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*Abstract***:** The "tipping" phenomenon, whereby an occupation switches from dominance by one demographic group to dominance by another, has occurred in various occupations. Multiple causes have been suggested for such switches, including several related to technological change, both through effects on the performance of the work and through the effect of changing demand for different occupations. The court reporting occupation provides a novel setting for testing the relevance of various proposed causes for the increased feminization of many occupations. In this case, many of the general correlates, including declining wages, are not found; rather the phenomenon is related to the earlier feminization of the clerical workforce and the increased identification of court reporting with clerical work.

Keywords: occupational segregation, court reporting, gender wage differentials

While the processes leading to occupational segregation are in general intriguing, a particularly interesting phenomenon is "tipping." Tipping refers to the situation when an occupation switches, often over a relatively short period, from being primarily occupied by one demographic group to being primarily occupied by another. While numerous such switches have occurred, including many cases where occupations switch from one ethnic group to another (often involving displacement of an earlier wave of immigrants by later waves of immigrants), some of the most notable cases involve male-to-female switches. While it is not surprising, given the influx of women into the labor force in the twentieth century, that percentage female would increase in a multitude of occupations, this by no means implies that occupations would tend to shift from predominantly male to predominantly female. They could theoretically achieve a stably integrated balance in which the percentage female is approximately equal to that in the labor force as a whole; this however is not the general case.

A number of case studies document the tipping phenomenon for the case of male-to-female transition. These studies have been carried out by sociologists (cf. Reskin and Roos, 1990, and their collaborators, who survey a number of occupations, including bartending, insurance adjusters and examiners, and bakers—Detman, 1990; Phipps, 1990; and Steiger and Reskin, 1990, respectively), historians (cf. Davies, 1982; Strom, 1989; and Cohn, 1985, on clerical work in the United States and the United Kingdom respectively, and Strom, 1987, on bookkeeping), and economists (cf. Strober, 1984 and Strober and Lanford, 1986, on public school teaching, and Strober and Arnold, 1987, on bank tellers).[1] These studies identify the tipping phenomenon and attempt to discern both what causes it and what causes the generally accompanying decline in wages. The main reasons suggested as the cause of both events are: 1) deskilling of the occupation (e.g., baking); 2) loss of control over important working conditions by members of the occupation (e.g., clerical work); and 3) advancement opportunities reduced or cut off entirely (e.g., bank telling).[2] These factors may occur in combination as well.

A serious problem these male-to-female tipping studies face is how to disentangle the effect on wages of "feminization" of the occupation from the effect on wages of these three

apparently concurrent factors. While the factors may occur prior to women's entrance in increased numbers into the occupation, it is difficult in general to distinguish the timing of these events given the infrequently collected data normally available to researchers. Therefore it becomes difficult for these studies to answer definitively whether these factors cause the occupation to become feminized—which then causes the decline in wages—or whether feminization is caused by the wage decline.

This paper provides a case study of an occupation where these factors do not coexist with feminization: The occupation of court reporting (where the focus in this paper is on conditions in the United States). Court reporting undergoes tipping, becoming almost completely feminized by the early 1990s, but does not concurrently demonstrate any of the three potential causes listed above. Court reporting requires more rather than less skill, as reflected in the longer training period required for this method of verbatim recording compared to other older but still available recording methods. No notable change in control over working conditions occurs over the period in which tipping occurs. In addition, there are more rather than fewer advancement opportunities due to the expansion of the freelance sector and of the judicial system.

The implication, through presentation of this counterexample, is that not only "declining" occupations become feminized. In its focus on occupations that have undergone reductions in their inherent desirability (whether measured by pay or prestige), the existing body of research on tipping presents an unbalanced view of the range of actual interactions between feminization and decline/stasis/improvement in occupational status. One other study, of computer work (Wright and Jacobs, 1994), actively questions the link between "decline" and increased feminization, finding a growth in demand for computer workers even as feminization occurs.

In addition, during the period during which feminization of court reporting occurs, wages do not undergo notable drops, either relative to historical levels or relative to other occupations. This bolsters the argument that the occupation is not in decline during this period. However, there is wage variation across states in the 1990s related to variations in percentage female, which raises the question of whether or not these relative wage differentials will be preserved in

the future. This finding raises interesting questions regarding the mechanism by which feminization of an occupation in and of itself affects wages (Reskin, 2003), particularly because this variation occurs only in the public employment sector of the occupation, where both wages and piece rates are set by governmental bodies.

The paper is structured as follows: First court reporting is defined and the processes of technological innovation, professionalization, and feminization in court reporting are described. Next evidence regarding the tipping phenomenon in court reporting and concurrent wage change patterns is presented. Then earnings regressions and earnings indexes are calculated that demonstrate while percentage female by state within court reporting has an effect on earnings, earnings for court reporters overall have not notably declined. The following section considers why tipping occurred in this occupation, concluding that the phenomenon is related to the earlier feminization of the clerical workforce and the increased identification of court reporting with clerical work. The final section considers what might happen in the future to the court reporting occupation. Multiple data sources are used to build the case, including results from several surveys of court reporters conducted by the author, historical records provided by the court reporting associations, phone interviews of experts within the court reporting profession, and Census Bureau microdata and historical data series.

What is court reporting?

Court reporting is the colloquial term for verbatim reporting. Court reporters record oral proceedings, whether in the courtroom, in a deposition setting, at a conference, or for television, and produce a word-for-word account of the event, generally a printed transcript. The method of recording the proceedings varies, but it often involves the use of a specialized typing device, the stenotype machine. Reporters are generally responsible for both the recording of the proceedings and subsequent delivery of the transcript, although much of the production of the transcript can be devolved onto support personnel. Persons in charge of videotaping or audiotaping proceedings are not considered to be court reporters, although court reporters sometimes use a

tape recorder as well as stenotype in order to double-check parts of the account.

There are two sectors in the court reporting business, official and freelance. Official reporters record courtroom proceedings, while freelance reporters mainly record depositions. Official reporters are typically paid a salary and in addition usually sell their transcripts to lawyers and whoever else desires them at a per page rate. Freelance reporters—most of whom join firms as employees, partners, or as independent contractors—are often paid an hourly rate for time spent in depositions plus a per transcript page rate. Alternatively, they are paid on a pure per-transcript-page basis. While a small number of reporters (generally in rural areas where there is less business in either sector) split their time between the sectors, most specialize, with reporters generally beginning their careers in the freelance sector. While the general public often thinks of court reporters only in their official capacity, freelance reporters have existed alongside official reporters for quite some time. The oldest continuously operating freelance firms in England and the United States date back to 1891 in London and 1906 in Cleveland.[3]

Technological innovation, professionalization, and feminization in court reporting

Court reporting has actually come to require a higher skill level over time and there was increased demand for court reporters (caused by the increased size of the legal system) during the period when rapid feminization occurred. Additionally, the advent of the machine shorthand method, a major technological change, predated the period when tipping occurred, while women had entered the occupation earlier without causing tipping.

Technological innovation

There have been three major waves of technological innovation in court reporting:

1) The development of shorthand writing systems; 2) the development of the stenotype machine; and 3) the development of computer-aided transcription.[4] Court reporting as an occupation is ancient. Shorthand writing systems existed in ancient Greece and were commonly used in the Roman Empire.[5] In the mid-1500s, several systems for English were developed and popularized. In 1588 Timothy Bright published the first system in England approaching fully

phonetic writing. Court reporters, all men, including Charles Dickens, recorded England's parliamentary debates. By 1835 over one hundred systems for English had been published. In 1837 Isaac Pitman published a pamphlet (a mere twelve pages and two plates) detailing his system, which became the most commonly used system in America in the mid-19th century.[6] In 1888 John Robert Gregg published his system. Gregg came to America in 1893, moved to Chicago in 1895 and opened a school for teaching his method; the Gregg method became the standard penwriting system and is still taught today for nonreporting uses.

Machine stenography dates from the latter part of the nineteenth century.[7] The current machine's prototype dates to 1910, when Ward Stone Ireland created a machine with the same keyboard pattern used today.[8]

Around 1901, an alternative technology developed, namely a speaking tube with four holes; each hole had an attached tube which led into another room, where four people sat, each taking down what the speaker said through their assigned tube as he rotated it to match different speakers in the courtroom. Though this technology proved overly cumbersome, during WWII a related technology, stenomask, came into use, in which a single reporter repeats what is said, along with annotation, through a tube into a recorder. Many persons were trained on stenomask by the armed forces to report on military proceedings.[9] This method is still used, and there are currently about 1000 members of the National Verbatim Reporters Association (NVRA, formerly the National Stenomask Verbatim Reporters Association) (as compared to over 22,000 members in the NCRA). For the remainder of this paper, the term "court reporters" is not used to include stenomask reporters. Instead they are viewed as a potential substitute for court reporters in the transcript production process and their effect on pay for court reporters will be examined later in the paper.

