-1918: Evidence from the Banking Industry

Andrew J. Seltzer
Department of Economics
Royal Holloway College, University of London

I wish to express my gratitude to the staff of The Royal Bank of Scotland Archives in Islington (Derek Hammond, Lucy Wright, Jenny Mountain, Alison Turton, and particularly Philip Winterbottom) for their enormous help with the records that I have used in this paper. I also want to thank Judith Allen for help in collecting the data. Remaining errors are entirely mine.

During the late 19th and early 20th century there was considerable consolidation of the English banking industry. According to Capie and Wood, the total number of banks in the United Kingdom declined from 303 in 1890 to 75 in 1920.¹ At the start of the period, the majority of banks were privately owned, but by 1914 only a small handful of private banks remained.² This decrease in the number of banks was accompanied by an increase in the number of banking offices, which more than doubled from 3,478 in 1890 to 9,668 in 1920, implying a thirteen-fold increase in the number of branches per bank. Employment in banking and insurance grew by 3.15 percent per annum between 1891 and 1900 and by 4.36 percent between 1901 and 1910, far higher than in any other service industry.³ There has been little research on personnel practices for the industry over the period or the consequences of growth and consolidation to the industry's workforce. In a recent book Yousef Cassis has extensively analysed the careers of "bankers" (directors and salaried general managers) over the period.⁴ However, the dual processes of consolidation and growth meant that, even as employment in the industry was growing, there were fewer of Cassis' bankers, and increasingly the day-to-day business of banking was conducted by salaried staff.

This paper examines the career experiences of banking employees over 1890-1918, the period in which large joint-stock banks went from being a minority of banks to complete domination of the industry. A number of contemporary writers have given qualitative descriptions of certain features of personnel practices in the industry;

¹Capie and Woods, "Money in the Economy". There figures differ slightly from those provided in the Banking Almanac (for example, the Banking Almanac shows 227 private banks and 114 joint stock banks in England and Wales in 1890), however, the overall picture of the disappearance of the private banks and consolidation of the joint stock banks remains.

²According to Nishimura, The Decline the number of private banks in England and Wales dropped from 148 in 1890 to 29 in 1913. The share of banking offices run by private banks dropped from 21.1 percent to 2.2 percent over this same period.

³Lee, "Service Industries", p. 123.

⁴Cassis, City Bankers.

however, I am unaware of any quantitative analyses of these practices. The main feature of banking employment of the period were as follows.⁵ Initial employment in the industry was typically based more on connections than on merit. Bank employees were hired shortly after completing their secondary education, normally at the age of 16-18. Initially they were assigned routine clerical duties and were closely supervised by more senior employees. As they acquired experience and proved themselves over time, they would be given more complex tasks and independent responsibility. Employees who proved suitable for the job enjoyed considerable job security, often remaining with the same employer until retirement. There was very little mobility between banks; however, employees within a bank frequently moved between branches.

This paper uses data on employment at four joint stock banks: Williams Deacon's Bank (WDB) between 1890 and 1918, London & County Banking Company (LCB) in 1900, Manchester and Liverpool District Bank (ML) between 1909 and 1918, and Sheffield and Rotherham Bank (SR) between 1894 and 1907. The primary focus of this study is on William's Deacon's Bank, which was a medium-sized joint stock bank. It operated two distinct clusters of branches: one in London and one in the north, primarily Lancashire. In 1890 it operated 45 branches and sub-branches, ranking 15th of the 115 joint stock banks in England and Wales, and had assets totalling £14,384,798 in 1900.⁶

As was typical for the industry, Williams Deacon's Bank was the product of a series of mergers. The most important of these was the merger of the London-based

⁵See Gilbert, A Practical Treatise, Royal Bank of Scotland, et. al. "The Nineteenth Century", p. 37 and Kynaston, City of London, p. 247-48, and Sykes, The Country Banker.

⁶Banking Almanac and Directory.

Williams, Deacon & Co. with the Manchester-based Manchester and Salford Bank in 1890, which is the starting point of this study.⁷ In 1907 WDB absorbed the Sheffield and Rotherham Bank. Among the workers in the sample, 183 began their career at Manchester and Salford Bank, 61 began at Williams, Deacon & Co, 19 began at Heywood Brothers & Co or Hardcastle Cross & Co (two northern banks which were absorbed by Manchester and Salford in the 1870s), and 64 began at Sheffield and Rotherham Bank. However, even apart from amalgamations, WDB was a growing organization during the period of this study, opening 64 new branches and sub-branches and hiring 917 employees between 1891 and 1918. Figure 1 shows 4 different measure of the WDB's size and growth over the period: branches, staff, total credit, and number of accounts. The picture painted by each of these series is very similar: growth occurred consistently throughout the period of this study (with an acceleration in 1907 following the absorption of Sheffield and Rotherham Bank). Over the period, the bank approximately doubled in size.

The primary data source for this study is Williams Deacon's Bank's salary records between 1890 and 1918, which have been collected from The Royal Bank of Scotland Archives in Islington.⁸ The records cover every employee in the bank over this period of time, with the exception of those who left before 1895.⁹ The records contain the date of birth, date of entry to the bank, date of entry to the branch, annual salary, and

⁷After the merger in 1890 the official name of the bank was Williams Deacon and Manchester and Salford Bank. This was shortened to Williams Deacon's Bank in 1901. For the sake of simplicity I use the name Williams Deacon's Bank over the entire period 1890-1918.

⁸GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WD/481, GB 1502/WD/46/1.

⁹The records contain both male and female employees. I have excluded women from the analysis in this paper because they performed very different duties than men, and are thus not comparable to the employees in the sample. Prior to the First World War, women were employed as typists and phone operators, but not clerks. During the War women temporarily assumed the role of clerks, but did not keep these positions afterwards.

date of and reason for exit (resigned, dismissed, died, retired, and “left”).¹⁰ A sample record covering employees from two of the Bank’s London branches between 1911 and 1920 is shown in Figure 2 I have recorded branch and wage information for every employee as of October 1 each year.¹¹ The sample contains 14,943 man-years of data. Although the records do not contain information on position, it is possible to infer the manager of each branch. I have done this by assuming that the first employee reported for each branch was the manager at the beginning of the period covered by the record book. If he left and another individual with similar seniority joined shortly afterwards, I assume that this new individual was the new manager, regardless of their order in the records.¹² For the period prior to 1900 I have checked the list of managers inferred in this manner against a WDB document listing branches and their managers and found a 100 percent correspondence.¹³ In addition to the personnel data, The Royal Bank of Scotland Archive contains data on the performance of the WDB’s branches over time (number of staff, value of credits, value of debits, and number of accounts), which I have linked to the personnel data.¹⁴ I have used Bartholomew’s Survey Gazetteer of British Places to determine the county in which each branch was located, in order to examine regional differences in wages. I have used Feinstein’s

¹⁰In some cases the records do not contain exact dates (for example month and day of birth are frequently missing). In this case, I have assigned the date to be the mid-point of the possible range of dates, e.g. if month and day are missing, I assume the birth date to be July 1, if only day is missing I assume it to be the 15th. This approach minimizes the variance of the measurement error, assuming that entry occurred uniformly throughout the year.

¹¹The choice of date is fairly arbitrary. I chose not to use the end-of-year figures because at this time a fairly high proportion of employees were on short-term assignments away from their normal branch. There are two exceptions where information was not recorded on October 1, new entrants who began after October 1 and final year employees who left before October 1. In both of these cases the information was recorded for the latest available date.

¹²An alternative procedure would be to assume that the highest paid employee at each branch was the manager. Although this is likely to be correct in virtually all instances, any errors are highly problematical for my analysis. Since one of the objectives of this paper is to determine the relationship between position and salary, any approach that defines positions using salary has effectively assumed the nature of the relationship.

¹³GB 1502/WD/377/1.

¹⁴There are a number of sub-branches in the data set, which do not have a manager. All deposits, accounts, and staff at a sub-branch have been linked to the manager of the parent branch.

data on inflation and unemployment to compute real wages and to examine the effects of the business cycle on wages and promotions.¹⁵

In order to determine whether the practices of Williams Deacon's Bank were commonplace throughout the industry, I have also collected a smaller sample of similar records from three additional banks.¹⁶ London & County Banking Company (LCB), which operated only in the Southeast of England, was one of the largest banks in England. It employed 1,726 workers at its 160 branches in 1900 and had total assets of £32,370,000 in 1899. Manchester and Liverpool District Bank (MLD) had 54 branches and sub-branches in 1880 and assets of 19,621,000 in 1899. I have analyzed the records of 249 employees at Lancashire branches over the period 1909-1918. Sheffield and Rotherham Bank (SRB) had 49 employees at its 4 branches in 1900 and assets of 2,626,000 in 1899. The information contained in the records of these three banks is fairly comparable to that of WDB. The MLD data contains additional information on position title, but does not have information on date of birth. The LCB records also do not contain date of birth, and, since these are records from only one point in time, they do not contain information on exits or internal transfers. The number of man-years of observations available for the different banks is as follows: LCB – 1,726, MLD – 1,734, and SRB – 696.

