Ports of Entry

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Abstract

Early statements on internal labor markets view firms as consisting of ports-of-entry jobs and other jobs. Workers are hired into the former and promoted to the latter. In the strictest form, external hiring only takes place at certain job levels and thereafter workers are insulated from the forces of market competition. Data from the Swedish Employers' Confederation are used to determine the existence of ports of entry in firms that represent a large part of the Swedish economy. Although there is a great deal of promotion from within, at every level there remains significant hiring from the outside. The data are more consistent with tournament theory or with theories of firm-specific human capital than they are with the more rigid institutional views.

It has long been recognized that labor differs from other products and that its special characteristics sometimes justify giving attention to unusual aspects of the labor market. Agency theory is a case in point. One rarely worries about a table or chair refusing to do its duty, but motivating workers is central to much of economic analysis.

Another aspect of labor markets that is not unique, but remains important, is the fact that labor is not generally transacted in spot markets. Instead, some longer term relationship between employer and employee is involved. Whenever there is a long term relationship, the prices - in this case wages - that are observed at a point in time do not necessarily reflect the opportunity cost nor value of the item in question. As a result, incumbent workers may be somewhat insulated from competition from those outside the firm and firms may be somewhat insulated from competition for the workers from other firms. The existence of firm-specific human capital, mobility costs or matching that reflects a wedge between internal and external value as well as incentive considerations may yield an environment where most hiring at high levels in the firm are from within.[1] The system of internal promotion reflects the advantages of incumbents over outsiders.

In its extreme form, this practice leads to a situation where all new employees enter the firm at the lowest level and where higher levels are filled exclusively from those promoted from lower levels. Exclusivity of internal promotions has the disadvantage that the firm may miss new opportunities, may not always get the best worker for the job, and may not be able to grow or adjust

[1]See Becker (1962) on firm-specific human capital, Jovanovic (1979) on matching, Lazear (1979) on incentives and Lindbeck and Snower (1986) on insider-outsider differences.

quickly as a firm's product markets change or develop.

In this form, "ports of entry" exist in the firm. Certain jobs serve as entry points into organizations. All workers come into the firm through these jobs and move up (or down) over the course of their careers. In what follows, a new, detailed organizational data set from Sweden is used to analyze the prevalence and nature of ports of entry within firms.[2] Prior economic studies of how firm hierarchies evolve have been limited by the lack of data with detailed information on the entire structure of firms. While hierarchies of individual firms have been analyzed,[3] it is unclear how well the patterns observed in these studies generalize to the large set of firms in the economy. Now, however, a number of data sets exist that contain detailed information on all workers in a firm over time and that cover all or a large fraction of the country's firms. The data used cover almost all white-collar workers at a group of firms that account for about 40% of the Swedish labor market during the 1970s and 1980s.[4]

Economic Theory and Ports of Entry

A simple view of labor markets would suggest that firms have no need to use ports of entry. If all human capital were general and none were firm-specific, then mobility could occur at every

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[2]The notion that there may be ports of entry dates back at least to Reder's (1955) analysis of job ladders and received additional attention in Doeringer and Piore's (1971) book on internal labor markets.

[3]See Lazear (1992) and Baker, Gibbs, and Holmstrom (1994) for economic studies of private sector firms. See Barnett, Baron, and Stuart (2000) for a study of a large government bureaucracy.

[4]Gibbs, Ierulli, and Milgrom (2002) use the same data to study factors that drive employees to move between levels, change firms, or change occupations. While both papers study across-firm and within-firm transitions, this paper considers the hierarchies and sources of workers from the firm's perspective rather than focusing on the workers' careers.

level of the firm's hierarchy. Even if firms differ substantially in their human resources policies, labor markets might price general human capital efficiently, allowing employees to move about at any point in their careers. For example, some universities are better at training assistant professors than others. There is no necessity for the first university to retain all of its trainees. When assistant professors have acquired the requisite knowledge, they move to other universities and enter as associate or full professors. Human capital in academics, particularly at the research end, is general, so movement into jobs even at high levels seems natural. Long term contracts are unnecessary and in fact have no role in this purest form. Spot markets allocate labor perfectly and there is no reason for there to be any permanent attachment to a firm, although given mobility costs, long tenures could well be a feature of this market.

Many labor markets are not so simple, however, and a number of theories give rise to ports of entry. One obvious, albeit somewhat unsatisfying, justification for ports of entry highlights the importance of institutions. The institutional argument in its simplest form is that workers are (perfect) substitutes for one another. They rise to the top in the firm based on seniority, nepotism, influence, and discrimination. Thus, all workers must come in at the bottom and acquire promotions by working the system for a long enough period of time. This view allows little role for markets and mobility. Firms that run their businesses in an arbitrary fashion can be supplanted by those that behave more rationally. Only when firms are very insulated from market forces could such a system persist.

The theory of firm-specific human capital provides a more coherent story that might allow for ports of entry. The argument is that high level jobs in the firm require more firm-specific knowledge than low level ones. There is no way to acquire firm-specific knowledge other than

spending time in the firm. As a result, workers are hired in at low levels and move up the hierarchy as they acquire skills. This is consistent, but is a bit of a stretch because the theory of human capital has no role for jobs at all. Formally, a worker could be hired in as a vice-president and could simply be paid less until his stock of human capital were sufficient to justify the higher VP pay. Since there is nothing in the theory about tasks, there is no reason why jobs or job titles must change. In fact, in most human capital models, workers are perfect substitutes and differ only in the amount of efficiency units of human capital that they possess.

Career incentive models such as Lazear (1979) are similar to the theory of firm-specific human capital. They provide reasons for long term relationships between workers and firms (based on incentives) in which workers enter at low wages and end up with higher wages. But, as in the theory of human capital, there are no jobs per se and only if the level and wage are synonymous does the port of entry scenario fit well with work life incentives.

Tournaments provide a more cohesive reason for having ports of entry. In tournament theory, jobs are defined as wage slots. An individual enters the firm at one job level and is promoted to another if he wins the tournament. Losers remain in the same job. There is no necessity that tasks differ in the two jobs. In fact, most of tournament theory makes little mention of tasks.[5] Because there must be some losers, it is necessary for the firm to be narrower at the top than it is at the bottom. Furthermore, promotions to higher levels serve to motivate workers, so it is necessary that some workers come in at lower levels. The model taken literally implies that the top level of the firm can only have workers who are promoted in because it serves no role other than to motivate

[5]The exception are those papers that argue that tournaments perform a sorting role as well as providing incentives, e.g., Gibbs (1995).

those one level below.

What kind of evidence bear on the existence of ports of entry? Required are data on the entire firm's workforce that includes information on whether workers were hired into the position or promoted into it. It is important to have this data for a large number of firms to provide confidence that the findings are not atypical.

There are two ways to think about ports of entry. One is to look at each level in the firm and determine what proportion of workers are promoted into that position and what proportion are hired in from the outside. If some levels have very few workers hired from the outside and others have very many hired from the outside, then one could conclude that the lower level is a port of entry and the upper level is not. The second approach is to ask whether workers are hired disproportionately into one job over another and whether the high hiring job feeds the low hiring job. For example, suppose there are two jobs in the firm and that job 1 accounts for 75% of the work force, whereas job 2 accounts for 25%. Suppose further that 98% of the workers at the firm were hired into job 1 and only 2% were hired into job 2. It would appear then that job 1 is a port of entry and job 2 is not. The Swedish data permit both analyses.

Data

The data were collected and provided by the Swedish Employers' Confederation (SAF).[6] The SAF assembles very detailed and uniform data from establishment-level personnel records. The firms span virtually every private sector industry (with the exception of financial services). This

[6]This data description borrows liberally from Meyersson Milgrom, Petersen, and Snartland (2001). See that paper for further details about the SAF data.

study uses the SAF data for white-collar employees. In any given firm, this data includes all white-collar workers, with the exception of the CEO and other members of the executive team who negotiate their own wages rather than letting a union negotiate on their behalf. We use data for the years 1970-1990. During that time, the data were used in annual wage negotiations and were monitored by SAF and the relevant labor unions. Therefore, data quality is very high and is likely to be much more accurate than standard surveys that rely on self-reported wages.