Computer-aided transcription (CAT) was a goal for court reporters almost from the advent of the computer.[10] In 1976 some California reporters started using CAT on their own accord, using proprietary equipment manufactured by Barron.[11] However, CAT only became widely used by official reporters once personal computers became available in the early 1980s.

There are now microprocessors in the stenograph machines that translate keystrokes into English and feed directly to a computer hard drive while the reporter types.

Table 1, which documents the distribution of shorthand systems from available sources, 1917 to 1994, shows the growing dominance of the stenograph machine after 1942. While in 1942, only ten percent of NCRA members reported their system as stenograph, by 1956 the percentage had risen to 43 percent, and was well over 80 percent by 1976. While most of the surveys do not ask about the use of computers in transcription, in a 1990 survey of Tennessee reporters (Sharpe and Smith, 1991), 84 percent report using CAT at least some of the time.

Professionalization

The beginnings of the professionalization of this occupation occurred around the same time that stenographic machines were developed, and professionalization continued to parallel the rise of machine stenography. New York had the first state association, set up around 1880, which created a certification exam and pushed for a standard salary for reporters. The National Court Reporters Association (NCRA) was founded in 1899, originally as the National Shorthand Reporters Association (NSRA); the first NCRA convention was held in 1901, and NCRA's magazine (the journal of record for the profession) dates from 1905 (Rogner, 1991). Both NCRA and the state associations have sponsored speed contests throughout their history. The first speed contest held with machine entries was in 1914 (a penwriter won). In the 1920s, contests were stopped due to the prevalence of machinewriters among the winners; the contests were subsequently restarted, but machinewriters were barred from entry. In 1952 machinewriters were again allowed to enter, and contests have always subsequently been won by machinewriters. To give an example of the speed and accuracy required, in 1991 the winner in the NCRA National Speed contest, category of "280 words per minute in testimony," had an accuracy rating of 99.71 percent (*Journal of Court Reporting*, 1991).

Professionalization also occurred through the shorthand training process. As mentioned above, penwriting schools existed in the United States in the nineteenth century. The earliest formal stenotype-training program started in 1912 at MacCormac Junior College in Chicago; the

earliest private court reporting college dates from 1940. However, the earlier penwriting schools also took on machinewriting; the Gregg shorthand institute converted to the Chicago College of Commerce in 1950 and taught machinewriting.

The national and state associations have pressed for formal standards. While no certification is needed in twenty-four states and D.C., official reporters must be certified in twenty-seven states and freelance reporters as well in nineteen states (NCRA, 1995). Certification generally requires demonstrating ability through passing a speed and accuracy test. NCRA has certified reporters since 1935 and NVRA since 1971. Stenomask reporters can be in the federal system, but cannot be certified in some states, including California.[12]

How difficult is it to become a certified court reporter? A survey of California students who had signed up to sit for the certification examination found that they ranged between 18 and 96 months of preparation prior to sitting for the exam, with an average of 44 months (Cramer, 1989). Cramer (1995 interview) estimates that over 90 percent of students drop out of court reporting training programs before sitting for the certification exam; additionally, on the California exams, which are given twice a year, the pass rate averages a mere 36 percent (Cramer, 1991).

Regardless of rising standards in court reporting, the occupation appears to have experienced substantial growth in the twentieth century. Table 2 shows the rise in NCRA membership from 1909 to 1994, during which period membership rose by 4525 percent, for a 4.6 percent annual growth rate. However, many reporters belong only to their state association and many belong to no association at all; overall the NCRA estimates that there are around 45,000 reporters, with no way to measure overall occupational growth.[13]

Feminization

There is clear evidence of both feminization and tipping for the court reporting profession. Figure 1 shows the percentage female by cohort age among currently active court reporters (as of 1992). This graph shows percentages approaching one hundred percent female for the youngest cohorts, with a drop-off down to less than forty-five percent female among

reporters approaching retirement age. Additionally, Table 3 draws on tabulations of NSRA membership data from earlier years, reaching back to 1942, when the membership was 26 percent female, to demonstrate that percentage female only rose over to 50 percent in the 1970s, and only rose to over two-thirds in the 1980s.[14] Additional evidence of a sea change is that median age and experience figures for men and women increasingly diverge over this period.

Tipping occurred in the 1970s. In 1979 around half of reporters in their mid-thirties were men, but almost 90 percent of reporters in their mid-twenties were women (*National Shorthand Reporter*, 1979). A survey of schools in 1975 indicated that the student body was only 10 percent male (McFate, 1976), while anecdotal evidence indicates that in the late 1960s classes were about one-third male. Anderson and Stitt (1979) survey Illinois court reporting schools and observe a steady decline in the percentage of male students from 1966 to 1978, with an increased rate of decline in the last three years. Percentage female for the occupation is 86 percent in 1992, but it is clear from the age structure (as shown in Figure 1 and in the higher median age and years of experience for men in Table 3) that the occupation is rapidly approaching ninety percent female and could go as high as ninety-eight or ninety-nine percent female in fifteen years or less. From the pattern by cohort, it appears that feminization is not simply caused by overall growth in the occupation, with the net increase in employment being taken by women. Rather, the number of men entering the occupation is actually declining, with retiring men being replaced by women rather than by men. This is consistent with the pattern found by Coventry (1999) for the majority of feminizing occupations, in which women's entering the occupation is not associated with incumbent men's leaving, but rather with reduced entry rates for men.

The hypothesis of rapidly increasing feminization is further supported by data from New York state, where the author had the opportunity to perform a five-year follow-up survey in 1997.[15] Among these reporters, the percentage female had risen from 73 to 77 percent over the five-year period, with a rise from 81 to 87 percent in the freelance sector and a rise from 66 to 73 percent in the official sector. The median age and experience of these reporters had risen by five years in each case, indicating almost no entry into the profession in New York (where indeed

hiring in the official sector had been frozen around 1993, with tape recording systems now increasingly in use in the lower levels of the court system), and the female reporters' age and experience distributions were much closer to those for the male reporters.

As shown in Table 3, most reporters (over 67 percent) are employed in the freelance sector, a notable structural change from 1942, when over seventy percent were in the official sector. There is some variation in percentage female by sector, with the 1992 data showing the freelance sector to be 86 percent female and the official sector 81 percent female. This reflects to a large extent the fact that official reporters are older on average; current entrants do not generally plan to be official reporters when they enter the occupation, but enter the sector later if at all. As the percentage female rises for older age groups (even if the employment rates for female reporters drop off significantly more with age than for male reporters), this difference may narrow (as it apparently has in New York).

The pay structure in court reporting

Even as the percentage female has risen in court reporting, it apparently remains a lucrative occupation. Hourly earnings rates and total earnings are high compared to other occupations, particularly compared to those with similar educational attainment levels and/or percentage female. There is, however, an apparent earnings premium for men which increases with years of experience, and percentage female by state is negatively related to hourly earnings. This section also presents results relating to differences in transcript preparation time between female and male reporters that imply that lower pay for women may reflect their lower productivity. On the other hand, controlling for transcript preparation time differences across geographic regions does not reduce the percentage female effect on wages. Finally, the data show no decline in earnings over time either compared to historical rates for court reporters or in terms of the relative rates compared to other occupations.

Average earnings

The earnings, transcript production, and demographic data on court reporters reported

herein comes from three mail surveys administered by the author, the first of which was undertaken at the behest of the California Court Reporters Association (CCRA) and the latter two of which were undertaken at the behest of the NCRA. The first set of surveys went in Spring 1992 to 3500 randomly selected CCRA members, all California residents, comprising 54 percent of the population of 6509 members. Then in Fall 1992 surveys went to 8500 NCRA members in the rest of the country (proportional to state membership, but randomly selected within each state), which comprised 56 percent of the non-California population of NCRA members. The survey instrument was identical to that used in the CCRA survey, except for additionally requesting identification of the state where the reporter mainly worked in 1991.

Both surveys, which required respondents to fill out a one-page sheet and mail it to the author in a postage-paid return envelope, had a high response rate—53 percent for the CCRA survey and 44 percent for the NCRA survey—and there were very few incorrectly answered questions or incomplete questionnaires. The surveys yielded a combined sample of 5664 reporters, 5355 of whom had complete enough data (including having to have worked at least one hour during 1991) to be included in the earnings regressions reported herein. The questionnaire asked for standard socioeconomic data, including sex, age, race/ethnicity, marital status, number of children and ages, education, the state where the person worked, and the urbanization level of county where the person worked; sector (freelance, official, or fifty-fifty), hours and weeks worked, individual earnings, and household income for 1991. The survey also asked what the individual did before becoming a court reporter, and what the individual thought he/she would do if his/her current job was lost. Details regarding the geographic breakdown and cross-tabulations for various subsamples are in [author] (1992). Results are weighted by state NCRA membership in order to be representative of the NCRA population.[16]

The calculation of 1991 annual earnings from these surveys provides clear evidence of high earnings potential for court reporters: $50,500 on average, with a median salary of $45,000 and one-fourth of the sample earning over $64,000. Official reporters can make substantially more than this if they are assigned to a case that generates high demand for transcripts, although

they cannot vary their per-page rates, which are set by statute. The most money per hour generated from a single case may have been made by the two court reporters assigned to the 1995 O.J. Simpson double murder trial. Los Angeles County estimated that the reporters would share over $500,000 in salaries and fees from the trial. While the salaries were only $60,000 per reporter per annum, the rest would have been generated by selling copies of transcripts for up to a dollar a page (Rogers and Stambler, 1995). However, court reporters work longer hours than the average workers, with a median yearly time of 2142 hours (over 41 hours per week) and fully one-fourth of the sample reporting working more than 2736 hours (over 52 hours a week).