The outline for the remainder of this paper is as follows. The next section examines wages in the banking industry. I consider the average level of wages over the period, the relationship between tenure and pay, and the extent of nominal wage flexibility. The third section considers the process of promotion to manager and the rewards upon

¹⁵Feinstein, C.H., National Income.

¹⁶GB 1502/WES/125/8, GB 1502/DIS/120, GB 1502/SR/22/2.

promotion. The fourth section concludes. The main conclusions of the analysis are as follows. First, real wages declined by 20-30 percent between 1890 and 1913. This decline accelerated during World War I. Second, tenure was the primary determinate of individual wages. Real wages increased through a worker's career, suggesting that the relationship between tenure and wages was designed to reduce worker turnover and increase the supply of effort, and thus was not solely driven by current-period productivity. Third, nominal wages were extremely sticky downwards; zero increments were common, particularly for older employees and it was very rare for an individual to take a pay cut. Fourth, there existed a salary premium for managers, independent of the individual holding the position. I argue that this policy provided a positive incentive to encourage effort by creating a well-understood set of rewards to individuals who proved themselves worthy of promotion.

II. Wages in the Banking Industry

As was typical for the industry, WDB employees started young and remained at the bank for a long period of time. Among Williams Deacon's Bank employees in the sample, 91.7 percent were less than 20 years of age at the time they entered the bank. Among those who left before 1918, average career lasted 12.8 years (13.5 years when First World War fatalities are excluded) and 23 percent remained 20 years or more. This sort of job attachment was atypical prior to the 1920s, and may have had important consequences for the structure of pay. Specifically banks may have wished to deviate from spot labour market practices where pay equals marginal revenue product in order to provide incentives for workers to remain on the job and supply effort.

A. Average Wages over Time

Economic historians have generally portrayed the period from 1890 through 1913 as being relatively favourable to workers. Boyer and Hatton (2002) estimate that the unemployment rate averaged 6.2 percent between 1892 and 1913, a level similar to their estimate of 5.4 percent for 1870-91 and considerably less than the 10.4 percent they estimate for 1920-39.¹⁷ Although real wages declined with the high inflation brought about by the First World War, the period prior to the War witnessed sizable wage increases for most workers. Feinstein (1990) and Officer (2004) have constructed wage series covering a range of predominantly blue collar industries over the period. These series show that nominal wages increased continually between 1890 and 1913, with about a 30 percent gain over the period. Using Feinstein's 1972 price series to deflate these wage series, I have constructed indexes of real wages, which can be compared to real wages at Williams Deacon's Bank over the period. Figure 3, panel I shows Feinstein's wage series between 1890 and 1913 and Officer's series between 1890 and 1918. Figure 3 also shows the average annual wage at the UBA and the annual average of the residuals from a pooled regression of the natural log of WDB wages on tenure, tenure squared, tenure cubed, and tenure to the fourth over 1890-1918.¹⁸

It can be seen from Figure 3 that banking wages behaved very differently from blue collar wages prior to the War. Between 1890 and 1914, a period of general wage

¹⁷Boyer and Hatton, "British Unemployment", p. 669.

¹⁸In addition to the regression residual I have examined average wages at WDB. Because average tenure at WDB was increasing over the period, the regression residual declines at a faster rate than the average wage series. However, broadly speaking the decline in banking wages remains whether one considers average wages or the tenure-adjusted residual.

increases, average real wages at Williams Deacon's decreased by about 20 percent and tenure adjusted real wages decreased by about 30 percent.¹⁹ It also can be seen from figure 3 there was a dramatic decline of real wages during the First World War due to the unprecedented high inflation rates of these years.²⁰ A likely explanation for the pre-War decline in banking wages is that there was an increase in the supply of potential bank employees that put downwards pressure on wages. Banking employees generally needed to complete two year of secondary education and to pass an examination set by either the individual bank or the Banker's Institute prior to commencing employment. Lindert (2004) estimates that secondary school enrolment increased by more than a factor of 7 between 1890 and 1910.²¹ Although much of the wartime decrease at Williams Deacon's was reversed by across-the-board salary increases in 1919, the decline in wages outlined in figure 3 undoubtedly led to discontent among banking employees, who formed a national union, the Bank Officer' Guild, for the first time in 1918.²²

B. The Structure of Individual Wages

Although figure 3 shows on the time path of average wages within WDB, it does not provide any insights as to individuals' wages over their careers. Figure 4 shows the average entry average wages of each entry cohort to WDB over the sample period

¹⁹In addition to a general wage series, Feinstein also constructs disaggregated series by sector (agriculture, mining, building, manufacturing, transport, distribution, domestic service, government, and general labor). In each of these sectors real wages were higher in 1913 than they had been in 1890.

²⁰A large number of younger employees volunteered or were drafted. These employees typically remained paid WDB employees while on military leave, but received no increments. However, the fact that a large number of young employees received a zero increment was not the driving force behind the real wage declines during the War years. Even with these employees included in the sample, the average nominal wage increment was higher during the War years than during the period 1890-1913.

²¹Lindert, Growing Public.

²²Unionization of the industry at this time period was not limited to Great Britain. Between 1918 and 1920, similar unionization occurred in Australia, Canada, New Zealand, and South Africa. Hill, From Subsistence, p. 20.

(panel I) and the growth of salaries over time (panel II).²³ There are large cohort effects, and it can be seen that entry wages declined after 1905. From the second panel it can be seen that tenure had a large effect on wages over at least the first 20 years of workers' careers and that real wages paid to individuals, as well as overall average wages, experienced a substantial decline during the First World War. Labour economists have produced a number of models to explain tenure-related wage increases within organizations. Broadly speaking, these can be categorised as either productivity-based (market) or incentive-based. Productivity-based models assume that employees are always paid their marginal revenue product. Individual productivity is determined by inherent ability and by human capital (education and training). Incentive models consider ways in which firms might separate individuals' pay from productivity in the short run to provide incentives that would result in reduced turnover or higher worker effort.

This paper considers two types of incentive models: deferred compensation and promotion "tournaments". Deferred compensation refers to tenure-based pay whereby younger workers are underpaid (earn less than their marginal revenue product) and older workers are overpaid.²⁴ Deferred compensation provides incentives to remain with the employer and supply sufficient effort to avoid dismissal because an employee who leaves the organization will lose future wage overpayments and thus face reduced lifetime income.²⁵ Although deferred compensation provides incentives to

²³Figure 4 includes only individuals who were less than age 19 at the time of entry. Panel II excludes 1 "high flyer" who's inclusion would nearly double the average wage of 1891 entrants.

²⁴See Lazear, "Why?" for a formal model of deferred compensation.

²⁵I use the term "supplying effort" as a catch-all phrase for properly performing one's job. In the case of banking this might mean arriving to work on time, not making high risk loans to friends, being courteous to the customers, using appropriate diligence in preparing the ledgers, or simply not stealing. Many of these forms of effort were difficult or costly to monitor continuously, and deferred compensation acts as a substitute for monitoring because it aligns the incentives of the workers with the interests of the bank.

employees to ensure that their performance meets minimum standards, it does not provide incentives to supply effort at higher than some minimum level. Promotions provide a carrot for employees to supply effort at higher levels. The tournament model implies that wages are attached to positions, and as openings occur within an organization, workers at lower level compete for promotion and thus a higher salary.²⁶ *A priori* there are good reasons to believe that incentive contracts may have been important in the banking industry. As noted previously, long-term relationships between banks and employees were commonplace, thus short-run differences between wages and productivity would have been possible. Hiring and training costs in the industry were high, and thus banks would have benefited considerably from reducing turnover.²⁷ Because branch employees had superior information to the Directors, banks also faced severe problems with moral hazard. Contemporary writers note concerns about theft, collusion between employees and customers, and granting of loans based on factors unrelated to sound business practice. To a certain extent, these problems could be reduced by the extensive monitoring systems operated by banks; however, personnel practices designed to align the interests of workers with those of the bank may have complemented monitoring.²⁸ This was noted by George Rae,

²⁶See Lazear and Rosen, "Rank-order Tournaments" on the tournament model.

²⁷At the time of their initial hiring, potential employees were screened for their suitability in the industry. This consisted of an interview (normally with the prospective employee, their father, and a high-level officer of the bank), a general exam covering various aspects of the prospective employee's education, and a medical exam. Upon hiring a new clerk had to provide a fidelity bond of "not less than £1000" as security (Royal Bank of Scotland, et. al. "The Nineteenth Century", p. 37). This was later replaced by a bond that was linked to the employee's pension contributions and was initially posted through guarantee funds operated by the banks. Training costs were very high, as virtually all training occurred on-the job. During an employee's first few years they would be instructed and closely supervised by a senior employee. Initially they would only perform very routine duties, such as checking the accuracy of the ledgers. Only gradually would they be given more complex tasks and independent responsibilities.