The dataset's firm and establishment characteristics include industry code, number of employees, and region. Individual data include wages, age, gender, and a detailed occupation code. The wage measure used in this study is base wage and refers to the normal pay for a 38 hour work week.

The occupation code, which is part of the Swedish occupational coding system and is known as the "BNT" code, is a four-digit number that can be thought of as the person's job title or "job". The first three digits of the occupation code, which is referred to as an "occupation family" throughout this paper, determine the type of work the person does. There are 51 unique white-collar occupation families.

The fourth digit of the occupation code, which is referred to as "level" throughout this analysis, is a single digit that indicates the individual's degree of responsibility and skill. In the analysis that follows, "level" can take a value between 1 (lowest level) and 7 (highest level). In some of the analysis, some of the levels are combined, but levels are always normalized so that the lowest level at any given firm is one. Not all occupation families have seven levels, so the 51 occupation families have a total of 285 occupation/level combinations.

The exact tasks associated with each level for any given occupation are documented in significant detail and, to the degree possible, are applied consistently across firms. Unions and the SAF oversee this classification. Because the data are used in wage negotiations, both sides have an incentive to insure the integrity and comparability of the classifications. As will be shown, level is highly correlated with (but not entirely determined by) pay. That is, the levels are classified by job responsibilities and this classification may affect an individual's pay. But it is not the case that firms classify employees' level based on their pay. See the Appendix for examples of occupation families and the differences in responsibilities at different levels of these families.

These data have the advantage of covering many years and many different sizes of companies. While that allows relatively general conclusions, it also presents numerous challenges. First, not all firms have workers at each level and, even at those that do, some of the firm/level observations are quite small. As a result, for some of the analysis, firms will be separated by the number of levels represented at the firm. In other parts, analysis will focus only on firms with some employees at one or both of the two highest levels and one or both of the two lowest levels. Finally, when transitions in individual firms are considered, only the 100 largest firms in the data are examined.

A second challenge is that, due to changes of ownership, data entry problems, or other causes, there appear to be some false transitions in the data. For example, there are cases where a firm with many employees is in the data in year t but not year $t + 1$. In year $t + 1$, another firm with largely the same individual workers appears in the data for the first time or a firm that has been in operation for several years before year t adds most of the employees from the firm that disappeared. In an attempt to maximize the length over which we follow an individual worker and to minimize

miscoded turnover, a variable called "family" is generated. Any two firms where more than half the workers from one firm appear at the other firm in the next year are treated as being part of the same family. If firms *x* and *y* and firm *y* and *z* are in the same families, a family is created including all three of these firms and any other firm that has a family relationship with any individual firm.

Finally, though up to twenty-one years of data are available for each firm, a significant portion of the job observations are censored on one side or the other. In some of the analysis, the level at which a person entered the firm for which he works is important. This information is not available with certainty for many of the jobs observed. When relevant, the implications of this censoring are considered in the discussion of the results.

Sources of Workers

The first analysis considers the fraction of workers in a given level (as of 1988) at a given firm who moved to that level from a different level in the same firm. This analysis includes all workers and all firms. There are seven possible levels, but not all firms have employees at each level. Each column in Table 1 corresponds to firms that, as of 1988, had each number of levels. An employee's 1988 level is considered, where 1 corresponds to the lowest level in the firm. It is determined whether each employee had previously been at a different level with this same employer. Employees who were already working in their current level when the firm first enters the dataset are dropped because their initial position at the firm cannot be determined unambiguously.

Table 1 makes it clear that the rate of external hiring relative to internal hiring decreases monotonically at higher levels. For example, in firms with six or seven levels, over 80% of employees in the top three levels moved to their current level from another level in the same firm.

A third or fewer of employees moved into their position internally at low levels of the organization, however.[7] Figure 1 shows this trend across levels graphically.

Table 1 and Figure 1 provide evidence that there are large differences in inside and outside hiring by level. The lower levels in the typical firm are much more likely to hire from the outside; the upper levels are more likely to hire from within. This is consistent with the notion that there are ports of entry into the firm.

That said, it is worth noting that even at the very high levels, a significant fraction of workers are hired from the outside. In six and seven level firms (which hire the fewest from the outside at top levels), approximately 15% of those in the highest level were hired directly from outside the firm.

Figure 2 shows the size of each level. The fourth level from the top - and not the bottom level - is the largest in terms of number of employees in both 6 and 7 level firms. Still, a relatively large proportion of the workers in this modal position come in through promotion. (Note that 65% are hired into the modal position internally.) Thus, it appears that the middle levels are almost absorbing states; most workers either get hired directly into these levels and stay there or get promoted from lower levels to the middle levels and rarely move beyond.

First Jobs and Destinations

While Table 1 looks at whether employees move into each level internally or externally,

[7] Note that the first row of Table 1 suggests that about one-fourth of workers move into jobs in the firm's lowest level internally. Most of these internal transitions are not demotions, but rather promotions from a level that no longer exists. That is, if the lowest level employee in the firm was promoted to the next level before 1988, he will still be at the lowest level in the firm, but he will have transitioned there from another level.

Table 2 looks at where workers start in the firm relative to where they are at a given point in time. To maximize the number of firms included in this analysis, the top two levels are combined and the bottom two levels are combined. Firms that do not have workers in both the top and bottom (combined) levels are dropped.

The second and third columns of Table 2 report the median and mean ratio of the number hired into a level to the number in that level, where the unit of observation is a level within a firm. Thus, the median is the ratio of the 50th percentile firm ranked by (# hired into level)/(# in level in 1988). The fourth column reports the number of firms in the sample at each level. The fifth column is the number in the level at each firm, averaged across all firms. "Cum. hired" is the number hired in that level or below. "Cum. in level" is the total number in that level or below. The last two columns are the same values expressed as percentages, i.e., the cumulative distributions.

The last two columns highlight the difference between entry level and current level. Fifty-nine percent of the workers are hired in at one of the bottom two levels but only 31% worked in those levels in 1988. The modal hiring level is 2 while the modal employment level is 3. At the lowest level, the median firm has twice as many hired into level 1 as actually are employed at that level. The highest level is almost the mirror image of the bottom with the median firm employing 2 ½ times as many at the level as it hired in at that level. In summary, many more work in the top level than are hired into it and many more are hired into the bottom level than work in it.

Table 3 displays the transition matrix from entry level to 1988 level, focusing on the same five levels as in Table 2. Even for the highest level workers, more workers who are currently at level 5 entered at level 5 than at any other single level. Of course, those who definitely entered at level 5 comprise less than a quarter of those at that level, but it is clear that despite the existence of

lower level entry and upward mobility, entry from outside the firm is reasonably common, even at the top levels of the typical organization.[8]

Panel B of Table 3 provides a sense of the overall pattern of entry and mobility. It computes the number and proportion of individuals along the diagonal, in the lower triangle and in the upper triangle of the matrix. Employees with unknown entry levels are excluded from this analysis. First, 52% of the observations lie along the diagonal, which means that 52% of the individuals in the typical firm are currently at the same level as they entered. It is striking that 46% are in the lower triangle, which means that 46% have been promoted at least one level. Only 2% lie in the upper triangle, implying demotion (usually due to changing occupation). Thus, entry at levels lower than those currently held is a very common pattern.

The picture that emerges from Tables 2 and 3 is that most individuals at any given firm were hired into lower or middle levels of the firm and did some advancing to higher levels. Almost 90% of the typical firm's workers were hired into levels 1, 2, or 3. About 85% work in those three levels at any point in time. It is the middle levels of the firm that comprise most of the workforce. The lowest level is relatively small.

