

Complexity Pays: Knowledge Coordination Premiums

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Abstract

A wealth and variety of knowledge can bring forth the birth of creative ideas, but great ideas may also be lost in disorganization. Who among us doesn't know the importance of a good administrator or coordinator? Coordinators who can effectively manage a variety of knowledge streams are particularly important for an organization. Becker and Murphy outline this important fact - how an increase in the variety of knowledge leads to an increase in the division of labor, which requires knowledge coordination and management (1992). I empirically test their theory by developing definitions of knowledge variety using weighted occupation-industry networks and applying a mixed effects regression using our knowledge variety variable on wages. Our results indicate that workers in industries with higher occupational variety receive a knowledge coordination premium. Furthermore, occupations who receive higher knowledge coordination premiums have communication and interpersonal skills. While the discussion of the impact of automatization on jobs suggests administrative jobs may disappear, our results indicate that knowledge coordinating jobs are still valuable in sectors that have a high division of labor.

JEL classifications: J31, J21, J24

Keywords: Wage Differentials, Labor Force and Employment, Size and Structure, & Labor Productivity

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1 Introduction

Developed nations have experienced economic restructuring with a large part of employment moving from manufacturing industries towards knowledge and service sectors. This industrial shift, alongside technological change, has transformed the organization of the labor market, and the type of skills and knowledge that are highly sought in this new economic environment. It has become particularly more important to manage intangible resources such as knowledge, communication and social skills. It was once the management of things, how to move physical products across the globe, but now it's increasingly more important to manage ideas. This historical transformation of skill sets is shaped by technological change [Acemoglu & Autor \(2011\)](#). With each wave of technology the demand for particular skills or tasks changes the way we work - from craftsman to specialization to fabrication and corporate organization. For example, during the time of fabrication, a rise of routine tasks were in demand, but also managerial positions who oversaw operations of large industrial plants. The ICT revolution has had its own effect on the demand of particular skills and tasks. The change of tasks or skills with technology is partly caused by capital skill complementarity where technology increases the need for new capital, which in turn requires certain skill sets to operate the new equipment, and in some cases, substitutes other skills. Identifying which skills or tasks are complimentary or substitutable has been an important discussion within the literature as it impacts the demand of future jobs and in consequence, the required training and education for those jobs ([Autor et al. \(2003\)](#), [Frey & Osborne \(2017\)](#)).

This paper adds to this literature by understanding an additional component that compliments the computer revolution in the knowledge economy, the importance of knowledge management in an industry. As technology and knowledge expand, specialization and the division of labor increases, which in turn increases the coordination costs to manage varied skillsets and knowledge. Technology mitigates some of the costs of managing knowledge of an increasingly specialized workforce, but workers in an occupationally diverse industry also internalize some of these costs - a knowledge coordination premium. Those that receive these premiums tend to have communication, information gathering, and resource management skills. Coordination premiums are particularly important for more occupationally diverse industries, which require knowledge management from a variety of occupations each of which hold important information for the functioning of the industry.

1.1 Skills, Tasks, & Computers

The type of skills in demand today are far different than 30 years ago due to the impact of this wave of innovation, computers, on skills, tasks and activities. For example, compare the impact of the typewriter to the computer. While typing on a typewriter and typing on a computer share a similar skill component, written expression, the computer has increased the specialization of additional skills beyond typing, like computer programming. It has fundamentally changed the demand of certain skills or tasks relative to others, which in turn augment wages related to these tasks [Autor et al.](#)

(2003) Goos & Manning (2007). Computers have created a new demand or complimented certain types of skills more than others.

More broadly, capital and skills are relative complements to each other. This idea originates from Griliches who suggested that capital is more complementary to skilled labor relative to unskilled labor (1969). At the same time, capital can also substitute skills, as well. The task based model, builds upon these ideas to understand what type of tasks will be substituted or complimented with the rise of computers (Autor et al 2003). The impact of these tasks has wide reaching impacts on the economy by changing the workforce structure - the demand of particular occupations, education and training, and in turn, the impact of wages and inequality. A broad range of research has subsetting tasks into categories like offshorability, routine cognitive, non-routine cognitive, routine manual, non-routine manual Autor et al. (2003), David & Dorn (2013), Goos & Manning (2007). Frey & Osborne further this topic by using Machine Learning classification methods to understand the impact of automatization on jobs (2017). They suggest that 47% of employment is at risk for being automatized for an unforeseen timeline (perhaps 10 - 20 years) and that the type of skills that are resistant to being replaced by robots require creativity, innovation and knowledge of social intelligence. Another paper by MacCrory & Frank applied principal component analysis to job characteristics in 2006 and 2014 and found that there are higher occupational requirements for supervision, math and pattern recognition, but slightly lower requirements for teamwork (2014). Indeed, computers are changing the way we work.