²⁸Banks had among the most extensive monitoring systems of any late 19th or early 20th century organizations (see, for example, Gilbart, A Practical Treatise). Bookkeeping was typically performed twice, independently by two employees. Ledgers were often checked by more than one employee, often on a daily basis. Staff were appraised annually by their superiors. Banks had extensive inspection staff who could turn up unannounced to check the books or operations of any of the branches. Bank rules strictly separated the handling of cash and the preparing of records. Kynaston, City of London notes

General Manager of The British Bank of the Middle East, writing in 1885, “A bank ought not to appraise the value of an officer’s services merely by what they would fetch in the clerk market. ...[B]ut when it is considered how much the Directors of a bank have to trust to the honesty, integrity, and honour of its staff, they will not lightly part with those who have proved themselves, by long service, the possessors of those essential qualifications, even if they have little else to recommend them to consideration.”²⁹

It is often difficult to empirically distinguish between these two explanations for a positive relationship between salary and tenure because of difficulties observing productivity. The WDB data do not contain any information that could serve as proxy measures of individual productivity, such as performance ratings. Consequently, it is necessary to make assumptions about likely changes in productivity over workers’ careers. Human capital theory implies that the primary source of productivity gains is either on-the-job training or learning-by-doing.³⁰ Human capital investments are fixed costs to the employer, and will be made at the beginning of a worker’s career in order to maximize the period for which they gain returns. The available evidence generally supports this view; contemporary writers noted the importance of early-career on-the-job training.³¹ This implies that in the absence of incentive contracts, productivity will be increasing with tenure at a decreasing rate, and perhaps declining as individuals

that it was common for banks to enforce prohibitions against employee behaviour outside work that may have led to debt and thus a temptation to steal (for example gambling, speculating, or even getting married on insufficient salary).

²⁹Sykes, Country Banker, p. 168.

³⁰Becker, Human Capital.

³¹Gilbart, A Practical Treatise.

approach retirement age. Thus in productivity-based models, the bulk of a worker's wage growth would occur early in their career.³²

Technological improvements that increase worker productivity might complicate the hypothesised tenure-earnings profile described above. In the presence of technological improvements, average productivity (and thus wages in the productivity model) will increase over time. If tenure also increased over time, there will be a correlation between tenure and productivity (which is omitted from the regression), thus an OLS regression will overestimate the tenure effect. The correlation between tenure and year over the sample period is .113. During the period of this study there were improvements in lighting and transport and the widespread diffusion of the typewriter. Although technologies only increased the pace of certain tasks and did not bring about fundamental changes to banking work, the available evidence indicates that they may have had a sizeable effect on productivity. Clive Lee estimates that employee productivity in banking and insurance increased by 2.15 percent per annum between 1891 and 1900 and 1.15 percent per annum between 1901 and 1910.³³ This is confirmed by evidence from Williams Deacon's branch results, which show that accounts per worker increased about 20 percent between from 1891 and 1914, and a further 27 percent during the War years.³⁴ In the regressions that follow, I include both a time trend and a First World War dummy variable as a way to control for the effects of productivity shocks.

³²Using modern data from the United States, Murphy and Welch (1990) find that virtually all real wage growth occurs within about 8-10 years of hiring.

³³Lee, "Service Industries", p. 140. Much of this productivity increase was likely due to the expanding market share of large joint stock banks, rather than within-bank increases.

³⁴Data on total accounts are from GB 1502/WD/377/1.

Although figure 4 strongly suggests the importance of tenure for wages, it does not examine workers who were approaching retirement age or control for other determinates of wages. As a more rigorous way of examining wages, I have performed a set of Mincer-type regressions using the WDB data. As is generally done in the analysis of wages, I use the natural log of real wage (in 1890 prices) as the dependent variable. The relationship between wages and tenure is the primary interest of the study. The total effect of tenure is captured by using tenure, its square, cubic and quartic as independent variables in the regression. This specification makes it possible to distinguish between whether the bulk of salary growth occurred during the earlier part of workers' careers, as would be predicted by productivity-based models or late in their careers, as would be predicted by the deferred compensation model. The other independent variables in the regression are POTENTIAL EXP (defined as age at entry - 15) and its square; BREMP (number of employees at the branch); MANAGER (1 if branch manager); BRMAN (the interaction of MANAGER and BREMP); HEADOFF (1 if employed at the bank's head office); INFL (the national inflation rate); UENMP (the national unemployment rate); and LONDON (1 if the branch was located in London) as an independent variable in the WDB regressions.

Table 1 shows the regression results. In order to provide sensitivity analysis, Table 1 shows the estimates for 6 alternative specifications of the model. The first two specifications are parsimonious, using only individual information, and thus exclude the position, branch, and national variables. The next two specifications show the estimates for the full model. The final two specifications exclude observations where the individual left the bank prior 1919 and prior to their 20th year of tenure. In order to test whether the estimated coefficients reflect unmeasured individual ability, I have

estimated the model using individual fixed effects (specifications 2, 4, 6) as well as using ordinary least squares with each man-year of data treated as an independent observation. The career length restrictions in specifications 5 and 6 make it possible to determine whether the estimated effect of tenure is a result of selective exits, i.e. whether employees who received lower wages due to lower ability or being unsuited to a career in banking were more likely to have left early in their career. Selective exits would result in an overestimate of the returns to tenure because the average quality of employees would be increasing with increases in tenure.

The results strongly confirm the existence of deferred compensation. Each of the tenure variables is strongly statistically significant and the estimated tenure-earnings profiles show that salary increased throughout a worker's career. For example, the coefficients from specification 3 imply that an employee joining at age 18 and retiring at age 60 would have received 39.0 per cent of his lifetime real salary increase after completing 20 years of tenure.³⁵ The coefficients on the tenure variables from the fixed-effects and restricted sample specifications are very similar to those in the simple OLS, implying that the measured influence of tenure was not caused by omitted individual ability or by selective exits.

The bank's pension policy, introduced in 1895, provides further evidence that the results from Table 1 reflect deferred compensation.³⁶ The plan allowed employees to retire on two-thirds of their final salary after 40 years service. The bank maintained a policy of mandatory retirement at age 60, although the directors could allow

³⁵This is based on the predicted values from the regression coefficients assuming that the individual was age 19 when they entered the bank, that they were in a northern branch with 4 staff their entire career without reaching the level of manager, that the national unemployment rate was 4 percent, and the inflation rate was 0 percent.

³⁶See Williams Deacon's Bank Limited, Williams Deacon's, pp. 152-3 on the pension plan.

employees stay on past 60 or retire earlier, if in ill health. Approximately 23.1 percent of retirements after 1895 were at the age 60. The existence of a mandatory retirement at age 60 provides strong evidence that the relationship between tenure and wages was the result of incentives not productivity. If wages were in line with productivity, a policy of mandatory retirement is counterproductive as the bank has nothing to gain by shedding workers who are paid at their marginal product. However, with deferred compensation contracts older workers are paid more than their marginal productivity and thus have an incentive to remain at the firm longer than is optimal.³⁷

Several of the other regression results shed light on personnel practices in the industry. The inflation rate is significantly negative in each specification, suggesting that the banks responded with a lag in adjusting wages to the inflation rate. As would be expected due to differences in the cost of living, wages in London were greater than in the north.³⁸ The relationship between branch size and wages is more complex. On the one hand, the greater prevalence of teamwork at large branches may have made monitoring more difficult and thus higher pay may have provided employees incentives not to shirk. In addition, higher wages may have been paid at larger branches as a compensating differential. Larger branches performed a wider range of tasks which require more teamwork by employees, with the likely result that employees had less independence in scheduling their tasks. On the other hand, the banks would have to ensure that employees at smaller branches were sufficiently capable to handle difficulties on their own as they would have few colleagues to turn to for assistance. The coefficient on branch size is significantly positive, although its

³⁷Lazear, "Why?"

³⁸I have also run the regressions with a greater breakdown of northern regions. All else equal, branches in greater Manchester paid significantly more than branches in Cheshire, Lancashire, or Derby. There was no statistically significant effect for branches in Yorkshire or Merseyside.

effect is relatively small. From specification 3, an employee at a branch with 20 staff would be expected to earn about 1 percent more than an otherwise equivalent employee at a branch with 2 staff. As will be explored at greater length in the next section, the regressions also show a strong relationship between position and wages. In each specification managers earned more than non-managers, and managers' compensation increased with the size of the branch.