Even though disproportionately many are hired into the lowest levels, a substantial fraction of the workforce makes its entry by being hired into the middle levels of the firm. The modal worker entry/current combination in Table 3 is the 3,3 cell. The second biggest cell is the 2,2 cell. The number who enter at 2 and are promoted to higher levels exceeds the number who are hired into and remain at level 2. Thus, the most important levels in the typical firm in terms of number of

[8] Strictly speaking, the current level is the modal entry level among those observations where the entry level is known. Left censored observations are less likely to have entered in the current level. As a result, at the highest levels, the current level may not be the true modal entry level.

employees also happen to be ports of entry, accounting for most of the hiring. These levels are *both* jumping off points *and* destination jobs for a large part of the workforce.

Another way to interpret Tables 2 and 3 is to say that firms appear to have ports of entry, but not exactly in the traditional sense. Most workers do not enter at the bottom. For example, those who are currently in level 5 come in roughly even numbers from levels 3, 4, and 5, but rarely from the two lowest levels. Those who are currently at level 4 are most likely to have entered at level 3, then level 4. The general picture is that workers enter at or near the position that they currently hold. While some of these workers may still be promoted at some point in the future, Table 3 provides a picture of internal and external transition from the firm's point of view. For example, the (3,2) entry in the table, equal to 11,333, is large relative to the total in that row. About two-fifths of the workers who are employed at level 3 in 1988 and for whom the entry level is known entered at level 2. But it is also true that a slightly larger number (12,469) who entered at level 2 are still at level 2. Although some may eventually move up to level 3, it is clear that at a point in time, many workers remain at the level at which they were hired into the firm.

It is also interesting to think of transitions from the worker's point of view. Some workers who recently entered the firm will not have been promoted at this point, but will be promoted at some future date. As a result, in Table 3, Panels C and D show the same analysis as Panels A and B, but show it only for workers who have been with the firm for ten years or more. The picture changes somewhat, but the conclusions are remarkably similar. There is still a significant portion of the workers along the diagonal. About one-third of the workers remain in the job levels into which they were hired. A small fraction are demoted and almost two-thirds of the workers have obtained at least one promotion during their time at the firm. Thus, entry with

promotion is the most common pattern, but a sizeable fraction are hired into the job that they will hold, perhaps for their entire lives.[9]

More can be understood by learning a bit more about the kinds of jobs that are represented by lowest and middle levels. The appendix provides descriptions of typical jobs in the data by major occupation. The occupations (called occupation families) are chosen to be among the largest numerically in the data. In one occupation family (manufacturing), there are no level 1 jobs. In construction and marketing, the lowest level jobs are for workers who do the most mundane tasks. For example, in construction, a job that requires simple calculations regarding dimensions and materials is classified as level 3 (out of 7). Most white-collar workers in construction are likely to be required to do some of these simple calculations, which means that firms hire most of their basic white-collar workers into levels 3 or higher. But the relationship is far from obvious because in both manufacturing and construction, any worker at level 3 or above is required to have a number of subordinates, which would suggest that there would be more below than at this level. Part of this may have to do with the data being restricted to white-collar workers. In manufacturing in particular, the subordinates might be blue-collar workers who do not show up in these data and therefore make the bottom of the hierarchy appear narrower than it is. More is said on this below.

Import and Export Jobs

Table 4 reports entry rates to and exit rates from a given firm/level. Each person/year is an observation. For example, of all the individuals in level 3 as of year *t*, 10.22% worked in a different firm in year *t* - 1 and 9.24% worked at another level of the same firm in year *t* - 1. Also, 10.51% of

[9]One change is that in levels 4 and 5, the modal level of hiring is now level 3.

the workers in level 3 as of year t worked at another firm in year $t + 1$ and 7.02% worked in a different level at the same firm in year $t + 1$. This is done across all firms that have workers in levels 1 and 5 (defined as in Tables 2 and 3). The main point to be inferred from Table 4 is that at lower levels of the typical firm, there is much external entry, but little internal entry. At high levels, there is much less external entry and substantially more internal entry.

Figures 3 and 4, which are based on the data in Table 4, capture the importance of external entry and exit and internal entry and exit graphically. Figure 3 displays the ratio of external entry to internal entry at each level, while Figure 4 displays the ratio of internal exit to internal entry. Figure 3 reveals that in low level positions, almost all entry is external. In high level positions, significantly more workers enter the position through internal promotion than through hiring from the outside.

Figure 4 makes clear the distinction between "export" jobs and "import" jobs. Some jobs take workers from other positions in the firm. Other jobs send workers to other positions in the firm. The low level jobs are export jobs whereas the high level jobs are import jobs. To see this, note that at level 1, almost five times as many workers are sent to other jobs within the firm than are brought in from other jobs within the firm. Level 1 does not import from other jobs in the typical firm. Instead, level 1 jobs hire from the outside and then export to other jobs within the firm. At level 5, the pattern is the reverse. Many fewer workers are exported to other jobs within the firm from level 5 than are imported from other jobs into level 5. Level 5 jobs are importers.

One other point is apparent from Table 4. At job level 1, the number of workers who leave the job to go to other jobs in the firm is about equal to the number who leave the job to go to other firms. (The external exit rate is 13.13%; the internal exit rate is 14.59%.) But at high levels, the

pattern is quite different. At level 5, over four times as many workers leave the level to go to other firms as leave the level to go to another level (in this case lower) within the same firm. Exports from level 5 are to the outside almost exclusively. Exports from the lowest level are as likely to be to other jobs inside the firm as to jobs outside the firm.

Summarizing, the middle levels of the typical firm account for most white-collar workers and the most white-collar hiring. There is a tendency for workers to be hired in at lower levels than they end up. There are ports of entry in that people tend to enter at different levels than they end up, but the extreme version of internal labor markets story does not seem to hold. A substantial fraction of workers are not hired in at the bottom, but rather at positions close to the ones they currently hold.

Time in Job

Table 5 reports time in job. Not surprisingly, the lowest levels in the firm tend to have the shortest job tenures.[10] Low level jobs are ports of entry, but they are also ports of exit. Workers who do not get promoted out of these jobs fairly quickly tend to exit the firm because job tenures here are relatively short. Note that the average tenure (uncensored) in level 1 jobs is about half that in level 5 jobs. The same pattern holds, but to a lesser extent in the censored data. So workers do not spend much time in low level jobs. At least on average, they move to higher level jobs in the firm or they leave the firm.

The more interesting and perhaps surprising finding in Table 5 is that job tenure becomes fairly constant above the lowest two levels. Average job tenures do not differ much among the top

[10] Many previous papers equate the term "tenure" with time spent at a given company. Here "job tenure" is defined as tenure in a job (level) at a single firm. An employment spell at a single employer can be made up of several jobs, each with its own job tenure.

three levels. While job tenure does increase slightly and statistically significantly at each increasing level, average job tenures only differ by about 10% for levels 3 and 5. This suggests that many employees have long spells in middle levels of the typical firm. It does not appear that firms are enforcing "up or out" policies, nor that employees who do not get promoted regularly leave to seek better opportunities. Rather, it seems many workers settle into a long spell in middle and upper-middle levels. This is more evidence that middle levels of the firm act as semi-absorbing states.

Wage Levels as Ports of Entry

Figures 5 and 6 reveal that the distribution of wages looks similar to the distribution of levels. Figure 5 shows that the distribution of wages in the sample is bell-shaped. Figure 6, which shows the distribution of wages at the largest firm in the sample, gives an indication that this distribution is not the result of combining many individual firms that have monotonically declining wage densities. This bell-shaped salary distribution is standard in the data.

It is now useful to determine whether there are ports of entry into "wage levels." In order to do an analysis that is comparable to the earlier ones,"level" is redefined for each person in each year so that levels are increasing in salary and the number of people in each level is the same as the number when levels assigned by the SAF are used. More specifically, let x_1% equal the percentage that are in the lowest SAF level, x_2% be the percentage in the second lowest level, and so on. Each year, employees are sorted by salary and assigned the x_1% lowest salaries to the lowest level, the x_2% to the second lowest, and so on.