Along with every task revolution, there also lies an organizational shift needed to compliment changing workforce structures. Organizing tasks has always been an important functioning of the firm or industry. Today, it is increasingly important to organize new or emphasized tasks complimenting computers, but also the increase of knowledge that has developed alongside. These new tasks and knowledge sets has created an increase in specialization or the division of labor. As workers become more specialized, they know less about other operations. As Becker puts it, “Highly specialized workers are surely experts in what they do, and yet know very little about the many other skills found in a complex economy” (Becker, 1993, p. 308). There is a mix of specialists in each sector - some whose specializations are highly related to each other, such as a software engineer and a front-end designer, and others, which are much more disparate, such as an accountant and a surgeon. Those sectors that have more diversity, especially in unrelated fields, will have higher coordinating costs to manage disparate types of knowledge Becker & Murphy (1992). The knowledge-based view of the firm emphasizes this aspect, that managing knowledge is integral for a firm to succeed and is its primary resource. Within a firm, individuals must be able to transfer and coordinate different knowledge bases, which can be difficult within an occupational diverse environment since knowledge varies in its transferability Grant (1996). This is why a knowledge coordinator is vital. It’s worth noting, however, that not every occupation in a firm needs to transfer their knowledge, perhaps only its output. For example, a janitor is integral to the functioning of any firm, but one does not need to know how the trash is taken out, only that it has been done to keep the organization clean and running. Thus, occupations who receive a knowledge coordination premium are limited to a subset of occupations.

1.2 Diversity, Tasks and Coordination Costs

An increase in knowledge increases specialization, which lends itself to increase the diversity of skills. Diversity can promote creativity, new ideas and innovation among seemingly disparate fields in products, but also, in organizational routines and resource management Østergaard et al. (2011). Diversity encourages industries to better utilize knowledge resources, both externally from different functions within an industry, but also internally through varied interaction and learning in a team. Through a variety of knowledge spillovers, industries gain from searching and experimenting, through an exchange of skills that leads to innovation and the potential for growth, a view argued by Jacobs (1969). Occupations interacting within an industry or related industry provide learning benefits and increases in efficiency of production processes Frenken et al. (2007). Even the development of the computer was born from cross-disciplinary work, such as the collaboration between electrical engineer, Presper Eckert, and physicist, John Mauchly. In academic settings, papers are increasingly done in teams across most fields - the production of knowledge is based on teamwork Wuchty et al. (2007). Overall, industries provide an opportunity to interact across disciplines among different skill sets, especially as the diversity of occupations grows within it.

However, there are limitations to diversity. If there is too much diversity, the coordination costs of managing and transferring knowledge may be too high due to conflict, lack of trust or poor communication. These costs can grow as the number of specialists increase, but over time, computers have mitigated these costs, allowing for diversity to increase at lower coordination costs. For example, for project management the software application *Slack* has become an important tool to increase communication across different components of a project. It has been promoted in specific industries because of its ability to integrate rapid communication through secure inter-office chats, which removed formalities and delayed responses due to the etiquette related to e-mail compared to app messages.