In order to check whether William Deacon's wage policies were typical for the industry, I have run a set of regressions similar to those reported in Table 1, specification 3 for the other banks. I also include OTHER (1 if position is noted as being something other than clerk or manager) and BROTHER (the interaction of BREMP and OTHER) for the Manchester and Liverpool regressions. The records for London and County Banking Company and Manchester and Liverpool Bank do not provide date of birth and thus POTENTIAL EXP was excluded from these regressions. Finally, because the LCB data are from a single year, there is no variation in INF and UNEMP, and thus these variables have been excluded from the analysis. Table 2 shows the regression results. The main results are similar for each of the banks: wages were closely tied to tenure, there existed a sizeable manager's premium that increased with branch size, and wages adjusted slowly to inflation. Figure 6 shows tenure-earnings profiles for the four banks constructed from the regression results in Table 1 and Table 2. The profiles are remarkably similar, suggesting a fairly competitive labour market despite the lack of worker mobility between banks.

C. Nominal Wage Rigidity

Another form of implicit contract between firms and workers that has received considerable attention in the literature and can be examined using the WBD data is wage stickiness, that is a failure of nominal wages to decline during times of deflation or unemployment or in response to declines in individual productivity. At the micro-economic level, wage stickiness may reflect fundamental worker preferences and be viewed as a form of insurance or incentive contract that firms provide to their workers. At the macroeconomic level, downwards wage stickiness has been cited as a prime reason for Keynesian business cycles. A number of studies by labour economists have concluded that there is considerable nominal wage stickiness in modern labour markets.³⁹ There is less evidence on wage flexibility prior to the First World War, and studies of this period have been hampered by the absence of individual-level wage data.⁴⁰ Studies using firm-level data have concluded that there was considerably more downwards flexibility in pre-World War I labour markets than is currently the case. Using data from the Ohio Bureau of Labor Statistics, Sundstrom finds considerable evidence of downwards wage stickiness, but still more nominal wage cuts than occur in modern labour markets.⁴¹ Using data from the Aldrich Report, Hanes and James, find strong evidence of wage flexibility, arguing that nominal wage decreases occurred with approximately the same frequency as increases.

Because the WDB data covers the same individuals over a period of time, it is possible to test for nominal wage stickiness by examining nominal increments. Figure

³⁹Akerlof, et. al. "Macroeconomics of Low Inflation".

⁴⁰Data limitations necessitate that previous studies of pre-First World War labour markets used firm-level job-title as the unit of observation, rather than individual worker-year. This creates the potential for overestimating wage flexibility. Specifically, if there was a high level of turnover for an occupation at a firm and new employees earned less than the current average then firm-level job-title would show a nominal wage decline, even if no existing employee took a pay cut.

⁴¹Sundstrom (1990).

6 shows the distribution of nominal increments over the period 1891-1918. It is clear from simple inspection of figure 6 that there was substantial wage stickiness. Only 0.15 percent of increments over the period were negative. In contrast, 33.5 percent were exactly zero. The frequency of zero increments occurs despite the fact that a large number of observations consist of younger workers whose specific-human capital was increasing due to on-the-job training. If the sample is restricted to employees with at least 10, 20, or 30 years tenure, the percentage of negative increments increases to 45.4, 57.8, and 69.6 percent respectively. However, the percentage of wage cuts remains relatively unchanged, ranging from .24 percent to .33 percent.

III. Promotion to Manager

Williams Deacon's Bank was organized along a classic U-form structure. At a medium-sized branch there were several clerks, a couple of tellers, an accountant, and a manager. At the inter-branch level there was an inspection staff, a head office led by the general manager, and the board of directors. Unfortunately the WDB wage books do not contain any information on position.⁴² However, as noted in the introduction, it is possible to infer the manager of each branch. The focus on promotion to manager would be natural even if other position information was available for two reasons. First, as there was only one general manager and a handful of inspectors, the level of branch manager was the highest to which most employees could reasonably aspire. Second, promoting the appropriate individuals to manager was crucial for the bank

⁴²The RBS Archive holds a number of pension records that contains this information. However, the pension records are only available for a sub-set of long-serving employees, and thus do not provide a random sample of workers. It is likely that these employees were long-serving because they were well matched to the industry and firm, and thus not a random sample of entrants. Because the sample would not be random, it is of doubtful suitability for a study of broader personnel practices.

because managers were expected to generate business and had considerable discretion over loan decisions. Although the banks' rules limited the discretion branch managers had when issuing loans, poor managerial decisions could be ruinous to the bank. The Directors' Minute book provides an example of the extent of the bank's concern about the exercise of managerial discretion. The Directors debated removing the manager of the St. Mary Axe branch in 1918 for not following the normal loan procedure, even though it was agreed that wartime pressures made proper consultation difficult, that the manager had an outstanding record, and that the loans in question were performing well.⁴³

Managers of large branches had greater responsibilities than managers of a smaller branches, and thus I use branch size to further identify level. As was typical of branch banks, most Williams Deacon's branches were relatively small; in 1914 42 branches employed fewer than 6 staff (henceforth referred to as small), 25 employed 6-19 staff (henceforth, medium), and 6 employed 20 or more (henceforth, large). Among the sample employees, 138 (11.1 percent) spent at least one year as a branch manager during the sample period, 67 (5.4 percent) spent at least one year managing a branch with more than 5 staff, and 18 (1.4 percent) spent at least one year managing a branch with 20 or more staff.⁴⁴ Approximately 10.5 percent of man-years in the sample were at the level of manager.

Promotion to manager was a slow process. In order to be considered for promotion individuals had to demonstrate competence in banking over a period of time. Even

⁴³GB 1502/WD/373/3.

⁴⁴In some cases the first observation of these managers in the sample was after their promotion to manager, either because they were promoted before 1890 or were a former employee of Sheffield and Rotherham Bank and were promoted to manager before 1907. Because this analysis focuses on promotions, these individuals are excluded from subsequent analysis.

then a managerial position had to open up. In 1865 J. W. Gilbert described existing promotion practice in the industry in the following manner: “Where there is no marked difference among the clerks, the promotion should go according to seniority...But it will often happen, that the clerk who is entitled to a vacant post by length of service is not so well qualified for it as some of his juniors. But even in this case, the individual should not be passed over, if he can perform the duties with an average degree of efficiency.”⁴⁵ Similarly, George Rae noted in 1885, “Other things being equal, the office of senior standing has the prior claim to advancement.”⁴⁶ This suggests that there was a queue to be promoted, and an employee’s position in the queue was determined more by seniority than ability, implying that even the most talented employees could only advance at the speed of the queue. In a private single-office bank or a small branch bank openings might be years in the waiting, depending on the age of the current managers. Following the increasing concentration of the industry and the expansion of branch networks, managerial openings within an individual bank occurred more regularly and employees would not have faced such severe “bottlenecks” in the promotion. Over the period of this study there were 103 promotions to manager at Williams Deacon’s Bank, over two thirds of which took place after 1900. Thus, by late in the period, the main hurdle to promotion at the WDB was demonstrating sufficient competence.

Although a few individuals rose to the level of branch manager in their early 20s or after fewer than 5 years tenure, typically the wait was much longer. Partly this was due to the fact that much of the human capital required to be a branch manager was firm-specific and only gradually acquired on the job. In addition, there may have been

⁴⁵Gilbart (1865), p. 209.

⁴⁶Sykes (1976), p. 167.

a delay between an individual acquiring sufficient competence, and his superiors recognizing this competence. The average age and tenure at the time of first promotion to manager was 36.47 and 18.37 years, respectively. Figure 7 shows the distribution of age and tenure at the time of first promotion to manager, first promotion to manager of a branch with more than 5 employees, and first promotion to manager of branch with more than 20 employees. Few employees were promoted before age 30 or with less than 15 years tenure. As would be expected, it took longer to rise to head the largest branches, where the manager had control over more resources and poor decisions would be ruinous to the profitability of the bank. It was the norm for the manager of the largest branches to be over age 50 and have had over 25 years service at the bank.

The regression results from table 1 show that managers were paid considerably more than non-manager who otherwise comparable in measurable characteristics. One explanation for this is that promotion came with a wage premium. The “tournament” model suggests that this might be a rational incentive scheme by the banks to provide positive incentives for good performance. According to this model wages are at least partially attached to position, independent of the individual holding it. When an opening occurs, employees at lower levels compete for promotion and the larger salary associated with the higher level. Gilbert describes the salary structure in some banks in the mid 1800’s as resembling tournaments; writing that a bank:

may have a fixed salary for each post, and a clerk has no increase in salary except when he takes a step up in rank. [At another bank] every post in the bank may have a fixed *minimum* salary. But each clerk holding a post for a certain period has an annual increase for

that period. Then he stops, and receives no further advance until he is promoted to the next post.⁴⁷

Another explanation for the relationship observed in table 1 is that there may be variables omitted from the regression that are correlated with manager. For example, it is plausible that different employees have different levels of unobservable productivity and only the most productive were promoted to manager. Thus the “manager effect” from table 1 might actually reflect an unmeasured productivity effect. The fixed effect specifications, which provide a control for individual-specific factors, suggest that much of the estimated manager effect is actually an ability effect. However, even in these specifications a large, statistically significant manager effect remains.