To put these earnings into perspective, Table 4 shows data from the March 1992 Current Population Survey regarding earnings for other occupations.[17] Data for average earnings, average years of formal education, and percentage female are shown, both for some larger occupational categories and for those occupations previously held by significant numbers of court reporters.[18] This demonstrates that court reporters earn significantly more than occupations with similarly high percentages of female members and occupations with comparable average educational attainment. Court reporters earn more than any group represented in the table save lawyers, who have higher formal education requirements and a lower percentage female.

Returns related to reporter and regional characteristics

Table 5 reports the results from a set of multiple regressions that control for a multiplicity of characteristics and allow one to observe the effects of numerous factors on earnings.[19] In particular, these regressions allow us to observe the effect of gender and sector ((freelance vs. official) on earnings. Thus I run one regression for the full sample as well as pairs of regressions for men and women separately, and freelance and official reporters separately, and report results, including regarding which coefficients are significantly different between the pairs of cases. While pooling is rejected (based on F-tests) for both subdivisions of the sample, it turns out that very few coefficients actually differ statistically significantly between subdivisions.

The five regressions were run using the SAS procedure SURVEYREG, explicitly allowing for the survey stratification by state in the error term structure and thus adjusting the

standard errors relative to standard ordinary least squares. The dependent variable in each regression is the log of hourly earnings. The regressions incorporate a large number of control variables measured at the individual level, including years of experience as a reporter and experience squared, age and age squared, several race or ethnicity categories, male, male interacted with years of experience, sector, hours status (part time or overtime), formal education received, rural or urban job location, geographic region, marital status, household income other than own earnings, and presence of children in the household. The interaction of male with experience was included based on court reporters' beliefs as to how the pay structure varied by gender, although the separated equations also allow us to see how all variables can vary in returns by gender. Three variables measured at the state level (counting D.C. as a separate "state") are also included: percentage female; a dummy for whether the state requires certification for the reporter's sector; and a dummy indicating presence of a substantial population of stenomask reporters.[20] The first of these variables is central to the analysis in that the effect of feminization on the court reporting profession can be assessed in part by observing how it affects earnings in the cross-section. The other two variables attempt to control for market forces that might affect earnings and might be correlated with percentage female.

These regressions all display a pay structure that is in many ways similar to that modeled in most earnings regressions, but they also contain a few surprises. Earnings display the usual single-peaked profile with respect to experience for the pooled sample and for all subgroups (with a significantly larger gain in earnings with experience in the freelance sector), but the age-earnings profile is flat for men and for official reporters. While the dummy for being a man is insignificant both overall and by sector, the interaction of this dummy with years of experience is significant in both sectors, indicating that base earnings are similar by gender, but that earnings have an additional increase with years of experience for men that women do not receive. Reporters earn less in rural areas and in the Midwestern and Southern regions. The existence of other household income lowers earnings rates. Marriage is positively related to earnings for all groups and presence of a preschool child in the household has a slight negative effect, while

presence of an older child has a greater negative effect for all groups save male reporters. There is a positive differential associated with being Black or Hispanic which is driven by higher returns to these characteristics in the freelance sector, but, given the jumpy pattern of these returns in the regressions by sex, is probably driven by outliers (there are few nonwhite or Hispanic court reporters, comprising less than seven percent of the sample).

Both the pooled and separated regressions show little payoff to formal education relative to the estimates found in most earnings regressions. This is not surprising given that pay is related to possession of a particular skill. Additionally, the pay structure in both sectors does not directly reward educational attainment. In the freelance sector pay is often on an hourly and piecework rate or just a piece rate. In the official sector salaries are often covered by union contracts or determined by governmental pay scale based on seniority and the piece rate per transcript page is set by the governmental jurisdiction as well.

Turning to the state-level variables, it is notable that certification has a positive effect on hourly earnings and has a significantly larger effect on free-lance earnings than on official earnings. Whether this is a proxy for higher-ability reporters or a measure of reporters' ability to create a barrier to entry to the profession in certain states and thereby push up wages cannot be determined yet.[21] Presence of stenomask reporters has no measurable effect on earnings except in the official sector, where it reduces earnings, presumably through competition. Percentage female among court reporters by state—which ranges from 56 percent to 97 percent, with a mean of 86 percent and a median of 89 percent—has a striking effect on earnings. However, the effect is only in the official sector and for women, not among freelance reporters or for men. For an official reporter, a one percent rise in percentage female for court reporters in his/her state leads to an hourly earnings reduction of 0.8 percent; the effect is half as large for women overall.

One hypothesis for why this effect occurs in the official sector is that the variable is a proxy for the power of official reporters to influence the setting of their salaries and piece rate. While in the freelance sector, unhindered forces of supply and demand can operate to set hourly and piece rates, in the official sector, rates are set through a negotiation process with the judicial

administrator in each state, typically subject to approval by the state legislature. The court reporters themselves fear that they are taken less seriously by the governmental authorities now that they are more feminized, and that they have had trouble generating strong leaders to spearhead the negotiation process from among their ranks now that they are more feminized.

Evidence regarding productivity differences by sex and region

One often-heard claim regarding econometric studies of wage differentials is that significant coefficients on sex dummies, interaction terms with a sex dummy, and percentage female, might indicate that these variables are proxies for unobserved characteristics related to productivity differences by sex. Therefore an interesting question is whether one could directly measure productivity for a set of individuals and consider whether differences by sex appear in such data. Because an important component of total compensation for court reporters is directly related to their production of transcript pages through payment of per-page piece rate, for court reporters it is actually possible to measure productivity in terms of how long it takes them to complete a transcript page. A higher number of transcript pages per hour translates directly into higher pay on the margin for both salaried and nonsalaried reporters. While lower hourly earnings may reflect lower salaries and/or lower piece rates for women than for men, they may also reflect lower transcript production rates for women than for men. While transcripts might vary in quality (measured by number of mistakes per page), quality differences do not affect the reporters' piece rate. Differences in difficulty of transcript preparation (e.g., transcribing very technical testimony such as medical or engineering-related terms, or non-native English testimony) do not affect the official piece rate, but can raise the rate for freelance reporters.

Fortuitously, the question of how long it takes to prepare a transcript page is a topic of interest to the court reporters as well. In spring of 1994 I surveyed a national sample of NCRA members (proportional to state membership, random within state; complete details in [author], 1994b). 7000 NCRA members were contacted (4000 freelance and 3000 official). This survey, while still only one page long, was more difficult to complete than the earlier surveys. The respondent had to pick a transcript that would yield at least fifty finished pages and keep track of

how much time each section of the chore took to complete (including the time spent by support staff). Consequently this survey had only a thirteen-percent response rate, with 928 returned, of which 873 were usable. Respondents were also asked for their tenure on their current job and their total time (experience) as a court reporter, both of which were measured in months.

While respondents were not asked to indicate their sex, almost 31 percent of the usable sample provided this information anyway, either by signing their name to the questionnaire or by attaching a return address sticker to the return envelope (in either case the name had to be clearly identifiable as gendered).[22] This subsample, consisting of 268 persons, 223 of whom were women (83 percent)—117 freelance and 106 official—and 45 of whom were men—22 freelance and 23 official, was used for the analysis reported below.

As shown in Table 6, women average slightly over one minute more per page in transcript production than do men. Even after controlling for differences in experience and tenure (men had on average five years more experience and four years more tenure in their current position), use of support staff (their time spent in production of the transcript was included on the questionnaires), length of transcript, and geographic region, this difference persists. There is a wide range of page completion times, which may explain why the earnings regressions reported in Table 5 displayed a wage premium for part-time workers and a wage penalty for workers who had significantly greater than average hours: Some workers must work significantly longer to complete the same number of transcript pages. The page completion time regressions reported in Table 6 represent the best-fitting specification (where regressions are run for all reporters, separately by sex, and separately by sector). The dependent variable throughout is the mean minutes spent per page in transcript production. The independent variables include a quadratic specification for experience, the transcript length measured in pages (to check for economies of scale in manuscript production—although very short transcripts had already been ruled out in the survey's instructions), a dummy to indicate whether or not the respondent worked in a southern state, and a dummy for female in the relevant regressions. Alternate specifications reject the addition of linear and quadratic terms for tenure in current position and the use of additional

geographic detail, such as a breakdown into nine Census divisions. An alternate specification includes a dummy indicating use of support staff finds that use of support increases total time spent on production, but has no effect on the coefficients on the other variables.