Tables 6 and 7 repeat the analysis done in Tables 1 and 3, respectively, except that levels are defined in terms of wages rather than the original definitions given in the data set. Comparing Table

6 with Table 1 exposes two differences when defining levels by wages. First, there are many fewer firms that cover all seven possible salary range levels than cover all SAF levels. This is because there are important firm and regional effects in wages so that a firm is highly unlikely to have an employee in both the top 1% and bottom 1% of the wage distribution, which is necessary to have representation in all seven salary levels. This does not appear to be important in this analysis. The importance of firm effects on wages will be considered in more detail in related work in progress.

The other difference between Table 6 and Table 1 is that the lowest level gets a noticeably higher proportion of its workers internally when levels are determined by wages. This is because nominal wage decreases and demotions are rare but relative wage decreases over time are quite common. Many people move down the wage distribution over time and, as a result, may move to the next lowest salary level. Again, this does not seem to impact the analysis.

Other than these two differences caused by institutional factors, the relative importance of internal versus external transitions looks remarkably similar when defining levels by either method. As Table 6 shows, when defining levels by salary, eighty percent or more of people move into the top levels internally at firms with at least five levels. The internal transition rate increases monotonically with level with the exception of one level at seven level firms. Table 6 leads to the conclusion that transitions across salary reflect changes in responsibility reasonably accurately.

Similarly, the transition matrix across salary levels shown in Table 7 looks quite similar to the SAF level transition matrix in Table 3. One small difference is that the upper right triangle (representing moves down in level) is somewhat larger when using salaries to determine level. It can be concluded from Tables 6 and 7 that firms have ports of entry in salaries in a very similar way to their ports of entry in job titles.

Disaggregation

Up to this point, the data has been analyzed as if it all came from one large firm. The reality is that these data represent as many as 7,267 firms. Now consider how the patterns documented so far vary across firms in the sample.

It is already clear that there is heterogeneity because Table 1 reports that there are some firms that have only one level and others that have as many as seven levels. However, this is largely due to firm size effects. That is, larger firms are more likely to have employees that specialize more narrowly and whose assigned tasks will fall more naturally into a single level.

Although the differences in firm structure due to size differences is also interesting, the rest of this section looks at heterogeneity in ports of entry across reasonably similar firms. The 100 firms (as of 1988) with the most employees in the sample are considered, conditional on the firm having employees at all five of the levels analyzed in Table 3.

Panel A of Table 8 displays internal transition rates measures as in Table 1, but it indicates how internal transition rates vary among these 100 firms. The point of Table 8 is to give more detail on the distribution of internal promotion rates across firms. For the most part, the relevant unit of analysis here is the individual firm. With the exception of the column labeled "observ=person," all numbers are at the level of the firm. The column labeled "Observ = Firm" shows the internal transition rate at each level averaged across the 100 firms. That is, for each level/firm combination, the percentage of employees who entered that level from another level in the same company was calculated. This transition rate was then averaged across the 100 firms. To give some idea of how firms vary, the 100 firms were ranked from lowest to highest internal transition rate at each level.

The percentile columns of Table 8 Panel A show firms at several points on the distribution of internal transition rates.

Internal transition rates are almost all monotonically increasing at every percentile in the distribution.[11] At every point in the distribution, the conclusion can be drawn that internal entry increases with responsibility. It is possible that some firms are internal promoters and others hire into levels almost exclusively from the outside. The pattern across firms is of interest, but Panel A does not provide information that is relevant to this issue. In Panel A, it is possible that a firm that is at, say, the 25 percentile for level 2 is not necessarily at the 25th percentile for level 5. Panel B is an attempt to provide relevant information on patterns by firms.

In Panel B of Table 8, firms are ordered on the basis of their internal promotion rates into level 2. The column labeled "1st" refers to firms that were in the lowest 25% in terms of their proportions hired internally into level 2. The numbers reported in each cell are the (unweighted) average internal promotion for firms within that cell. For example, in Panel B, the entry for level 4, 3rd percentile block, is 77.81%. This means that those firms that had level 2 promotion rates between the 50th and 75th percentile of level 2 internal promotion rates across all firms also had an average internal promotion rate of 77.81 percent at level 3. Those same firms had an average internal promotion rate of 42.47 percent at level 2.

With a few exceptions, the patterns are still consistent in that firms that are high on internal promotion at lower levels are also high on internal promotion at the top of the firm. For example,

[11] In fact, the two cases where the internal transition rate goes down at the highest level are probably due to the left censoring in the data. Many people at the highest level have been in that level the entire time the firm is in the data. Even though most of these people transitioned internally, they are dropped.

the firms that were at the top in terms of internal promotion rates at level 2 hired on average 59.79% internally into that level. The same firms also hired 83.80% internally into level 5, which is a number higher than the number for any other group. But it is also important to note that there are some reversals. For example, the firms that promoted the fewest from within at level 2 (having 15.34% internal promotion) had about the same internal promotion rate as the top group for level 5 promotions (84.68% versus 83.80%).

In addition, for a majority of the firms, most entry is internal at the highest levels and external at the lowest levels. Roughly the top quartile of firms have a clear port of entry at the bottom level. That is, for about a quarter of the firms, about three-fifths of the people at the second level entered their level internally and a significant majority more entered the three higher levels internally. Workers at the second level come almost exclusively from the first, which forms the port of entry for these firms that otherwise use internal promotion. It remains clear, however, that even these firms that show a strong preference for internal promotion hire a significant number of workers directly from the outside, even at the highest levels in the firm.

It is possible to get at the issue more directly using analysis of variance. Let the dependent variable be the internal hiring rate and let the unit of analysis be the level within the firm. In the sample of the 100 largest firms, each having five levels, there are 500 observations for this regression. How much of the variation in the internal hiring rate is due to levels and how much is due to firm fixed effects? Both the collection of firm fixed effects and the group of level indicators are significant as a group. That is, the hypothesis that these 100 firms have the same tendency to hire from within can be rejected, as can the hypothesis that the internal hiring rates are the same at each level in the typical firm. However, the level fixed effects are far more powerful than the firm fixed

effects. The fixed effects for each level are statistically different from one another, except for the two highest levels. Only six of the one hundred firms' fixed effects is statistically different from the median firm's fixed effect at the 5% significance level. Collectively, the level fixed effects explain ten times as much of the variation as the firm fixed effects.

There are examples of firms that have particularly strong promote-from-within tendencies. For example, 21 of the 100 firms source at least 50% of workers in each of levels 2 through 5 from another level in the firm. Eight of the 100 get at least 60% of their workers internally at each of these levels, while only one firm gets at least 75% internally at each of these levels. In terms of firms showing a strong tendency to hire externally, only one firm hired fewer than 50% of its workers at every level from another level internally.

In general, while there are differences across firms, the primary influence is the level. Low levels have significant amounts of external hiring and high levels are dominated by promotion from within.

Table 8, coupled with the regression results, suggests that the use of ports-of-entry and promote-from-within policies is quite common and that at some firms these human resource policies dominate the hiring and promotion process. However, most firms also show at least some willingness to fill positions at all levels externally.

Evidence and the Theories

The data are inconsistent with the caricature version of ports of entry. It is clear that in the typical firm, workers are hired from outside at virtually every level. Even among the most extreme firms in terms of internal hiring, it can be said that external hiring is significant. For example, from

Table 8, even at level 5, the typical firm among the 100 largest hires an average of 17% of its workers from the outside. But it is also true that hiring from the outside is much rarer at the top of the firm than at the bottom. From the same sample, the corresponding number of those hired from the outside at level 2 is 63%, which is almost four times as large a percentage as that for level 5. In firms of all types (in terms of total number of levels) shown in Table 1, the pattern is the same. There is plenty of internal job filling, especially at the top of the firm, but even at the very top, every type of firm category uses external hiring.[12]

The data also show that transition from lower to higher levels is common in most firms. Table 3 shows that almost two-thirds of workers who have been with the firm at least ten years move up at least one level from the level into which they were hired. Not surprisingly, entry at lower levels with promotion to higher levels is a very common practice in the typical firm. But again, at any point in time, a large number of workers are at the level into which they were hired. The snapshot analysis in Table 3 shows that even at level 5, a larger number who staff level 5 were hired into that level than into any other single level.