Another way to distinguish between these two explanations is to examine wage increments. If the difference in wages across levels can be explained by tournaments, then one would expect there to be an above-normal increment at the time of promotion. Table 3 shows the results of a set of regressions on the annual change in log real wages. The independent variables are tenure and its square; Promoted (a dummy equal to 1 if the individual was promoted to manager in the current year); Lag Promoted (equal to 1 if the individual was promoted to manager in the previous year); and Lead Promoted (equal to 1 if the individual was promoted to manager in the following year). I have run specifications where the promotion variables a set based on whether the individual was promoted to manager (specification 1), manager of a medium branch (specification 2), large branch (specification 3), and all three promotions (specification 4). The tenure variables reflect the non-linear trajectory of

⁴⁷Gilbart, A Practical Treatise, p. 203. Emphasis original.

wages shown in Table 1 and Figure 6. The tournament hypothesis implies that a given individual will receive a larger-than-normal increment in the year of promotion, but not in adjacent years. Thus the coefficients on Promoted will be positive and the coefficients on Lag Promoted and Lead Promoted will be zero. The omitted ability model implies that individuals of higher ability (those who were promotable) will earn larger than average increments in every year. Thus the coefficients on Promoted, Lag Promoted, and Lead Promoted will all be positive and of similar magnitude. The regression results generally support the tournament model. In each specification the coefficient on Promoted is strongly significant and of greater magnitude than the coefficients of Lag Promoted or lead Promoted. For example, in the specification that includes all 3 types of promotion, the increment for initial promotion to manager is estimated to be approximately 6.5 percentage points larger than normal in the year of promotion, but there is no statistically significant effect for the year before or after promotion. For an individual with 17 year of tenure (the median tenure at the time of first promotion to manager) the regression implies they could expect a 3.5 percent increment if they were not promoted versus a 10.0 percent increment if they were promoted.

Conclusions

This paper uses wage records to examine salaries and career tracks in the English banking industry between 1890 and 1918. The main conclusions are as follows. First, unlike manufacturing and a number of other sectors, which experienced increasing wages prior to the First World War, real wages in banking declined by 20-30 percent between 1890 and 1914. Second, wages increased with tenure over a worker's entire

career. I argue that this was a form of incentive contract designed to reduce turnover and increase effort. Third, there was considerable nominal wage stickiness; in approximately one third of sample man-years an individual received a zero nominal wage increment, but negative increments were virtually unheard of. Fourth, promotions to branch manager typically took 15-20 years and the associated pay increases were used as a positive incentive to encourage workers to supply effort.

References

George Akerlof, William Dickens, George Perry, "The Macroeconomics of Low Inflation", Brookings Papers on Economic Activity, 1 (1996), 1-76.

Banking Almanac and Directory, London: Waterlow and Sons, various years.

Becker, Gary S., Human Capital, 3rd ed., Chicago: University of Chicago Press, 1993.

George Boyer and Timothy Hatton, "New Estimates of British Unemployment, 1870-1913", Journal of Economic History, 62, 3 (2002), 643-675.

Forrest Cappie and Geoffrey Wood, "Money in the Economy, 1870-1939", in Rodrick Floud and Derdre McClosky, eds. The Economic History of Britain, Vol.2 1860-1939, Cambridge: Cambridge University Press, 1994, 219-246.

Youssef Cassis, City Bankers, 1890-1914, Cambridge: Cambridge University Press, 1994.

Charles Feinstein, National Income, Expenditure and Output of the United Kingdom 1855-1965, Cambridge: Cambridge University Press, 1972.

Charles Feinstein, "New Estimates of Average Earnings in the United Kingdom, 1880-1913", Economic History Review, 43, 4 (1990), 595-632.

James W. Gilbart, A Practical Treatise on Banking, London: Bell & Daldy, 1865.

Christopher Hanes and John James, "Wage Adjustment Under Low Inflation: Evidence from U.S. History", American Economic Review, 93, 4 (2003), 1414-1424.

John Hill, From Subservience to Strike: Industrial Relations in the Banking Industry, St Lucia: University of Queensland Press, 1982.

David Kynaston, The City of London, Volume II 1890-1914, London: Random House, 1995.

Edward Lazear, "Why is there Mandatory Retirement?", Journal of Political Economy, 87 (1979), 1261-64.

Edward Lazear and Sherwin Rosen, "Rank-order Tournaments as Optimum Labor Contracts", Journal of Political Economy, 89, 1981, pp. 841-64.

Clive Lee, "The Service Industries", in Roderick Floud and Diederik McCloskey, The Economic History of Britain, Cambridge: Cambridge University Press, 1994.

Peter Lindert, Growing Public, Cambridge: Cambridge University Press, 2004.

London & County Banking Company Limited, List of Officers at Head Office and Branches 1897-1900, Royal Bank of Scotland Archive, Islington, GB 1502/WES/125/8.

Manchester and Liverpool District Banking Company, Staff Records, Royal Bank of Scotland Archive, Islington, GB 1502/DIS/120.

Kevin Murphy and Finis Welch, "Empirical Age-Earnings Profiles," Journal of Labor Economics, 8 (1990), 202-29.

Shizuya Nishimura, The Decline of Inland Bills of Exchange in the London Money Market, 1855-1913, Cambridge: Cambridge University Press, 1971.

Lawrence H. Officer, "What Were the U.K. Earnings Rate and Consumer Price Index Then?" Economic History Services, February 2004, URL: <http://eh.net/hmit/ukearnpci/>.

Sheffield, Rotherham Joint Stock Banking Co Ltd, Staff Register, 1894-1910, Royal Bank of Scotland Archive, Islington, GB 1502/SR/22/2.

William Sunstrom, "Was there a Golden Age of Flexible Wages? Evidence from Ohio Manufacturing, 1892-1910", Journal of Economic History, 50, 2 (1990), 309-320.

William Deacon's Bank Limited, Staff Records, Royal Bank of Scotland Archive, Islington, GB 1502/WDB480/1 (covers 1890-1901), GB 1502/WD/480/2 (covers 1901-1910), GB 1502/WD/481 (covers northern branches, excluding Mosley St. 1907-1918), GB 1502/WD/46/1 (covers London Branches and Mosley St. 1911-1918).

William Deacon's Bank Limited, Directors' Minute Book, Royal Bank of Scotland Archive, Islington, GB 1502/WD/373/3.

William Deacon's Bank Limited, Particulars of Branches, Royal Bank of Scotland Archive, Islington, GB 1502/WD/377/1.

William Deacon's Bank Limited, William Deacon's 1771-1970, Manchester: McCorquodale and Co., 1971.

Table 1
Regressions on the Natural Log of Wages at Williams Deacon's Bank, 1890-1918

Variable\Specification	1	2	3	4	5	6
Tenure	.2155** (65.48)	.2022** (87.86)	.2188** (92.76)	.2791** (11.78)	.2136** (76.20)	.2641** (5.77)
Tenure ²	-.0085** (29.31)	-.0102** (47.19)	-.0091** (43.31)	-.0110** (58.27)	-.0085** (36.20)	-.0101** (47.37)
Tenure ³	.00015** (16.77)	.00023** (24.11)	.00017** (25.91)	.00025** (39.16)	.00016** (21.62)	.00022** (31.63)
Tenure ⁴	-9.32 e ⁻⁷ ** (9.98)	-2.00 e ⁻⁶ ** (24.11)	-1.11 e ⁻⁶ ** (16.61)	-2.14 e ⁻⁶ ** (30.00)	-9.77 e ⁻⁷ ** (13.67)	-1.87 e ⁻⁶ ** (24.11)
Potential Experience	.1071** (54.77)	.0871** (3.96)	.0507** (33.10)	.1771** (5.96)	.0436** (26.89)	.0985 (1.82)
(Potential Experience) ²	-.0020** (26.71)	-.0033** (3.87)	-.00062** (11.36)	-.0044** (5.94)	-.00063** (10.34)	-.0016 (1.35)
Branch Employment			.00053** (3.99)	.00075** (5.21)	.00045* (3.00)	.00081** (5.13)
Manager			.2585** (24.84)	.1108** (10.13)	.2267** (21.16)	.1143** (9.99)
Branch Employment * Manager			.0198** (46.64)	.0068** (15.76)	.0207** (49.06)	.0068** (15.32)
National Inflation			-.0149** (20.78)	-.0149** (31.63)	-.0148** (18.80)	-.0150** (28.39)
National Unemployment			.0047* (2.82)	.0027 (2.41)	.0046 (2.46)	.0026 (2.05)
Head Office			.1593** (13.31)	.0385* (2.60)	.1537** (11.64)	.0403 (2.48)

Table 1, Continued
Regressions on the Natural Log of Wages at Williams Deacon's Bank, 1890-1918

Variable\Specification	1	2	3	4	5	6
London			.2947** (27.41)	.2275** (8.97)	.2341** (19.48)	.2363** (8.94)
Time Trend			-.0095** (21.47)	-.0559 (2.39)	-.0113** (23.08)	-.0514 (1.13)
First World War			-.1426** (12.60)	-.1255** (16.55)	-.1466** (11.74)	-.1273** (15.08)
Constant	2.8913** (252.63)	3.3322** (51.71)	3.1701** (247.43)	2.8957** (39.09)	3.2489** (217.73)	3.0582** (13.88)
Model Specification	OLS	FE	OLS	FE	OLS	FE
Restrictions	None	None	None	None	Career \geq 20	Career \geq 20
Sample Size	14943	14943	14943	14943	11910	11910
F – Ratio	8856.99**	4572.21**	7862.64**	2868.97**	5858.57**	2171.12
Adjusted R ²	.7806	.6887	.8875	.8132	.8806	.8138

Notes: Fixed effects regressions were run using the 'xtreg' command in Stata 7.0

Absolute value of t-statistic in parentheses

Dependent variable is the natural log of real wage (in 1890 prices).