These regressions show that per page completion times decrease with experience up to somewhat over 20 years, and then increase gradually. However, there are notable differences in both the experience profile and the effect of the female dummy between the freelance and official sectors. In the freelance sector, there is no statistically significant effect of being female, while in the official sector the gender difference in completion time is around 1.3 minutes per page. Additionally, there is no statistically significant decrease in completion time in the official sector; a flat experience profile cannot be rejected.

It is critical to note that these completion time regressions imply only that the lower hourly earnings of women in this profession may be related to their lower productivity in transcript production (measured in terms of transcript pages per hour). Therefore declines in average hourly earnings for the occupation may be directly related to lower productivity workers comprising a larger share of employment over time. They do not imply that the percentage female effect across states is necessarily related to the lower productivity of women. However, the significantly negative effect of the South dummy on page completion time implies that regional variations in productivity, which might be correlated with variations in percentage female across regions, could explain part of the variation across states in hourly earnings (i.e., the consistently negative coefficient on South in the earnings equations shown above).

In order to test for this possibility, I estimated hourly earnings regressions identical to those displayed in Table 5, save for the addition of a variable calculated at the nine Census region level, which was average page completion time. This variable does not appear to be a good proxy for individual productivity variations. Even though there are measurable differences in the data in these completion times, and a significant effect in Table 6 of a Southern dummy, inclusion of this variable has no effect on the magnitude of the coefficients on other variables (save for reducing slightly the effect of South), including certification and percentage female.

So far this section has demonstrated that court reporters are currently well paid in comparison to other workers. But have wages nonetheless declined as feminization has occurred? The supporting evidence for this proposition is that percentage female measured at the state level in 1991 is negatively related to wages for official reporters. The next section turns to historical wage data to consider if wages have declined over time.

Relative earnings over time

Annual earnings data for 1901, 1939, and 1975, collected from a number of sources, are contained in Table 7. Recent data, from 1991, are also included. Earnings for court reporters are displayed, as are earnings for several reference groups: All employees; federal civilian employees; clerical workers; and lawyers. These data are used to calculate changes in purchasing power and relative wage differentials between the occupational categories over time.

The NCRA does not routinely collect salary data, so it is difficult to assess historical earnings for court reporters. In Table 7, the older reported earnings for court reporters are specific to California, where the CCRA historian (Bob Clark, interviewed April 14, 1995) had collected data retroactively; these are compared to 1991 earnings for the CCRA subsample. At the turn of the century, official reporters were paid on a salary-only basis, with a state court rate of $2000 per annum. Payment per page gradually came into effect in the larger cities. By 1938-1939 in California, the federal court rate was $10 per day plus $0.30 per folio, with two and a half folios per page. The rate for 1939 is therefore a base rate of salary for 250 days. This can be compared with the average from the 1991 CCRA survey of $65,000 for official reporters, which appears reasonable, given the earnings figures contained in a pamphlet circulated by the CCRA in the early 1990s: $35,000 to $60,000 for official reporter salaries (i.e., not counting earnings from transcript sales); $18,000 to $80,000 for freelance reporter earnings (CCRA, n.d.).

Figures released by the NCRA for 1975, based on a small survey, indicated national official salaries ranging from $10,000 to $16,000, plus zero to $10,000 or more in income generated from selling transcripts, and freelance earnings from $20,000 to over $45,000 (McFate, 1976). These should also be treated as minimum figures; the NCRA walks a fine line

between wanting to recruit students (given chronic shortages of reporters in many jurisdictions, excess supply does not appear to have been a problem historically) and not wanting to appear overpaid, lest judicial administrators lower their pay rates or attempt to replace them with cheaper labor (such as videotaping proceedings and producing transcripts from the videotapes only on demand rather than as a routine matter). These numbers are roughly consistent with NCRA numbers from 1973 which specify the national range for official reporters as $10,000 to $30,000 and for freelance reporters as $12,000 for beginners, $15,000 for reporters with a few years of experience, and $25,000 for highly experienced reporters (NSRA, 1973).

First, considering court reporting earnings in isolation, how much did earnings need to have risen over time in order to maintain purchasing power? According to the historical cost of living index for the United States, from 1900 to 1975, the price level rose 545 percent (U.S. Department of Commerce, 1975), and from 1975 to 1991, the price level rose 153 percent (Council of Economic Advisors, 1995). So in order to maintain purchasing power from 1901, salaries would need to have been $12,900 in 1975 and $32,600 in 1991. These levels are easily surpassed. In order to maintain purchasing power from 1975, salaries would have to have been in the range of $50,000 to $114,000 for freelance reporters and $25,000 to $66,000 for official reporters in 1991. This freelance range appears somewhat higher than those implied by average salaries in 1991, but are not implausible given that many freelance reporters work part-time, and these are implied to be full-time salaries. The official average salary falls within this range.

Second, are relative earnings ratios stable over time between court reporting and other occupations? In 1901 state official reporters in California made twice the national earnings of clerical workers and federal workers; this was still approximately the case in 1991, with federal employees gaining somewhat (to 52 percent) and clerical workers falling behind (to 35 percent). Employees overall gained on court reporters, closing the gap from 22 percent in 1901 to 42 percent in 1991. But reporters gained income relative to lawyers: In 1939 lawyers made 1.75 times the earnings of official reporters; by 1991 they only made 1.20 times as much as all reporters and made less than official reporters in California.

In sum, this occupation pays well and the occupants have low turnover and job autonomy: It is a profession. This occupation does not fit the patterns found in other case studies of tipping. The following section discusses what forces could have led to tipping in this case.

Why did tipping occur?

Sociologists and economists have advanced a number of alternative explanations for why tipping has occurred in particular occupations. A satisfactory explanation must address two issues: Why do occupations tip rather than becoming stably integrated; and why does tipping occur in some occupations and not in others. The fallback argument, that men do not like to work in occupations once women enter them, thus fails to explain why some occupations maintain a stable proportion of females to males.

Sociologists have advanced five arguments regarding which occupations are likely to undergo tipping, based on their interpretations of case studies of other occupations where tipping has occurred. The first three arguments were listed at the beginning of this paper: Occupations where deskilling and loss of control occur, and advancement opportunities are greatly reduced, are likely to experience tipping. Fourth, the occupation may be facing declining demand (e.g., baking). In all these cases, women are either allowed in only as these processes begin to occur, as men decide not to enter the occupation. If the root of the barring was employer discrimination, employers are then forced to turn to the less-preferred labor source; if the root was employee discrimination, employers are now free to hire women without incurring costs in the form of reduced production due to resistance by male employees. These arguments are both consistent with any of a number of job queuing theories (cf. Strober, 1984, and Strober and Catanzarite, 1994; Reskin and Roos, 1990). A fifth theory is that standardization of a "craft" through schooling, so that the necessary training specific to the occupation can be received outside of an apprenticeship or informal training mechanism (e.g., clerical work), leads to reduced barriers to entry for women, who then enter the occupation and drive down the wages through this increase in labor supply.[23] Men would then decline to enter this occupation, preferring others where the

barriers to women had not yet fallen, thus maintaining social closure (Tomaskovic-Devey, 1993).

In the case of court reporting, there is contradictory evidence for all of the above sociological explanations. First, regarding potential deskilling, the occupation requires more skill now, not less. The training period for machine shorthand is comparable to the time it takes to learn penwriting methods, and reporters must now also be proficient personal computer users, both during the initial recording period if they are using a real-time method, and during subsequent transcript production. Second, regarding loss of control, there appears to be no change over the period. Official reporters are still treated as essentially autonomous professionals who, alone among government employees, are able to sell the fruits of their labor in addition to drawing a guaranteed salary. Freelance reporters can either join a firm, run by one or more court reporters in partnership, or work alone. Third, advancement opportunities have not changed over this time; court reporters do not rise to other positions within the court system, nor do they rise in the freelance sector through layers of management; most court reporting firms employ at most an office manager. Fourth, as shown in Table 2, there are increased numbers of court reporters over time and the employment growth rate is positive. Finally, standardization of the "craft" of court reporting through schools had already happened in the nineteenth century for the penwriting method, and continued in the early twentieth century for machine stenography, as reporters train either at private court reporting schools or in community/technical college programs.