Given the amount of external hiring that occurs at every level, it is difficult to argue that workers are insulated from market forces. Theory suggests that markets can be arbitraged with very little actual movement. Even in the most liquid markets, like those for equities, with rare exception, a very small fraction of a firm's total shares are traded on any given day. These labor markets seem to provide enough mobility for a substantial amount of arbitrage opportunity. The rigid internal labor market view is not supported by the data, but at the same time, most firms seem to prefer

[12]Table 8 reveals that at least 10% of the firms in the large firm sample do fill their top levels exclusively from the inside. This may simply reflect a small number of promotions at those firms.

hiring internally to going outside, at least for high level jobs.

This set of findings is consistent with the tournament view of the labor market, especially as supplemented by Chan (1996). Hiring into high levels of the firm is primarily from within. The higher level jobs draw most of their talent from inside in order to provide appropriate incentives, but if there is a sufficiently dominant outsider, firms hire into the position from the outside. Internal promotion is preferred to external hiring because it provides better incentives for workers at lower levels in the firm. If workers know that they must compete with a large pool of outsiders for a particular job, their incentives are diluted because the chances that their increased effort can affect the probability of winning against such a large pool of competitors are slight. If the pool is narrowed to insiders, incentives are enriched. Occasionally, however, insiders are so dominated by an outsider that it pays to hire the outsider over promoting the insiders even at the cost of diminished incentives. But such cases should be relatively rare. The pattern in the data seems to support this view. Furthermore, if the value of effort is higher at the top of the hierarchy, providing incentives to high level workers is especially important, which could explain why firms are reluctant to hire from the outside at top levels.

Unfortunately, this view cannot be distinguished from another. The data are also consistent with models of firms valuing a mix of firm-specific and general human capital. Suppose that a significant fraction of human capital is firm-specific, which gives insiders an edge over outsiders. Most promotion would be from within and this would be most true at the top, where workers possess the greatest quantities of firm-specific human capital. But, as in the Chan model, occasionally an outsider comes along who so dominates insiders that it is worth hiring him even though he does not possess the firm-specific human capital of the incumbents. This view is equally consistent with the

findings.

It might be possible to distinguish between the two theories based on exit data. Theories of firm-specific human capital give strong predictions about low levels of turnover. If firm-specific human capital is important, firms that use internal promotion should also be those with low turnover rates. Workers should not exit the firm when firm-specific capital is important because their inside value is likely to exceed their outside value. No such implication comes from tournament theory so it might be possible to check this in future work.

Conclusion

The evidence supports the view that ports-of-entry and promotion-from-within policies are common. The tendency to promote from within is apparent at most firms, but a significant amount of hiring from the outside occurs even at the highest levels of the firm. Evidently, most firms prefer to fill positions internally, but are willing to hire from the external market when efficient.

Firms are more than just extensions of a spot market. They are complicated structures, the form of which is consistent with a tournament view of the internal labor market. The evidence is also consistent with a world in which firms value a combination of firm-specific and general human capital. The evidence appears to be inconsistent with more extreme views of ports of entry such as an institutional and influence model. Nor are the data consistent with the notion that internal labor markets are frictionless, with only general human capital and no need for incentives. Instead, it is clear that internal mobility is an important source of labor for higher level jobs in most firms.

References

Baker, George, Michael Gibbs, and Bengt Holmstrom, "The Internal Economics of the Firm: Evidence From Personnel Data," *Quarterly Journal of Economics*, CIX, 1994, 881-919.

Barnett, William P., James N. Baron, and Toby E. Stuart, "Avenues of Attainment: Occupational Demography and Organizational Careers in the California Public Service," *American Journal of Sociology*, CVI, 2000, 88-144.

Becker, Gary S., "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy,* LXX, 1962, 9-49.

Chan, William, "External Recruitment versus Internal Promotion," *Journal of Labor Economics*, XIV, 1996, 555-570.

Doeringer, Peter, and Michael Piore, *Internal Labor Markets and Manpower Analysis* (Lexington, MA: D.C. Heath and Company, 1971.)

Gibbs, Michael, "Incentive Compensation in a Corporate Hierarchy," *Journal of Accounting and Economics*, XIX, 1995, 247-277.

Gibbs, Michael, Kathryn Ierulli and Eva M. Meyersson Milgrom, "Occupational Labor Markets," Manuscript, July 2002.

Jovanovic, Boyan, "Job Matching and the Theory of Turnover," *Journal of Political Economy*, LXXXVII, 1979, 1246-60.

Lazear, Edward P., "Why Is There Mandatory Retirement?" *Journal of Political Economy*, LXXXVII, 1979, 1261-1284.

Lazear, Edward P., "The Job as a Concept," in *Performance Measurement, Evaluation, and Incentives*, William J. Bruns, ed. (Boston: Harvard Business School Press, 1992).

Lindbeck, Assar, and Snower, Dennis J., "Wage Setting, Unemployment, and Insider-Outsider Relations," *American Economic Review,* LXXVI, 1986, 235-39.

Meyersson Milgrom, Eva M., Trond Petersen, and Vemond Snartland, "Equal Pay for Equal Work? Evidence from Sweden and a Comparison with Norway and the U.S.," *Scandinavian Journal of Economics*, CIII, 2001, 559-583.

Reder, Melvin, "Theory of Occupational Wage Differentials," *American Economic Review*, XXXXV, 1955, 833-852.

Table 1

Proportion in a Level who Moved into that Level Internally

	Total # of Levels						
Level	1	2	3	4	5	6	7
1	32.00%	29.83%	29.57%	27.01%	23.85%	25.54%	24.19%
2		51.81%	54.14%	50.75%	41.81%	35.83%	32.08%
3			67.21%	68.55%	65.47%	64.72%	33.78%
4				76.10%	79.96%	80.38%	65.25%
5					79.65%	86.33%	84.11%
6						86.90%	85.46%
7							85.19%

Sample Sizes							
Level	1	2	3	4	5	6	7
1	3,019	2,665	3,534	2,888	2,210	1,163	215
2		2,239	4,010	6,414	7,000	6,300	1,275
3			2,461	4,839	9,295	14,486	7,036
4				2,247	4,397	12,445	16,315
5					1,676	5,075	10,044
6						1,389	3,094
7							648
# firms	2,086	1,461	1,464	1,124	699	331	102

Employee levels and the number of levels in firm based on 1988. Employees whose 1988 level is the same as their level when the firm first enters the dataset are dropped.

Table 2

Ratio of Number Hired Into Level to Number Currently In Level

Level	Median	Mean	Firm/level cells	Avg/cell	Total Hired	Total in Level	Cum Hired	Cum Empl	Cum Hire %	Cum Employ %
1	2.00	2.96	512	7.83	10,582	4,010	10,582	4,010	0.175	0.066
2	1.29	1.60	492	30.54	25,096	15,028	35,678	19,038	0.589	0.314
3	0.76	0.83	493	50.31	18,270	24,805	53,948	43,843	0.890	0.723
4	0.50	0.56	451	27.22	5,014	12,277	58,962	56,120	0.973	0.926
5	0.40	0.46	512	8.78	1,651	4,493	60,613	60,613	1.000	1.000
Total	0.95	1.30	2460	24.64	60,613	60,613				

Sample is limited to employees for whom their level when they first began working for their 1988 employer is available. Those 42% of the 1988 sample employees who were hired before their firm enters the sample are dropped. The two highest levels are combined into level 5 and the two lowest into level 1. Firms that did not have employees at both levels 1 and 5 in 1988 are dropped. "Median" is the median across all firms at a given level of (# employees currently at the firm who started at the firm in that level)/(# in the level at the firm in 1988). "Mean" is the average across all firms of this same ratio.