* indicates statistical significance at a 1 percent level

** indicates statistical significance at a .1 percent level

Source: GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WDB481, GB 1502/WD/46/1

Table 2
Regressions on the Natural Log of Wages, Other Banks

Variable\Bank	SRB	MLD	LCB
Sample Years	1894-1907	1909-1918	1900
Tenure	.3209** (39.73)	.2703** (37.32)	.1475** (18.16)
Tenure ²	-.0146** (25.05)	-.0129** (18.38)	-.0062** (7.78)
Tenure ³	.00029** (18.58)	.00030** (12.39)	.00012** (4.08)
Tenure ⁴	-.0000019** (14.10)	-.0000027** (9.62)	-.0000065 (1.93)
Potential Experience	.0167** (10.53)		
(Potential Experience) ²	-.00058** (7.94)		
Branch Employment	-.0222** (5.34)	.0029** (4.41)	.0044** (5.13)
Manager	.1496** (3.94)	.1677** (5.29)	.6000** (19.93)
Other Position		.1595* (3.16)	
Branch Employment * Manager	.02233** (10.97)	.0241** (15.82)	.000054** (9.89)
National Inflation	-.0139** (4.30)	-.0206** (20.57)	
Other Position * Manager		.00031 (0.14)	
National Unemployment	-.0172* (2.87)	.0395** (9.58)	
Head Office	.5973** (5.07)	-.0592* (3.15)	-1.2115** (5.16)
Constant	2.8658** (56.61)	2.7402** (97.92)	3.8663** (149.84)
Sample Size	696	1734	1726
F – Ratio	1223.41**	2343.08**	1229.98**
Adjusted R ²	.9548	.9419	.8507

Notes: dependent variable is the natural log of real wage (in 1890 prices).

** indicates statistical significance at a .1 percent level

* indicates statistical significance at a .1 percent level

Sources: Manchester and Liverpool District Bank – GB 1502/DIS/120
Sheffield and Rotherham Bank – GB 1502/SR/22/2
London & County Banking Company – GB 1502/WES/125/8

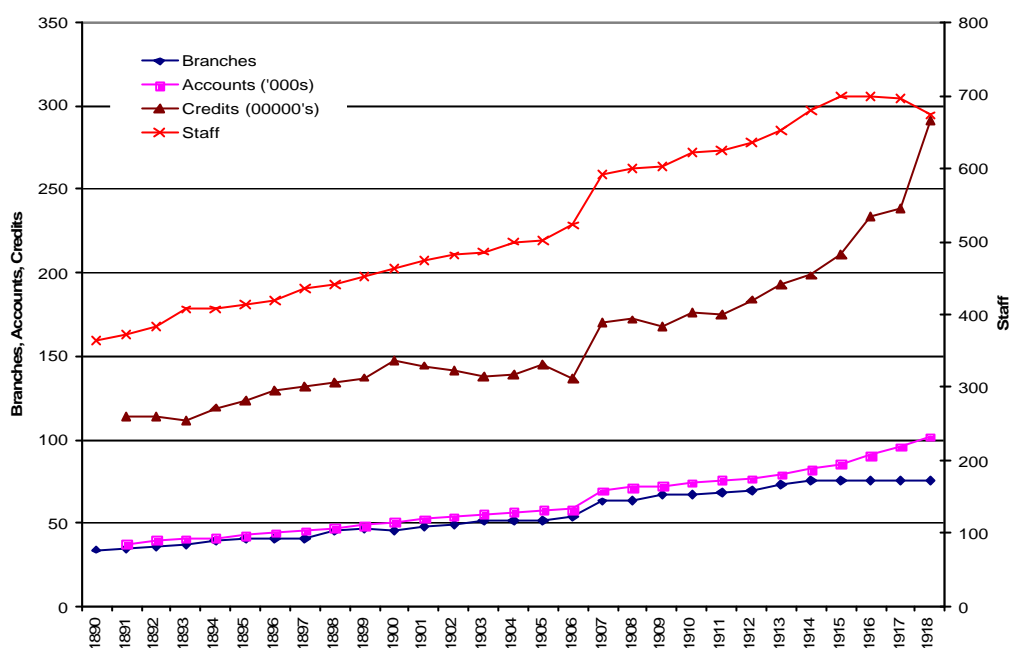
Table 3
Effect of Promotion on Earnings at Williams Deacon's Bank

	1	2	3	4
Tenure	-.0163* (68.66)	-.0162* (68.55)	-.0161* (46.92)	-.0163* (68.88)
Tenure squared	.00028* (47.55)	.00028* (47.30)	.00027* (46.92)	.00028* (47.54)
World War I	-.1335* (68.14)	-.1336* (68.11)	-.1387* (68.27)	-.1336* (68.36)
Promoted to manager in current year	.0824* (9.55)			.0649* (7.21)
Promoted to manager in previous year	.0289* (3.29)			.0164 (1.78)
Promoted to manager in following year	.0061 (0.71)			-.0028 (0.32)
Promoted to manager (>5 staff) in current year		.0889* (7.61)		.0463* (3.62)
Promoted to manager (>5 staff) in previous year		.0414* (3.48)		.0188 (1.44)
Promoted to manager (>5 staff) in following year		.0347* (2.92)		.0202 (1.55)
Promoted to manager (>20 staff) in current year			.1803* (7.53)	.1060* (4.09)
Promoted to manager (>20 staff) in previous year			.1150* (4.80)	.0916* (3.52)
Promoted to manager (>20 staff) in following year			.0805* (3.49)	.0689* (2.77)
Constant	.2306* (119.6)	.2307* (119.52)	.2303* (119.45)	.2308* (120.04)
Adjusted R ²	.5299	.5290	.5296	.5327
F	2301.85	2293.44*	2298.33*	1164.24*
Sample Size	12246	12246	12246	12246

Notes: * = significance at a 1 percent level
Dependent variable is $\ln(\text{Real Wage})_t - \ln(\text{Real Wage})_{t-1}$

Source: GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WDB481, GB 1502/WD/46/1

Figure 1
Growth of Williams Deacon's Bank 1890-1918



Note: The data contains no record of employees who left before 1895. To obtain estimates of staff numbers from 1890-94 I have extrapolated backwards from 1895 using the average exit rate from 1895-1914.

Sources: Staff – GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WD/481, GB 1502/WD/46/1; Branches, Accounts, and Credits – GB 1502/WD/512/S and GB 1502/WD377/1.