Economists have several lines of reasoning to draw on for explanations of why tipping occurs, all based on their generally-held view of how labor markets work: Demanders of labor look for cheaper sources of labor that can be substituted for more expensive ones, while suppliers of labor look for occupations which offer them the highest return (which can include both pecuniary and nonpecuniary benefits) for their time spent working for pay. First, as the available technology changes for an industry, employers shift, if possible, to cheaper labor sources to train on the new technology, particularly if the skills embodied in the current workers give them little or no edge in learning to use the new technology.[24] Second, if demand for an occupation expands but the supply of men is very inelastic, while the supply of women is relatively elastic, then

women are recruited in order to keep wages from rising. Third, if barriers to entry for an occupation are dropped (for instance, the nineteenth century and early twentieth century view that women should not be court reporters because they would be forced to hear expletives in the courtroom) and women are actually more productive than men in the occupation, employers will prefer to hire women. Fourth, in the case where barriers to entry are dropped, if alternative wages are lower for women, women will enter the occupation, driving down the wage, and men will leave if their alternative wage is now higher.[25]

For court reporting, there is evidence to the contrary for several of the above explanations. First, the technological change of machine stenography predated the tipping period and women are in the profession before widespread adoption of machine stenography. The later wave of technological change, adoption of CAT, occurs after feminization. Interestingly, stenomask reporters undergo a similar decline in percentage male in the same period (the mid 1970s), with no observable technological change to relate to the tipping that has occurred. The second argument, that increased demand combined with different supply elasticities for men and women affects the percentage female, does have merit, as will be discussed below. However, the question of why elasticities would differ needs to be addressed. Third, while formal and informal bars to entry for women still existed in the early twentieth century, for several decades prior to when tipping occurs, women were found in the profession. Regarding the question of whether women are better at court reporting than men, the evidence presented above indicated that transcript completion times are faster for men or at any rate no slower. In considering compensation in alternative occupations, this has always been a high-paying profession and there has been no obvious change in the pecuniary returns (including fringe benefits). In addition, working conditions do not appear to have altered noticeably to change nonpecuniary returns, save for peoples' reactions to being in an increasingly female-dominated occupation.

The most plausible explanations for why court reporting has tipped come from the court reporters themselves, based on their observations of what happened. First, though least plausibly, some (e.g., CCRA historian Clark) trace the feminization to the labor shortage caused by World

War II. However, many men attended court-reporting school under the GI bill, and Goldin (1991) counters this argument for increased female labor force participation in general.

Second, the reporters believe both that men are less likely to be aware of the occupation and are not recruited for it. Little recruiting at all occurred prior to the late 1960s and early 1970s, when growth in the number of court reporter training programs (at community colleges) occurred. Nowadays recruiting mainly takes place, to the extent that it does at all, in secretarial classes in high schools.[26] Many still hear of it through friends or relatives who are court reporters. Anderson and Stitt (1979, p. 44) contend that court reporting schools are training the very people they recruit: Females; based on "secretarial image, recruiting in predominantly female settings (shorthand classes), listing court reporting in the secretarial program, and failing to recruit in male audiences." Notably, stenomask reporters originally had a higher proportion of men than court reporters, apparently due to being drawn from the predominantly male military pool, but are now around ninety percent female. Most stenomask reporters now are trained by others in the profession.[27] Here the reporters, including Anderson and Stitt themselves, appear to have identified a plausible mechanism for why and when tipping occurred.

Third, they believe that the organization of their work, related to the rise of the freelance sector's share of total employment, is relatively more appealing to women. They argue that the self-employment aspect of freelance work is relatively more appealing, that women may be less likely to object to working alone at home (where transcript production is generally done), and that the ready availability of part-time freelancing and flexibility in transcript preparation is appealing to women, who are more likely than men to have other responsibilities (i.e., child care). The first two arguments appear spurious: Men have a higher self-employment rate than women in the general population throughout the period when tipping occurs; and a large portion of the job involves working with others (e.g., meeting for deposition-taking, routine activities occurring at the freelance firm's office). However, the third argument has merit: Women have a higher rate of part-time work than men in the general population, and this job has a high hourly earnings rate, particularly relative to other part-time positions. As women entered the workforce

in increasing numbers in the 1970s, they might well enter the expanding freelance sector.

Fourth, the court reporters cite image as a factor discouraging men from entering the occupation, but having an encouraging effect on women. They believe that court reporting is perceived as similar to secretarial work. It requires knowing how to type and learn a type of shorthand, both of which may be viewed by potential entrants as female-typed skills, and business colleges that offer courses in court reporting list them in secretarial programs. This is in strong parallel with the pattern Roos (1993) reports regarding tipping towards women in the printing (i.e., typesetting) industry, also occurring in the 1970s, when typesetting, through technological change, became more similar to clerical work. Secondly, a much-used option for failed court reporting students is to become a secretary. This is viewed as a female-typed occupation and is therefore not an appealing fallback for men; given the high dropout rate from court reporting training, it is therefore a risky proposition for men. This line of argument is somewhat unsatisfying in that it removes the problem of how to determine why female-typing occurs back one step, as well as assuming that female-typing creates nonpecuniary costs for men.

An alternative way to evaluate this argument is to consider what occupations the entrants to court reporting are coming from. The CCRA survey and first NCRA survey described above contain data on which occupations court reporters had held immediately prior to entering the court reporting profession. Sixty-nine percent of respondents reported some previous occupation. The occupational distributions for women and men who worked in a different occupation prior to becoming a court reporter are shown in Figure 2. In each case occupations with less than three percent of respondents are collected together into the "other" category.

As shown in Figure 2 (a), about two-thirds of female court reporters were previously employed in a clerical occupation; forty-three percent were secretaries. The next big categories for women were waitress and other food service occupations, and retail or wholesale sales. Almost none came from anything other than a traditionally female, low-paying occupation. Thus not only do these women receive a large pay increase upon entering court reporting, but it is also easy for many of them to return to clerical work if court reporting does not pan out.

Men, on the other hand, display a less clerically concentrated occupational distribution prior to entering court reporting, as shown in Figure 2 (b). However, over one-third reported prior work in the popular categories for women of clerical and sales occupations. Another twelve percent held managerial or professional occupations, twelve percent came from the armed forces, and ten percent from craft occupations. This distribution does not match the overall distribution of men in the economy. Thus male court reporters are relatively likely to arrive in court reporting from the less well-paying, more female-dominated areas in the occupational spectrum. They are less likely than the female court reporters to come from clerical positions.

In summary, the most promising explanations for why and when tipping occurred in this occupation are: 1) Formal recruiting, drawing from the predominantly female population in secretarial skills classes, began in the late 1960s to replace the mainly informal recruiting occurring up to that point; 2) The increased availability of part-time work due to expansion of the freelance sector in the 1970s (paralleling the increased size of the legal system) was relatively more appealing to women, who were entering the labor force in increased numbers during the 1970s and were interested in occupations that offered high part-time earnings; 3) The fallback occupations of secretarial or clerical work are less risky for women who fail to achieve court reporter status than for men because they are relatively more likely to have prior work experience in these areas and are willing to enter these occupations if necessary. In other words, as the demand for court reporters increased, the new entrants came from the same group as the clerical workforce, a group that had become feminized earlier in the twentieth century.

The future of the court reporting occupation

While court reporters have enjoyed robust demand conditions throughout the latter part of the twentieth century, it is still possible that changes, particularly related to changing technology and increased cost-consciousness on the part of judicial administrators, may reduce demand for court reporters in the near future. It is possible that future technology may be harnessed to make their jobs more secure, or replace them entirely. It is also possible that the feminization of this

occupation makes them more likely to be replaced.

How would the latter mechanism operate? Feldberg and Glenn (1983) assert that women serve as a transitional labor force, so that: "jobs in which females are concentrated, or have recently been allowed to enter, are most likely to be displaced by technology" (p. 67). Burnell (1993) finds both that the degree of occupational segregation increases in industries undergoing rapid technological change, and that women workers are underrepresented in these industries. This implies that workers in female-dominated occupations within such industries may be unable to push for higher earnings, or at least that higher earnings are incompatible with increased or even stable employment levels. Thus court reporting is of particular interest as we wait to see if this feminized occupation can hold onto its high earnings level and maintain employment in the years to come.

It is also notable that the "top dog" phenomenon exists within this occupation: Men are disproportionately involved in administration of the national and state professional associations, and men are more likely to be heads of agencies. Are women less likely to assume leadership roles as the older cohorts retire? Is this because of lack of interest, or lack of opportunity? And if women do not assume these leadership roles as the men increasingly retire, will declines occur in earnings and employment? Assuming that someone will have to fill positions such as head of the NCRA, will these new leaders not be as good as the previous male leaders at fighting for high levels of pay and employment? And is this because feminization of the occupation in and of itself puts the new leaders at a disadvantage by bringing on a patriarchal reaction from judicial administrators?

Several points weigh against a happy outcome for the profession. Lower pay is observed in the official sector in the more feminized states, and reporters are constantly fighting off electronic recording threats in state legislatures and in the lower courts.[28] However, there are also points weighing in their favor. Court reporters have embraced realtime technology, which involves simultaneous recording and computer transcript production. Just as the stenographic machine method got a publicity boost from its use in the Lindbergh trial in 1938 (CCRA, n.d.),

realtime has received a boost as millions of television viewers saw it in action during the Simpson trial in 1995. Additionally, court reporters are finding additional areas in which to apply their skills, such as realtime conference transcription and providing the captioning for closed caption television. Computer-based technological change may lead to more of a complementary effect for skilled labor in the long run than a displacement effect, as found in Osterman's (1986) study of the impact of computers on the employment of clerks and managers in the 1970s.