Table 3

Entry Level by Current Level

Panel A

	Entry Level						
1988 Level	**1**	**2**	**3**	**4**	**5**	**Unknown**	**Total**
1	4,257	325	31	0	0	1,626	6,239
2	4,006	12,469	519	35	2	7,868	24,899
3	2,852	11,333	12,987	336	26	18,941	46,475
4	703	3,183	5,358	3,832	167	14,503	27,746
5	102	510	1,247	1,275	1,583	5,989	10,706
Total	11,920	27,820	20,142	5,478	1,778	48,927	116,065

The two highest levels are combined into level 5 and the two lowest into level 1. Firms that did not have employees at both levels 1 and 5 in 1988 are dropped.

Panel B

Lower triangle number	30,569
Lower triangle percent	45.5%
Diagonal number	35,128
Diagonal percent	52.3%
Upper triangle number	1,441
Upper triangle percent	2.1%

Panel C: Employees with ten years or more service

Current Level	1	Entry Level 2	3	4	5	Unknown	Total
1	835	161	16	0	0	1,150	2,162
2	1,467	2,349	215	20	1	4,879	8,931
3	1,562	3,916	2,160	138	17	12,286	20,079
4	505	1,759	2,089	756	92	10,455	15,656
5	83	348	789	602	465	4,625	6,912
Total	4,452	8,533	5,269	1,516	575	33,395	53,740

Panel D: Employees with ten years or more service

Lower Triangle Number	13,120
Lower Triangle Percent	64.5%
Diagonal Number	6,565
Diagonal Percent	32.3%
Upper Triangle Number	660
Upper Triangle Percent	3.2%

Table 4

Entry and Exit Rates by Level

Level	External Entry	Internal Entry	External Exit	Internal Exit	Observations
1	22.60%	3.03%	13.13%	14.59%	276,102
2	15.65%	6.28%	10.71%	11.40%	874,621
3	10.22%	9.24%	10.51%	7.02%	1,179,978
4	7.09%	12.08%	10.54%	5.91%	624,829
5	6.95%	10.48%	12.28%	2.87%	245,274
Total	11.91%	8.54%	10.93%	8.33%	3,200,804

An observation is a person/year. An observation is defined as an "external entry" if the person is not working at the firm in year t and works at the firm in a given level in year $t + 1$. The other entry and exit variables are defined similarly. The first and last year that any firm is in the dataset is dropped from the sample.

Table 5

Job Tenure by Level

Level	All Observ. Mean	All Observ. # obs	Uncensored Mean	Uncensored # obs	Left Censored Mean	Left Censored # obs	Right Censored Mean	Right Censored # obs	Both Sides Censored Mean	Both Sides Censored # obs
1	2.45	98,847	1.93	59,873	3.06	21,927	2.93	13,912	5.86	3,135
2	3.31	252,517	2.64	145,159	4.08	48,093	3.80	49,402	6.88	9,863
3	4.14	287,252	3.57	154,691	5.08	42,703	4.27	77,437	7.26	12,421
4	4.40	146,859	3.81	75,995	5.54	19,662	4.40	45,036	7.87	6,166
5	4.58	54,606	3.92	27,694	5.69	7,856	4.67	16,403	7.65	2,653
Total	3.77	840,081	3.13	463,412	4.52	140,241	4.13	202,190	7.16	34,238

Level	% right cens	% left cens
1	17.25%	25.35%
2	23.47%	22.95%
3	31.28%	19.19%
4	34.86%	17.59%
5	34.90%	19.25%
Total	28.14%	20.77%

Censoring Methodology:

The two highest levels are combined into level 5 and the two lowest into level 1. Firms that did not have employees at both levels 1 and 5 at some point while in the sample are dropped. An observation is an individual spell of employment in one level at one firm. A job is "left censored" if the employee was working in that level in the first year in which his firm was in the available dataset. A job is "right censored" if the employee was working in that level in the last year in which his firm was in the available dataset.

Table 6

Proportion in a Level who Moved into that Level Internally

Level Defined by Salary Distribution

	Total # of Levels						
Level	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	54.81%	41.46%	41.44%	38.11%	30.80%	22.15%	44.90%
2		65.31%	61.62%	55.29%	52.38%	48.35%	68.82%
3			72.58%	69.84%	69.28%	67.40%	45.36%
4				76.70%	78.76%	78.19%	68.92%
5					80.28%	82.53%	85.30%
6						82.49%	88.76%
7							85.83%

Sample Sizes

Level	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	3,516	3,039	3,482	3,201	2,766	3,319	49
2		2,684	3,958	6,287	9,049	15,473	170
3			2,615	4,907	10,758	26,700	399
4				2,043	5,278	15,324	711
5					1,760	5,009	694
6						1,245	427
7							120
# firms	2,402	1,669	1,509	1,084	713	358	8

Employee levels and the number of levels in firm based on 1988. Employees whose 1988 level is the same as their level when the firm first enters the dataset are dropped. Level is defined by where the person is in the salary distribution in a given year. Fraction in each level is set to correspond to SAF level distribution used in previous tables.

Table 7

Entry Level by Current Level

Level Defined by Salary Distribution

Panel A

	Entry Level						
Current Level	**1**	**2**	**3**	**4**	**5**	**Unknown**	**Total**
1	4,232	595	78	9	2	1,585	6,501
2	5,434	11,933	1,609	48	4	9,536	28,564
3	3,007	10,865	11,353	984	13	19,101	45,323
4	770	3,041	3,854	4,343	363	13,040	25,411
5	95	475	827	1,278	1,711	5,220	9,606
Total	13,538	26,909	17,721	6,662	2,093	48,482	115,405

Panel B

Lower triangle number	29,646
Lower triangle percent	44.3%
Diagonal number	33,572
Diagonal percent	50.2%
Upper triangle number	3,705
Upper triangle percent	5.5%

Table 8

Internal Hiring Rate Distributions

Panel A

	Observ =	Observ =	Firm Percentile					Total
Level	Person	Firm	10th	25th	50th	75th	90th	Emp's
1	12.99%	15.09%	0.00%	0.00%	10.35%	21.83%	32.35%	2414
2	33.96%	36.57%	15.70%	22.56%	33.87%	48.76%	59.42%	10539
3	64.36%	64.54%	46.18%	52.47%	64.87%	76.80%	82.61%	21573
4	83.20%	80.80%	66.82%	76.09%	81.74%	88.42%	92.82%	13609
5	83.30%	82.36%	65.04%	73.21%	85.71%	92.86%	100.00%	5056

Panel B

Quartiles determined by fraction of people hired into level 2 internally

	Firm Percentile			
Level	1st	2nd	3rd	4th
1	16.76%	13.43%	16.37%	13.28%
2	15.34%	28.44%	42.47%	59.79%
3	61.10%	62.61%	64.56%	69.98%
4	79.36%	81.02%	77.81%	84.80%
5	83.68%	83.57%	77.05%	83.80%

Sample limited to 100 largest firms as of 1988 that had employees at each of the five levels. The two highest levels are combined into level 5 and the two lowest into level 1. Each entry in Panel A represents the percentage of employees in a given level/firm combination (as of 1988) that moved into that level/firm from another level in the same firm. Second column of Panel A ("Observ = Person") displays this percentage for all employees in a given level across all firms. Third column of Panel A ("Observ = Firm") calculates this percentage for each firm and then displays the average of the 100 level/firm combinations. The fourth through eighth columns of Panel A display percentile of these level/firm aggregates. Employees who were already in their 1988 level when their firm enters the dataset are dropped.