Figure 2
A Sample Wage Record from Williams Deacon's Bank

41 *The Henry Reed Branch*

NAME	Date of Birth	Entered Service	Year Navy	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
<i>William Bennett</i>	<i>25 Aug 1894</i>	<i>1 June 1922</i>		250	275	300	350	375	425	500	600	700	900
<i>John Robertson</i>	<i>7 Mar 1882</i>	<i>15 Oct 1907</i>		170	190	190	200	220	235	250	270	300	350
<i>William Robertson</i>	<i>3 Dec 1902</i>	<i>26 March 1908</i>		95	110	130	130	140	160	180	200	215	215
<i>William Robertson</i>	<i>18 Jan 1902</i>	<i>15 Nov 1909</i>		70	80	90	100	100	100	100	100	100	100
<i>William Robertson</i>	<i>5 Dec 1905</i>	<i>26 June 1914</i>					60	70	80	90	100	100	100
<i>Small Robert</i>	<i>11 Dec 1898</i>	<i>26 May 1916</i>						40	60	70	70	100	170
<i>Robert Robert</i>	<i>11 March 1899</i>	<i>10 April 1916</i>							80	80	100	100	100
<i>Robert Robert</i>	<i>19 July 1900</i>	<i>2 Oct 1917</i>							50	50	50	50	50
<i>Robert Robert</i>	<i>10 Aug 1904</i>	<i>19 Oct 1917</i>		170	170	180	190	205	220	250	275	300	375
<i>Robert Robert</i>	<i>2 Aug 1904</i>	<i>6 March 1919</i>					150	165	190	200	215	235	306
<i>Robert Robert</i>	<i>16 Oct 1909</i>	<i>27 Sept 1915</i>						30	55	65	65	90	117
<i>Robert Robert</i>	<i>5 Aug 1919</i>	<i>9 Dec 1929</i>											
<i>Robert Robert</i>	<i>10 Nov 1908</i>	<i>7 Sept 1908</i>											
<i>Robert Robert</i>	<i>11 Dec 1908</i>	<i>7 Sept 1908</i>											
<i>Robert Robert</i>	<i>18 March 1919</i>	<i>2 Aug 1919</i>											
<i>Robert Robert</i>	<i>18 March 1919</i>	<i>2 Aug 1919</i>											
<i>Robert Robert</i>	<i>6 Aug 1904</i>	<i>29 Nov 1902</i>		170	170	180	190	205	220	260	275	300	375
<i>Robert Robert</i>	<i>19 Aug 1909</i>	<i>26 Aug 1907</i>		90	100	110	120	130	140	150	160	170	180
<i>Robert Robert</i>	<i>4 March 1903</i>	<i>26 Sept 1912</i>		60	70	70	80	90	100	100	100	100	100
<i>Robert Robert</i>	<i>19 March 1906</i>	<i>1 Aug 1908</i>		130	140	150	160	170	180	190	200	215	235
<i>Robert Robert</i>	<i>17 July 1909</i>	<i>19 July 1910</i>		260	260	260	260	275	300	300	300	300	300
<i>Robert Robert</i>	<i>25 Oct 1905</i>	<i>24 Oct 1913</i>		70	70	70	70	80	90	90	90	90	90

41

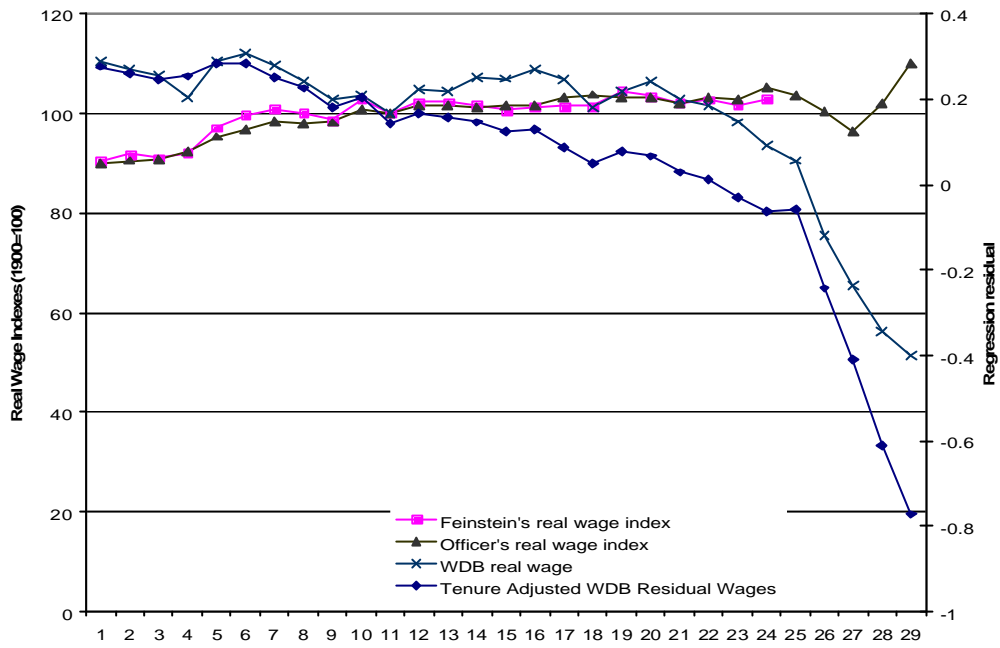
Henry Reed Branch

144 Aug 1916 from

50 60 70 70 70 70 150

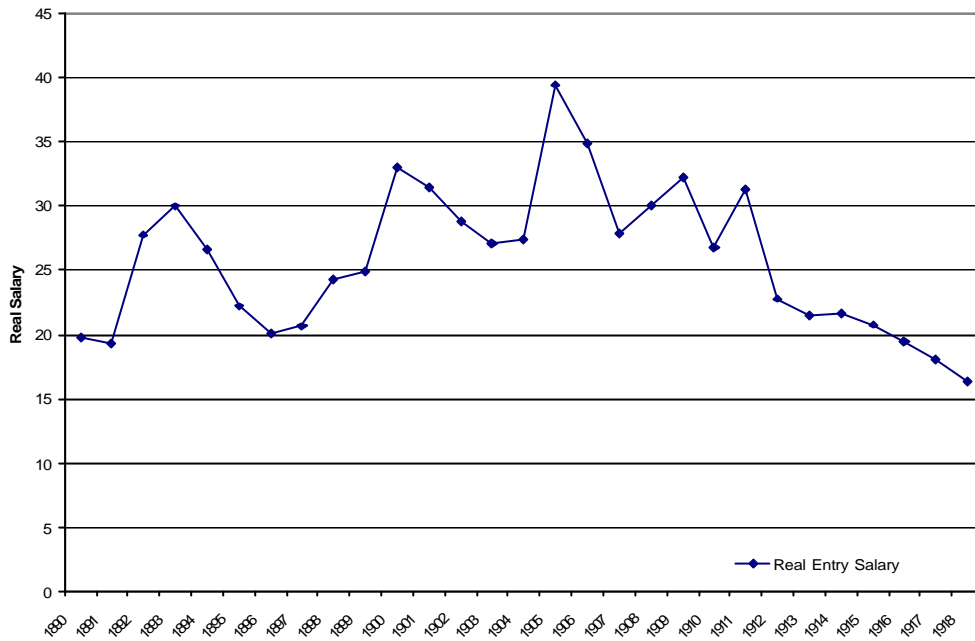
Source: GB 1502/WD/46/1

Figure 3
Wages, 1890-1918

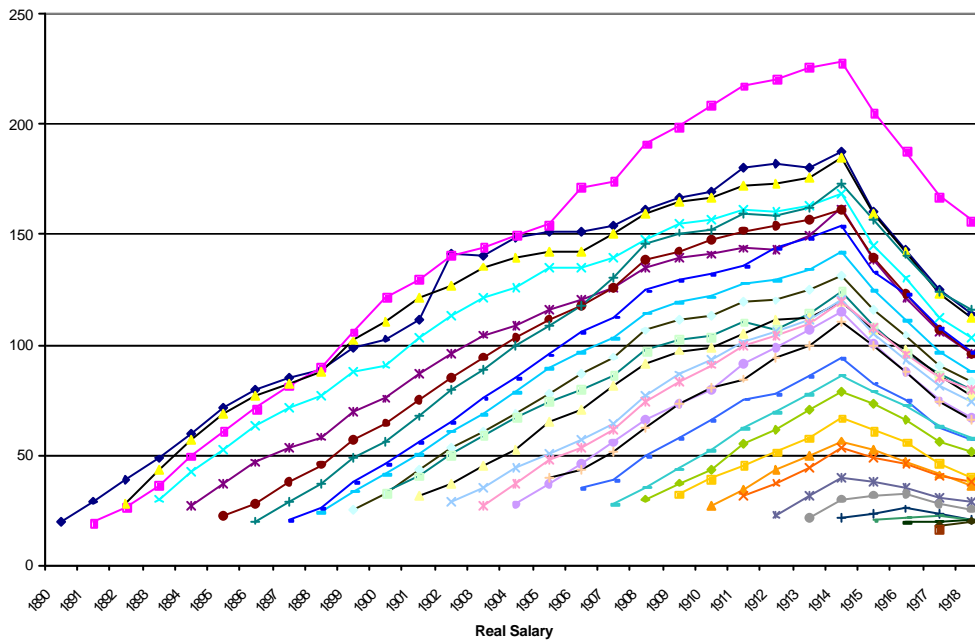


Sources: GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WD/481, GB 1502/WD/46/1, Feinstein, "New Estimates", Officer, "What were?"