In conclusion, while court reporting may well become a relic in the long run, there is also a good chance that specialized professional court reporters will continue to be the agents that marshal the changing technology used to preserve the spoken word. Thus the court reporting occupation, in its co-evolution with technology over the latter part of the twentieth century and its interrelationships with both the public and private sectors, provides an instructive example for other currently feminizing professions that the deskilling-lower wage-replacement scenario sketched above may not necessarily be applicable.

Notes

[1] There are also case studies that identify female-to-male tipping, including Roos (1993) for the printing industry during some periods, and Catanzarite and Strober (1993) for assembly operatives in *maquiladoras*. In these cases there appears to be a reversal of the causes of feminization, in particular increased skill levels required, along with perhaps a change in the type of capital equipment used in the production process. For instance, the case of baby-delivery (male obstetricians displacing female midwives), as reported by Ehrenreich and English (1973), appears directly related to the use of forceps by obstetricians. The more recent feminization of the ob/gyn subspecialty within medicine appears to be related both to increased supply of women into this area and increased demand on the part of consumers for female ob/gyn practitioners.

[2] Strober and Lanford (1986) identify increased formalization of the profession (i.e., professionalization) as one of the causes of tipping in the teaching profession.

[3]To ascertain these dates, I looked through the advertisements for court reporting firms in the back of the November 1991 *Journal of Court Reporting*.

[4]Information in this section comes from National Shorthand Reporters Association (1973), NCRA (1991), and from phone interviews with Bob Clark, NCRA and CCRA librarian-historian for over 22 years (April 14, 1995); Gary Cramer, a CCRA officer and official reporter for the Los Angeles Municipal Court (April 18 and 19, 1995); Anita Glover, immediate past president of the National Stenomask Verbatim Reporters Association and head of a stenomask reporting firm in Virginia (September 17, 1995); and Nancy Patterson, head of Bryan College, a private court reporting school in California (April 14, 1995).

[5]In the 4th century BC freed slave Marcus Tullius Tiro recorded Cicero's and other speeches using his own Tironian System (including inventing "&"), which was used for many centuries.

[6] This was due to Isaac's brother Ben coming to America in 1842 and opening a school in Cincinnati to teach his brother's method. He trained a generation of court reporters as well as reporting himself, notably for the trial of John Wilkes Booth.

[7] In 1879 Bartholomew developed the first stenographic machine in Bellview, Illinois; it was still used as late as 1939. In 1885 Anderson Kerr developed the next machine, taking out numerous patents on the technology involved; this machine printed both single and grouped letters.

[8] The machine weighed 54 pounds and was referred to as "Old Ironsides." In 1911 a factory was established in Owensboro, Kentucky to produce a slightly less weighty version of this machine, and machine stenography began to catch on with reporters.

[9]Cramer, *op. cit.* Stenomask reporting has the advantage that training takes only a few months; it involves stylized dictation by the reporter onto a tape, while generally another recorder tapes the proceedings directly for backup. While this may seem silly today, this method made more sense in the 1940s when recording quality was poor, sometimes using wire rather than magnetic tape as the recording medium. Stenomask reporters operate at a severe speed disadvantage on transcription vs. real-time reporters; voice-recognition software is still not sufficiently reliable to enhance this method, and only six schools currently train people in this method.

[10]This discussion of changing computer-based technologies is due to Cramer (April 18, 1995). In the late 1960s in Texas, one entrepreneur invented a computer system that would read a paper punchtape and translate the reporter's notes. This was not very efficient, as it required punchcards to correct every mistake either it or the reporter made. In 1975, Xerox ran an

experiment, using some California reporters as guinea pigs. They recorded their keystrokes from the stenograph machine on magnetic tape, which was then used as mainframe input. The reporter would receive back printed output for correction and resubmission.

[11] The reporters recorded their keystrokes onto magnetic tape and gave the tape to the machine's proprietor, who would return a finished transcript; it could be returned for additional editing. The equipment cost about $75,000 (in 1976 dollars), so only the larger freelance firms and some independent entrepreneurs were able to afford them. In the freelance firms, reporters had editing stations back at their desk for use once the data were input, much as word-processing systems by companies like WANG came into use in offices. XScribe equipment was the next to come along in the late 1970s. This system was very popular, especially with some more enterprising official reporters. The system used an optical scanner to read the paper tape. Reporters would bring their tape to a "service center" when they wanted to use this method.

[12] Stenomask reporters are mainly found in states that were late to set up licensing restrictions or do not certify at all. The highest percentage (estimated to be as high as half of the court reporters in the state) is found in Virginia, where court reporting is privatized, so there are no official reporters except in the federal system (Glover, *op. cit.*).

[13] The federal government classifies stenographers and court reporters together, with no way to separate the categories. The total for 1992 is 115,000 (U.S. Dept. of Labor 1995, p. 288).

[14]According to Cramer (April 18, 1995), who trained in California from 1965 to 1968.

[15] [author] (1997). These survey subjects were New York State Court Reporter Association members (all 820 of them as of 1997) rather than NCRA members. The survey instrument is

almost identical. Other than a greater preponderance of official reporters, they were similar in demographics to the 1992 NCRA New York data, save for points mentioned in the text.

[16]An important question is whether or not the NCRA members are representative of court reporters as a whole. It appears likely that they are not significantly different from those reporters who join only state organizations. The author has carried out two other surveys, undertaken at the behest of the Certified Shorthand Reporters Association of New Jersey and the New York State Court Reporters Association respectively, which provide evidence to support this claim. The surveys, carried out in early 1994 and early 1997, used a survey instrument which was essentially identical in form to those used for the CCRA and NCRA surveys. The New Jersey survey was sent to all members of the Association who were official reporters in 1993 (see [author] 1994a for complete details on this survey and its results). The New York survey was sent to all members of the Association (see [author] 1997). The basic demographic information for these groups was not significantly different from comparable NCRA members (those reporting New Jersey work in the official sector in the first case, those from New York in the second case). However, it is not possible to ascertain whether NCRA and/or state association members are different from those reporters who belong to no court reporting association at all.

[17]This is a national random sample collected by the Bureau of the Census. From this sample, a subset of workers meant to be roughly comparable to the court reporters in terms of hours worked and age is used, namely persons ages 25 to 64 who work at least an average of 25 hours per week worked and at least 1600 hours total in 1991.

[18]Mean education, not including court reporting school, was calculated from the survey data by setting high school diploma=12, some college=13, associate degree=14, Bachelor's degree=16, Master's degree=17, and not including those indicating other formal education.

[19]Regressions were also run for year-round full-time reporters only. Regressions were also run using annual earnings as the dependent variable (given that there is measurement error generated by asking respondents to indicate their annual earnings, average weekly hours, and number of weeks worked by circling a range of numbers). The results from both sets of regressions are similar to those reported and thus are not reported herein; they are available upon request.

[20] Percentage female is calculated using the sample; state certification codings are taken from NCRA (1995). Glover, *op. cit.*, identified states with a significant stenomask population, and her choices checked by my counting up the stenomask reporters by state in the NVRA on-line directcory (http://www.nvra.org/, accessed July 8, 2005) and marking those states that contained more than five percent of the total stenomask reporter population. These twelve states are Arkansas, Florida, Georgia, Louisiana, Massachusetts, Mississippi, Missouri, North Carolina, Pennsylvania, South Carolina, Texas, and Virginia. Alternative specifications, including dropping the states with less of a stenomask population, weighting states more heavily (using a 0-1-2 index instead of a dummy variable) if they had a high stenomask population, or redefining states as having a high stenomask presence based on the ratio of stenomask to nonstenomask reporters do not yield significantly different results from those reported in Table 5.

[21] Exclusion of the certification dummy in a nested model decreases the magnitude of the effect of percentage female on earnings. Taken as a measure of formalization differences across states, this negative correlation with percentage female argues against the phenomenon identified by

Strober and Lanford (1986) as a cause of tipping for the teaching profession in the nineteenth century being of similar import in the case of court reporting. Absence of the stenomask reporters variable in a nested model does not affect the coefficient on percentage female.

[22]One might of course question the representativeness of a sample of persons who decide both to fill out this questionnaire and to affix their name to the envelope; there is no way to verify this; however, the subsample is similar in gender composition to the earlier NCRA survey.

[23]This theory was suggested to me by sociologist Andrew Newman.

[24] Charters and Grimes (1997) provide an interesting counterexample to this argument in their study of librarians, in which they argue that technological change in libraries is associated with a decreasing relative number of new female librarians.