Figure 1

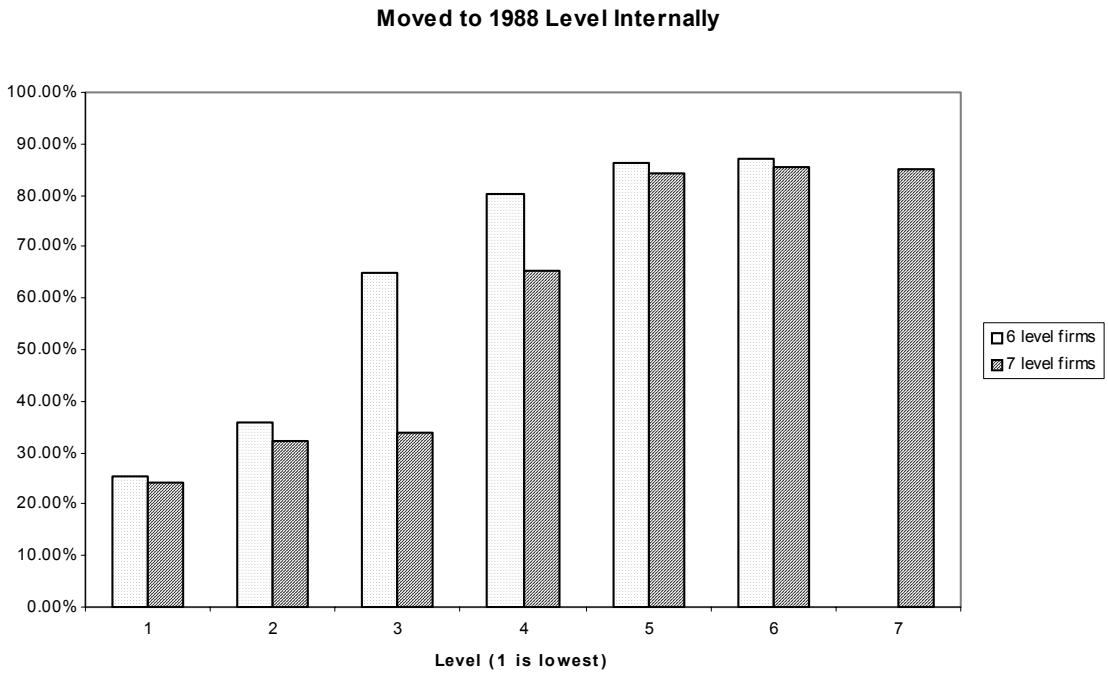

Moved to 1988 Level Internally
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
1
2
3
4
5
6
7
Level (1 is lowest)
6 level firms
7 level firms

Figure 2

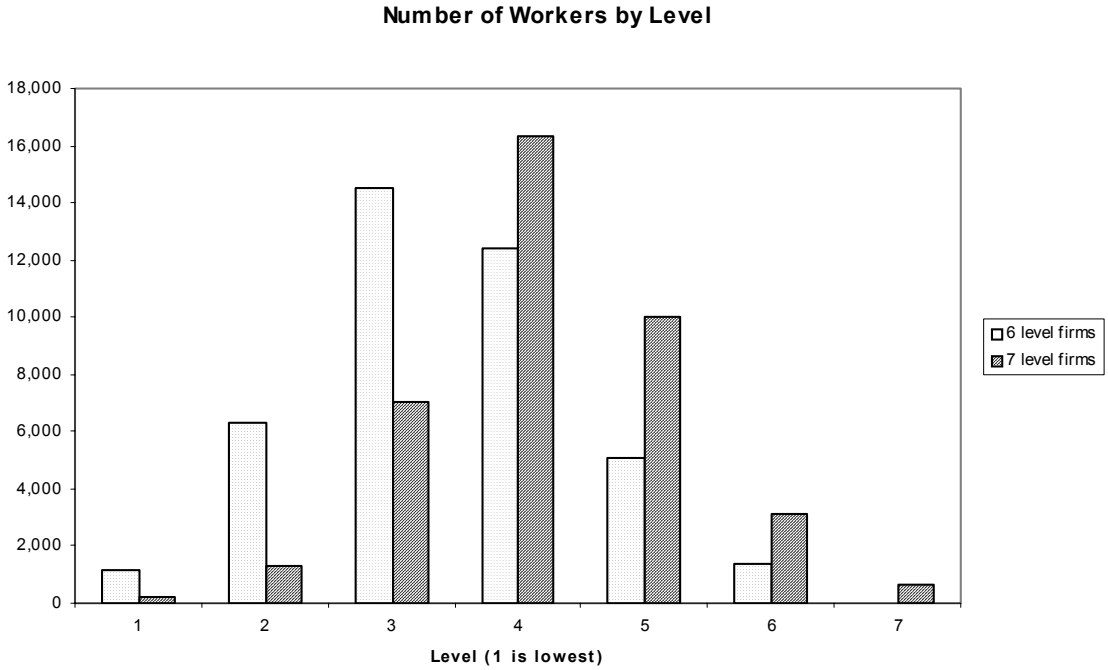

Number of Workers by Level
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1
2
3
4
5
6
7
Level (1 is lowest)
6 level firms
7 level firms

Figure 3

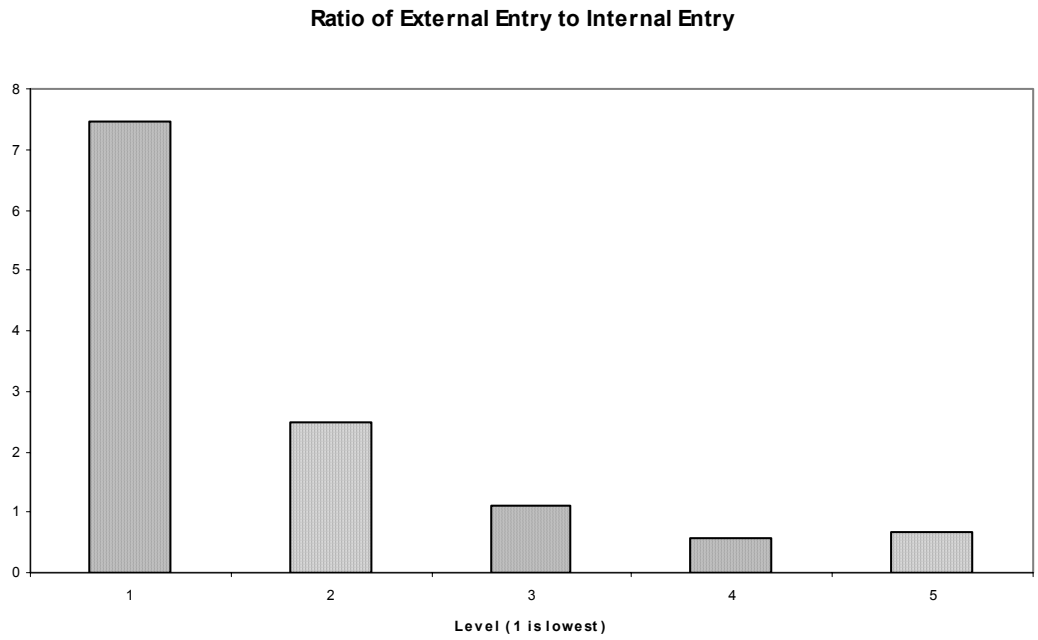

Ratio of External Entry to Internal Entry
8
7
6
5
4
3
2
1
0
1
2
3
4
5
Level (1 is lowest)