Figure 4
Salaries at Williams Deacon's Bank, 1890-1918



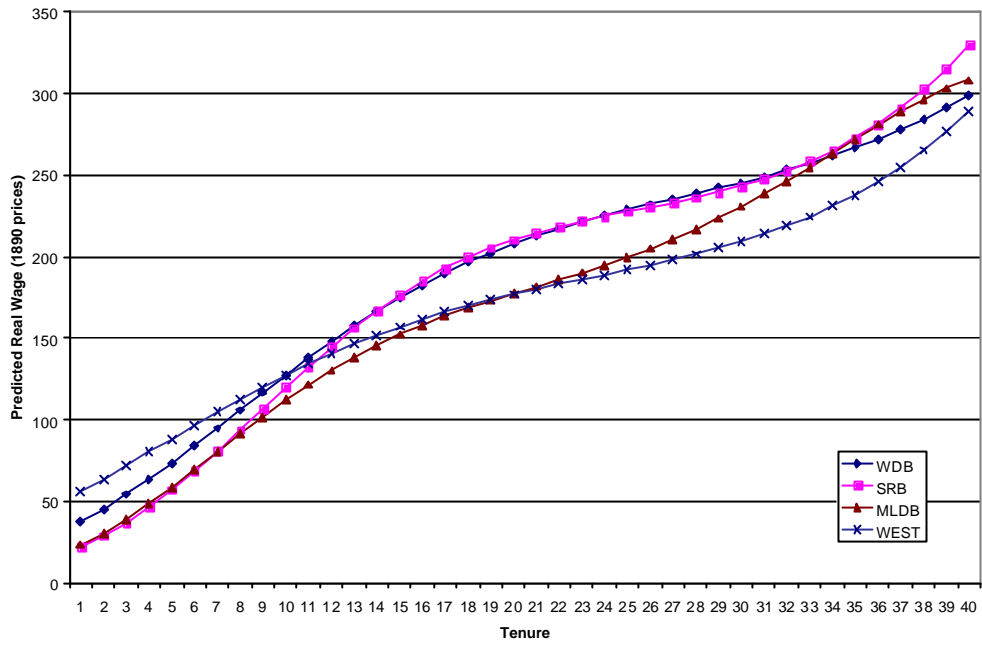
I. Real Entry Salaries by Cohort



II. Salary Growth by Cohort

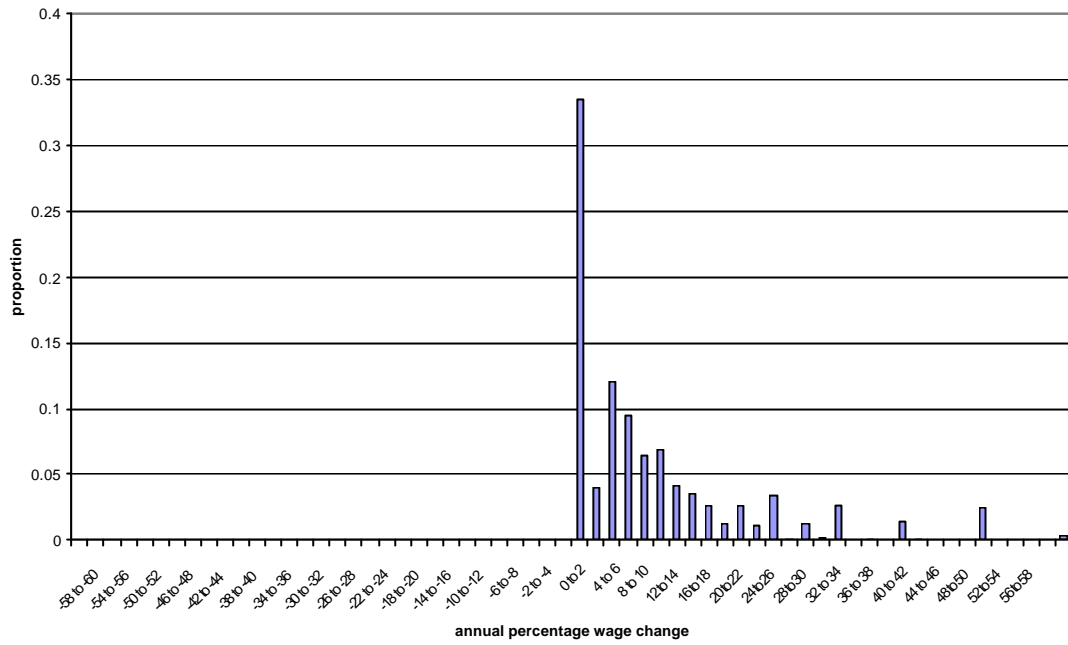
Sources: GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WD/481, GB 1502/WD/46/1

Figure 5
Estimated Wage Profiles at Four Banks



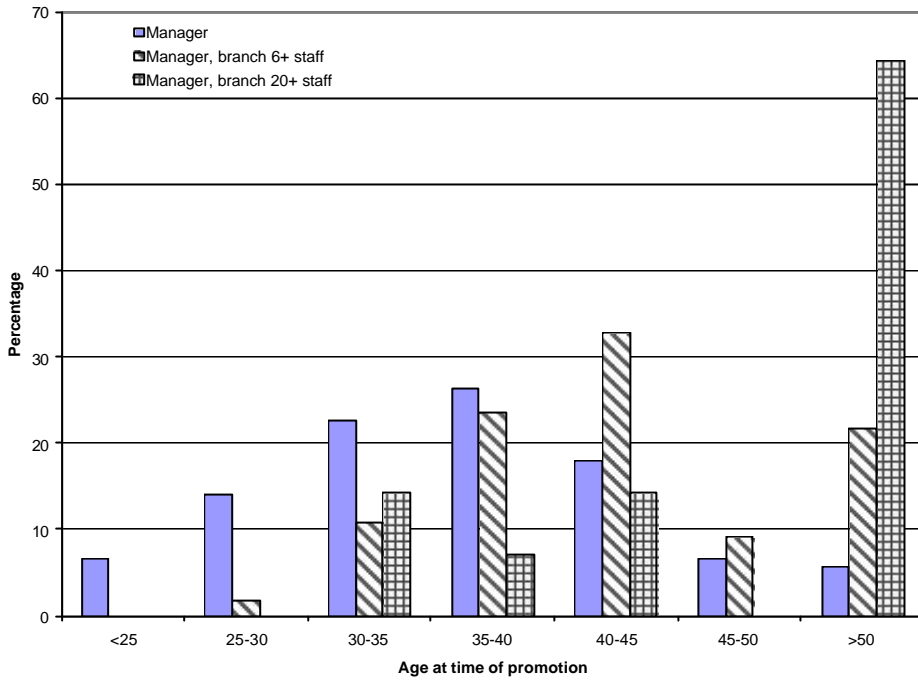
Source: Table 1 (specification 3) and Table 3

Figure 6
Distribution of Wage Increments

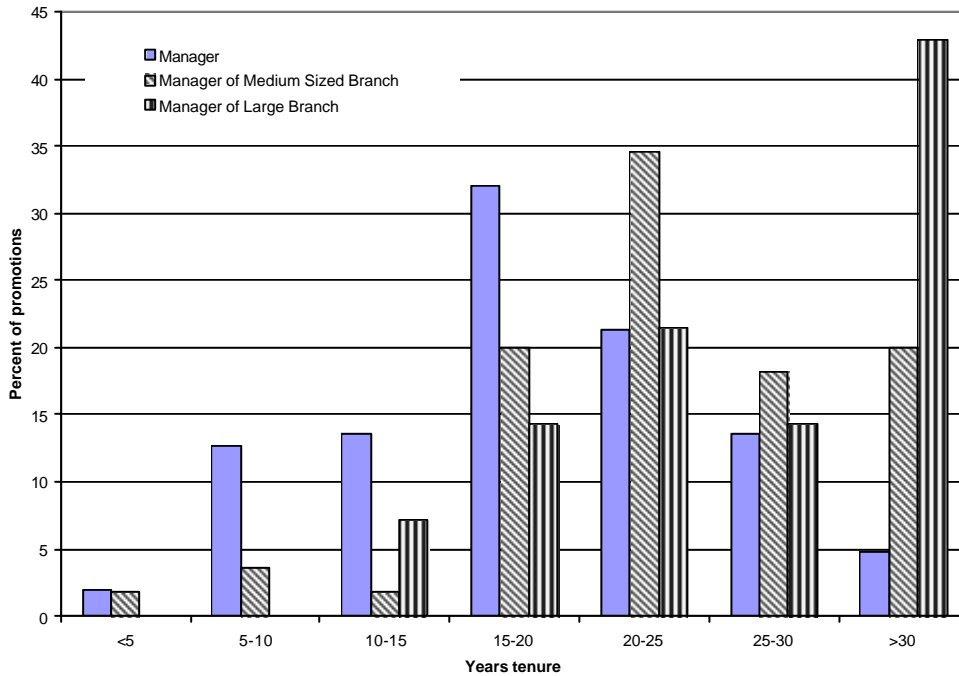


Source: GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WD/481, GB 1502/WD/46/1

Figure 7
Distribution of Age and Tenure at Time of Promotion



I. Age



II. Tenure

Sources: GB 1502/WD/480/1, GB 1502/WD/480/2, GB 1502/WD/481, GB 1502/WD/46/1