[25] Strober and Catanzarite (1994) create a more comprehensive theoretical structure combining elements of economics and the sociological queuing concept in which changing supply and demand conditions along with differential power relationships into a "relative attractiveness" theory wherein white men "choose to inhabit those occupations that are most attractive to them, leaving the occupations that they find less attractive, leaving the occupations that they find less attractive for the other race-gender groups" (p. 117). Assuming that attractiveness is not endogenous (i.e., that having more women in the occupation does not cause the decline in attractiveness, but rather some other facet of working conditions and/or pay about the job relative to other jobs must also change), this explanation is difficult to reconcile with the wage data and job descriptions presented above. One would want to know what occupations potential male court reporters entered instead, a difficult piece of information to obtain. Strober and Lanford (1986, fn. 35) argue that a decline in the female/male wage in teaching brought women into the

profession, causing the percentage female to rise, which then discouraged men from entering the female-typed profession. This is a less likely scenario for court reporting; there is no indication that separate wage rates by sex existed for reporters in either the freelance or official sector.

[26]The idea that recruiting practices might have discriminated against men has been controversial among court reporters. One (Karpowicz, 1977) asks: "Have we unwittingly practiced a kind of discrimination by recruiting the girls in the senior high school shorthand class rather than directing our recruiting efforts to the junior college freshman and sophomore English classes?" Another (Gillett, 1977, p. 32) responds: "The fact that the people enrolled in shorthand classes are a natural recruitment base is far from indicative of discrimination against men."

[27]They can also train at Aquinas College in Massachusettts, and there are a couple of correspondence courses available. Glover, *op. cit.*, asserts that it takes about two months for her to train a person, if the person is mature, has good English skills, knows how to use a word processor, and has worked as a legal secretary.

[28]For example, the commissioning by various court reporting associations of the various reports written by the author stems from this concern.

Table 1

Percentage distributions of shorthand systems used by court reporters, 1917-1994

	1917	1923	1930*	1942	1956	1976	1990	1994
stenograph	0	0	0.39	10	43	86.51	91	99.99
Gregg	5	15	N/A	28	33	11.91	7	.01
Pitman	[ ]	85	N/A	54	15	1.52	0	0
other	[95] (mostly Pitman)	0	N/A	8	9**	0.06	2	0
number of systems listed	23	N/A	25	41	40	13	3	2

*two-thirds of the listings in 1930 had no system designated

**other, or no system listed

Sources: 1917, 1923, 1930, 1942, 1956, 1976— Gilman (1976), drawing on NSRA/NCRA membership directories; 1990—Sharpe and Smith (1991), surveying members of the Tennessee Shorthand Reporters Association; 1994—author's third survey

Table 2

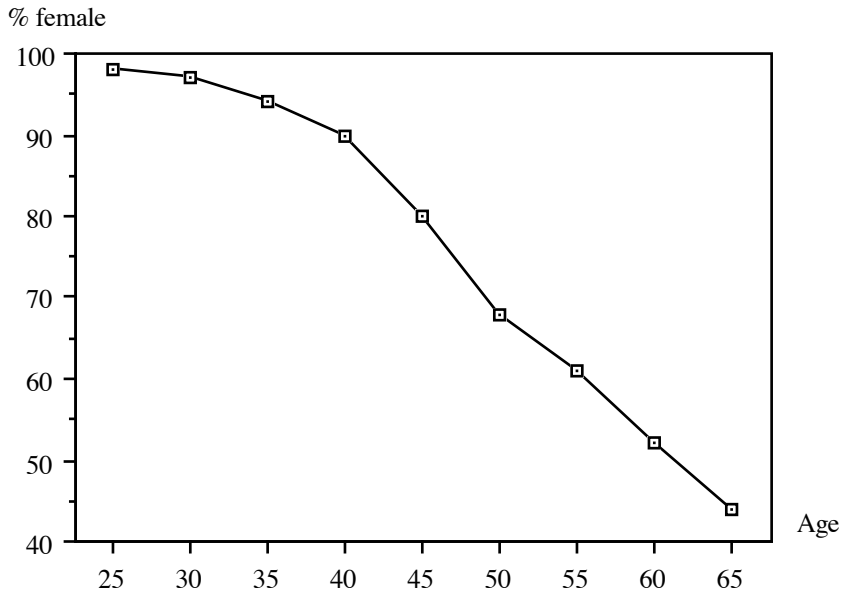
NSRA/NCRA working court reporter membership and growth rates, 1909-1994

	1909	1917	1923	1930	1942	1956	1976	1994
membership	400	725	1342	1013	1119	2421	9950	18,500
percentage growth per annum	--	7.4%	10.3%	-4.0%	0.8%	5.5%	7.1%	3.4%

Sources: 1909— Rogner (1991), drawing on the 1909 NSRA convention proceedings; 1917, 1923, 1930, 1942, 1956, 1976—Gilman (1976), drawing on NSRA/NCRA membership directories; 1994—provided to author from NCRA membership roster.

Figure 1

Relationship between cohort age and percentage female



Source: Author's first and second surveys

Table 3

Demographic characteristics of court reporters, 1942-1992

	1942	1968	1975	1979	1992
percentage female	26%	30%	55%	62%	86%
median age					
women	40	--	--	--	35
men	44	--	--	--	46
median years of experience					
women	15	--	--	--	10
men	19	--	--	--	21
distribution by type					
official	72%	--	--	38%	29%
freelance	28%	--	--	53%	67%
both	--	--	--	9%	4%

Sources: 1942—Gilman (1976), drawing on the NSRA membership directory; 1968—interview with Cramer; 1975—Gales (1976), based on the 1974-75 NSRA membership directory; 1979—"Demographics of NSRA Membership," *National Shorthand Reporter* (July 1979), p. 65; data supplied by the NSRA insurance carrier, Albert H. Wohlers & Co.; 1992—from author's first and second surveys.

Table 4

1991 mean annual earnings, education, and percentage female,

for broad occupational groups and selected occupations

	Earnings	Education	Percentage female
court reporters	50,500	13	86
year-round, full-time workers, ages 25-64			
all such workers	30,000	13	42
By occupational group			
managers	41,500	15	42
professionals	38,000	16	48
technicians	32,500	14	47
sales workers	31,500	14	39
production workers, skilled	30,500	12	40
production workers, unskilled	24,500	11	25
clerical workers	23,000	13	40
service workers	19,500	12	49
Selected occupations			
secretaries	20,500	13	99
retail sales workers	20,500	13	55
food service workers	13,500	12	78
lawyers	64,000	18	23
teachers	31,000	17	68
medical technicians	25,000	14	81

Source: Calculated from the Current Population Survey Annual Demographic File (March 1992)

Table 5

Regressions of 1991 log of hourly earnings, overall, by sex, and by sector

	All	Women	Men	Freelance	Official
State's percentage female	-0.31**	-0.31**	-0.37	-0.14	-0.67***
	(-2.35)	(-2.05)	(-0.71)	(-0.77)	(-3.91)
State certification	0.11***	0.12***	0.06	0.13***	0.07***
	(6.51)	(6.16)	(1.63)	(6.19)	(2.68)
State stenomask	-0.03	-0.02	-0.08	-0.02	-0.07**
	(-1.43)	(-0.79)	(-1.41)	(-0.54)	(-2.19)
Male	-0.05	--	--	-0.07	-0.04
	(-1.04)		--	(-1.00)	(-0.47)
Male*Experience	0.01***	--	--	0.01***	0.01*
	(3.88)		--	(3.86)	(1.71)
Experience	0.04***	0.05***	0.04***	0.04***	0.03***
	(9.71)	(11.38)	(3.46)	(8.41)	(5.24)
Experience^2/100	-0.07***	-0.11***	-0.04*	-0.08***	-0.05***
	(-5.65)	(-7.71)	(-1.69)	(-4.79)	(-3.61)
Rural	-0.11***	-0.10***	-0.15***	-0.12***	-0.11***
	(-5.85)	(-4.61)	(-4.34)	(-4.12)	(-5.14)
Midwest	-0.25***	-0.25***	-0.23***	-0.19***	-0.34***
	(-9.60)	(-8.14)	(-4.84)	(-5.47)	(-11.63)
South	-0.14***	-0.15***	-0.08	-0.13***	-0.19***
	(-5.68)	(-5.45)	(-1.28)	(-3.92)	(-5.70)
West	-0.04	-0.02	-0.14***	-0.02	-0.06*
	(-1.46)	(-0.56)	(-2.74)	(-0.59)	(-1.95)

Table 5 (continued)