Figure 4

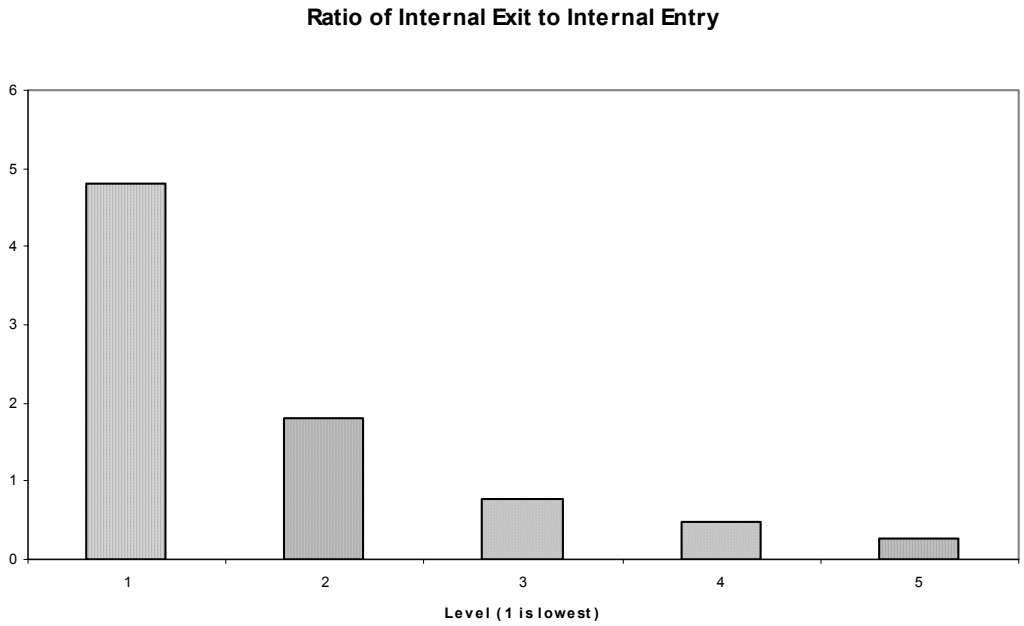
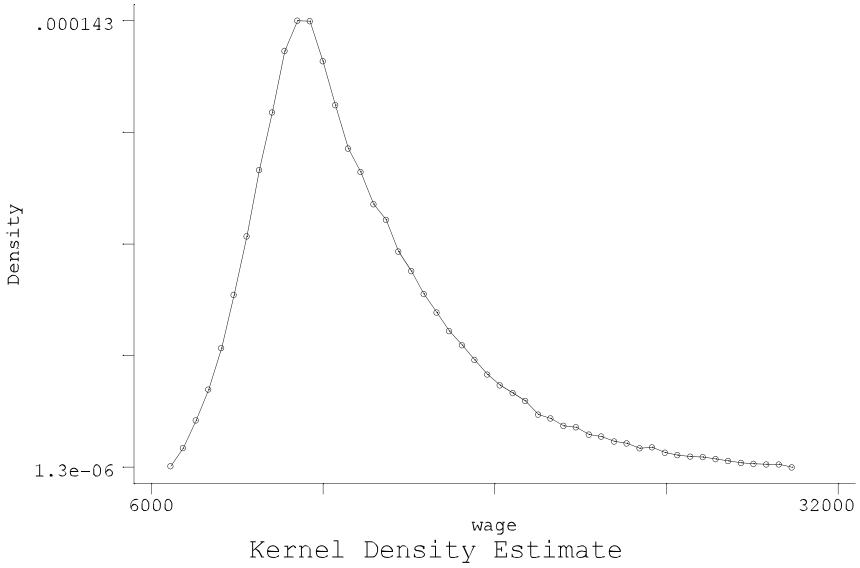

Ratio of Internal Exit to Internal Entry
6
5
4
3
2
1
0
1
2
3
4
5
Level (1 is lowest)

Figure 5

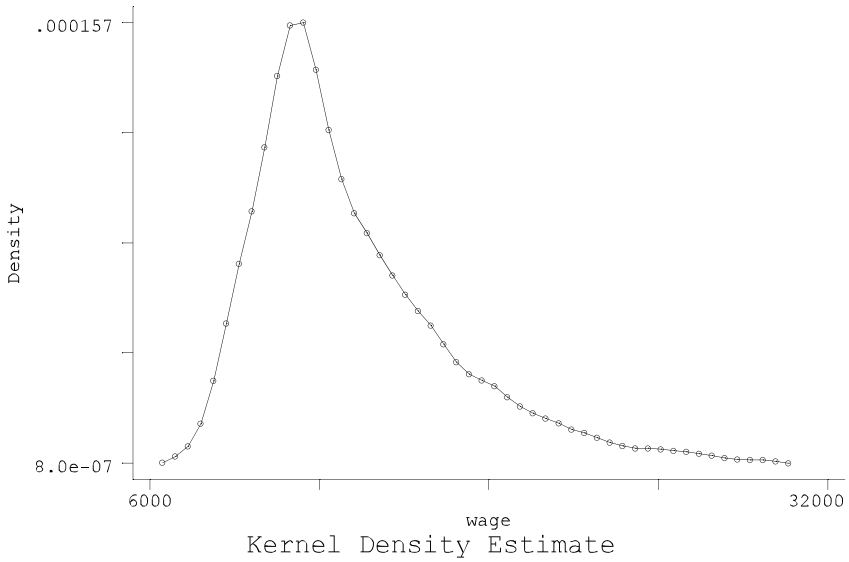
Cumulative Wage Distribution



Sample includes all employees in 1988. Wage is Swedish Kroners per month.

Figure 6

Wage Distribution at Largest Firm



Sample includes 7417 employees of a single firm in 1988.

Appendix

Description of Positions in SAF Data

Occupation Family 1: Occupation # 120 – Manufacturing, Repair, Maintenance, and Transportation
11% of 1988 sample
There is no level 1 in this occupation.
Level 2 (4% of occupation #120 employees) – Assistant for unit; insures instructions are followed; monitors processes
Level 3 (46%) – In charge of a unit of 15-35 people
Level 4 (45%) – In charge of 30-90 people; does investigations of disruptions and injuries
Level 5 (4%) – In charge of 90-180 people; manages more complicated tasks
Level 6 (0.3%) – Manages 180 or more people
There is no level 7 in this occupation.

Occupation Family 2: Occupation #310 – Construction
10% of the 1988 sample
Level 1 (0.1%) – Cleans sketches; writes descriptions
Level 2 (1%) – Does more advanced sketches
Level 3 (12%) – Simple calculations regarding dimensions, materials, etc.
Level 4 (45%) – Chooses components; does more detailed sketches and descriptions; estimates costs
Level 5 (32%) – Designs mechanical products and technical products; does investigations; has 3 or more subordinates at lower levels
Level 6 (8%) – Executes complex calculations; checks materials; leads construction work; has 3 or more subordinates at level 5
Level 7 (1%) – Same as level 6 plus has 2-5 level 6 subordinates

Occupation Family 3: Occupation #800 – Marketing and Sales
19% of 1988 sample
Level 1 (0.2%) – Telesales; expedites invoices; files
Level 2 (6%) – Puts together orders; distributes price and product information
Level 3 (29%) – Seeks new clients for 1-3 products; can sign orders; does market surveys
Level 4 (38%) – Sells more and more complex products; negotiates bigger orders; manages 3 or more subordinates
Level 5 (20%) – Manages budgets; develops products; manages 3 or more level 4 workers
Level 6 (7%) – Organizes, plans, and evaluates salesforce; does more advanced budgeting; manages 3 or more level 5 workers
Level 7 (1%) – Same as level 6 plus 2-5 level 6 subordinates

Occupation Family 4: Occupation #900 – Finance
5% of 1988 sample
Level 1 (1%) – Office work; bookkeeping; invoices; bank verification
Level 2 (7%) – Manages petty cash; calculates salaries
Level 3 (18%) – More advanced accounting; 4-10 subordinates
Level 4 (31%) – Places liquid assets; manages lenders; evaluates credit of buyers; manages 3 or more level 3 employees
Level 5 (28%) – Financial planning; analyzes markets; manages portfolios; currency transfers; manages 3 or more level 4 employees
Level 6 (12%) – Manages credits; plan routines within the organization; forward-looking budgeting; manages 3 or more level 5 employees
Level 7 (2%) – Same as level 6 plus 2-5 level 6 subordinates