	All	Women	Men	Freelance	Official
Age	0.04***	0.03***	0.01	0.05***	0.01
	(4.65)	(3.60)	(0.35)	(4.70)	(10.99)
$Age^2/100$	-0.05***	-0.04***	-0.02	-0.06***	-0.01
	(-5.07)	(-3.80)	(-0.97)	(-5.04)	(-1.23)
Married	0.09***	0.09***	0.07*	0.09***	0.07***
	(4.90)	(4.39)	(1.96)	(3.91)	(2.70)
Racial/ethnic group (measured relative to white and other)					
Asian	0.06	0.04	0.07	0.09	0.04
	(1.30)	(0.96)	(1.00)	(1.54)	(0.68)
Black	0.11**	0.07	0.49***	0.21*	0.03
	(2.08)	(1.18)	(4.48)	(1.88)	(0.59)
Hispanic	0.12***	0.12***	0.09	0.12**	0.07
	(2.86)	(2.70)	(1.21)	(2.11)	(1.14)
Presence of children					
child under 6	-0.03	-0.04**	-0.03	-0.03	-0.04*
	(-1.59)	(-2.54)	(-0.62)	(-1.13)	(-1.66)
child 6 - 17	-0.06***	-0.07***	-0.01	-0.07***	-0.06***
	(-4.02)	(-3.87)	(-0.33)	(-3.12)	(-2.67)
Education level (measured relative to high school)					
Some college	0.04**	0.05**	0.01	0.03	0.04**
	(2.21)	(2.54)	(0.30)	(1.27)	(2.04)
Associate degree	0.04*	0.04**	0.03	0.04	0.03
	(1.86)	(2.00)	(0.51)	(1.43)	(1.22)
Bachelor's degree	0.05**	0.05	0.10*	0.07**	0.02
	(1.99)	(1.60)	(1.68)	(1.96)	(0.58)

Table 5 (continued)

	All	Women	Men	Freelance	Official
Master's degree	0.06	0.02	0.22*	0.06	0.07
	(1.13)	(0.34)	(1.92)	(0.75)	(1.22)
Other	0.10**	0.14**	-0.09	0.14**	-0.00
	(1.97)	(2.49)	(-0.84)	(2.10)	(-0.03)
Total yearly hours worked (measured relative to 1300-2750)					
< 1300	0.62***	0.60***	0.90***	0.62***	0.56***
	(17.66)	(16.46)	(7.94)	(15.96)	(6.23)
> 2750	-0.23***	-0.22***	-0.27***	-0.23***	-0.24***
	(-17.65)	(-15.18)	(-9.16)	(-12.86)	(-13.70)
Other household income	-0.04***	-0.03***	-0.09***	-0.04***	-0.03***
(per $10,000)	(-8.18)	(-6.83)	(-7.25)	(-6.93)	(-4.15)
Type of reporter (measured relative to official)					
Freelance	0.02	0.00	0.06*	--	--
	(1.15)	(0.05)	(1.84)		
50 - 50	0.04	0.03	0.09	--	--
	(1.13)	(0.72)	(1.45)		
Intercept	2.42***	2.46***	3.09***	2.01***	3.38***
	(13.49)	(12.82)	(6.26)	(8.70)	(14.94)
Mean log earnings	3.09	3.05	3.30	3.09	3.09
Number of observations	5355	4576	711	3596	1573
adjusted R-squared	.32	.31	.42	.31	.39

*** coefficient is significantly different from zero at the .01 level on a two-tailed test

** coefficient is significantly different from zero at the .05 level on a two-tailed test

* coefficient is significantly different from zero at the .10 level on a two-tailed test

Table 6

Regressions of transcript page completion times, overall, by sex, and by sector

	All	Women	Men	Freelance	Official
Female	1.09**	--	--	0.86	1.33**
	(2.52)			(1.25)	(2.40)
Experience	-0.17**	-0.20**	0.11	-0.26**	-0.06
	(-2.21)	(-2.54)	(0.86)	(-2.20)	(-0.66)
Experience^2/100	0.32*	0.46**	-0.37	0.61	0.11
	(1.73)	(2.09)	(-1.14)	(1.64)	(0.51)
Manuscript length	-0.001	-0.001	-0.01**	-0.005	-0.001
(in pages)	(-0.63)	(-0.44)	(-2.12)	(-0.96)	(-0.46)
South	1.24***	1.15***	1.35**	1.17**	1.42***
	(3.48)	(2.81)	(2.23)	(2.36)	(2.66)
Constant term	5.13***	6.53***	4.08***	6.31***	4.25***
	(7.15)	(9.80)	(3.02)	(5.68)	(4.13)
Mean minutes per page	4.94	5.14	3.98	4.98	4.91
Number of observations	268	223	45	139	129
adjusted R-squared	.08	.05	.17	.08	.07

*** coefficient is significantly different from zero at the .01 level on a two-tailed test

** coefficient is significantly different from zero at the .05 level on a two-tailed test

* coefficient is significantly different from zero at the .10 level on a two-tailed test

Table 7

Nominal average annual earnings for court reporters and other selected worker groups, 1901-91

	1901	1939	1975	1991
court reporters				
all	--	--	--	$50,000
free-lance	--	--	$20-45,000	$49,000
official	--	--	$10-26,000	$53,000
official—California	$2000	$2500+	--	$65,000
all employees	$438	$967	$12,000	$27,000
federal civilian employees	$974	$1843	$14,000	$34,000
clerical workers	$1009*	--	--	$23,000
nonsalaried lawyers	--	$4391	--	$64,000

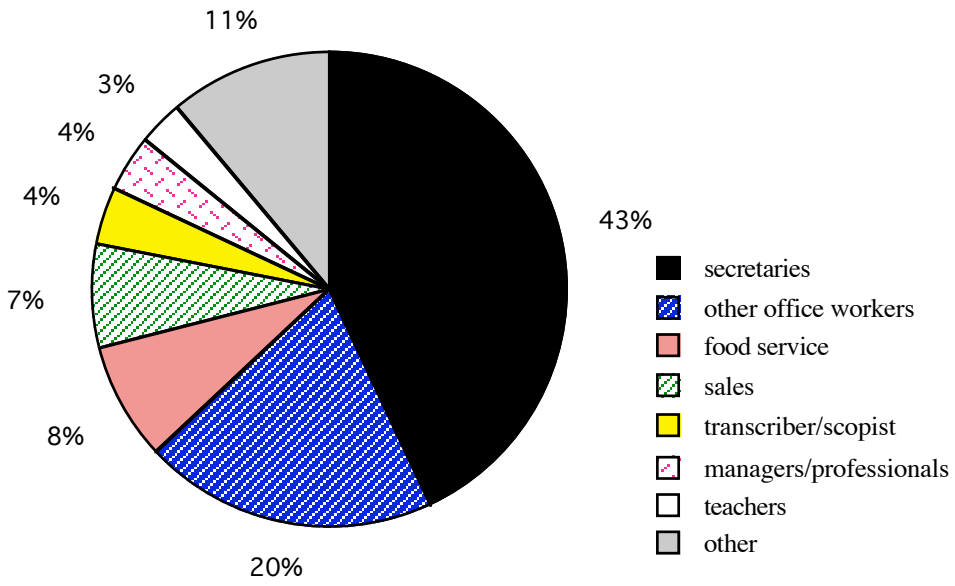
*in manufacturing and steam railroads

Sources: Court reporters, 1991—author's first and second surveys; other years—CCRA and NCRA data; all employees, 1975, 1991—Council of Economic Advisors (1995), Table B-45; federal civilian employees, 1975, 1991—1992 Statistical Abstract of the United States, Table 533; clerical workers and lawyers, 1991—author's calculation as reported in Table 4; other workers and years—U.S. Department of Commerce (1975), series D724, D764, D787, D914.

Figure 2

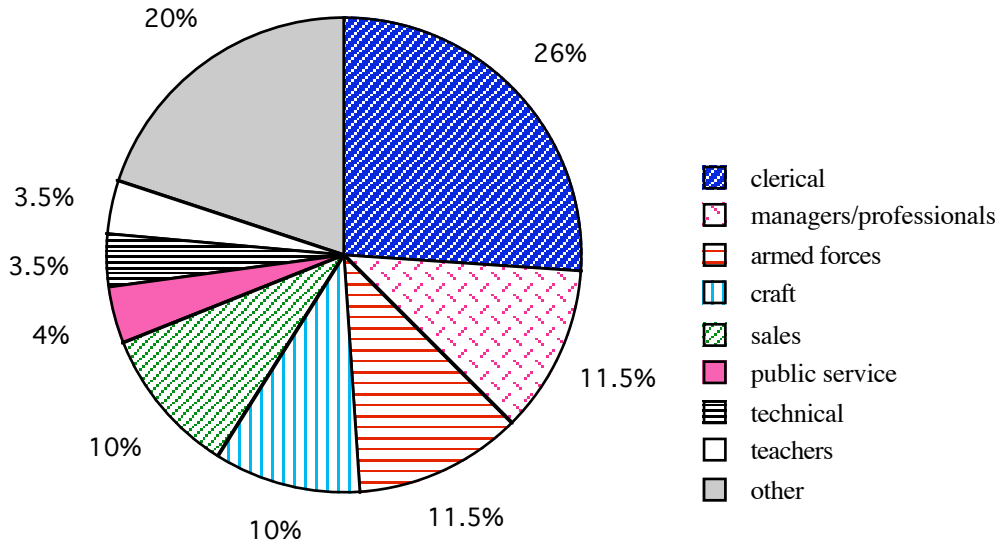
(a)

Occupational distribution of female court reporters prior to entering the profession



(b)

Occupational distribution of male court reporters prior to entering the profession



Source: Author's first and second surveys

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