The limits of specialization and diversity are dependent on coordination costs - whether the benefit to organizing a diversity of occupations outweighs its cost. Becker & Murphy (1992) model precisely this idea in which the division of labor is mitigated by coordination costs. They define economic growth (ie income) to be dependent on human capital, technological progress and coordination costs. The premise of his model is that an increase in specialization is due to growth in knowledge. This growth of knowledge that is embodied within the human capital of workers raises the marginal product of teams and therefore of workers (as workers are assumed to have equal input to produce a product). These productivity increases are reflected in the output (wages) of workers. Workers are allocated to different sectors based on the fact that coordinating varying degrees of specialization will differ among sectors. Hence, workers who are in industries with higher division of labor will be more productive and earn more. At the same time, higher coordination costs mitigate the division of labor. If coordination costs are too high, there will be less investment in knowledge and thereby limit the expansion of specialization. Higher rates of growth in income and human capital are attained when the level of technology increases because technology induces higher rates of specialization and therefore knowledge leading to higher income. Thus, innovation, while rather blankly, impacts the rate of the division of labor and therefore income.

This paper empirically tests Becker & Murphy's (1992) hypotheses that coordination premiums are dependent on the division of labor in an industry. We expand on this idea and suggest that occupations who have knowledge management positions earn a coordination premium where there is a greater variety of knowledge. Knowledge diversified industries are characterized by their labor inputs, which is the variety of knowledge and skill resources that exist within an industry. The assumption is that the higher the division of labor, ie the number of occupations, there will be more variety of skillsets and knowledge within an industry. To measure knowledge and skill variety within an industry, I build an occupation-industry network to provide a framework of how closely related occupations are too each other.

I expand his idea, however, by testing to see if there is a wage premium for knowledge coordination tasks. The calculated measures of occupational variety within an industry are used as a proxy for knowledge coordination premiums assuming that the higher the variety or division of labor, then the more knowledge coordination is required. I test if knowledge coordination premiums can be captured when estimating wages at an industry level by applying a mixed effects model that regresses our variety measures and control variables on wages. The mixed effects model is used for two main reasons; our dataset is naturally nested so that occupations are nested within industries for which mixed effects models can be aptly applied, and I can distinguish fixed effect parameters that effect the entire population from random effect parameters which allow occupation characteristics to vary by industry.

Some occupations may receive a knowledge coordination fee, while others may not at all. With this in mind, the random effect parameter estimated from the mixed effects model provides estimates of the knowledge coordination fee for each occupation. These estimates gives us a ranking of the intensity of knowledge coordination between occupations. Furthermore, I hypothesize that knowledge management is becoming more important for occupations and there are certain skills attached to effectively manage knowledge. To understand this relationship, O*NET skills data set is connected to the random effect estimates and compare the type of skills high coordination premium estimates have compared with low coordination premium estimates. The results indicate that communication, comprehension and resource management skills occur more often among high knowledge coordination occupations.

2 Methodology

Imagine a large media firm - what are the types occupations needed for them to operate that might come to mind? Perhaps, communication and media officers, for example. However, they would also need organizers, like secretaries to communicate between departments or graphic designers, to implement their ideas and accountants to ensure their finances are in order. There would likely be many more communication officers than accountants, yet, both jobs are vital to the firms success. A few approaches are taken to measure the variety of occupations within an industry to take these considerations into account. One measure is a simple measure, *diversity*, that counts number of different

occupations that have a significant share in the industry. This approach is useful, but does not take into account that some occupations are more similar than others. Thus, using a weighted measure, *weighted diversity*, takes this into account the similarity between occupations in an industry that is derived from an occupation-industry network. These two measures are inspired by the complexity literature applied to trade data (Hidalgo et al 2009). Another important facet of industry diversity is the concentration of a particular occupation in an industry. Often this is done by measuring the expected information (occupations) in a distribution, which is also called Shannon’s Law or Entropy. These three measures are how occupational variety is counted within an industry and are detailed in this section.

2.1 Measures of Variety

If one were to count only the number of occupations within an industry, one would want to ensure that the job is vital to its functioning and that any one-off hirings does not impact it. Essentially, one would only want to count occupations that have a significant contribution to the labor market and will filter occupations that do not have a large impact in an industry. To do this, I use the Balassa index commonly known as revealed comparative advantage (RCA). Let x be the number of people working in occupation o in industry i where;

$$RCA_{io} = \frac{x_{io}/\sum_o x_i}{\sum_i x_o/\sum_{io} X} \quad (1)$$

When the occupation share of an industry is greater than the share of that occupation in the entire occupation population, then I consider that occupation to be specialized in that industry (i.e. when $RCA \geq 1$). I choose occupations that hold the requirement:

$$M_{io} = \begin{cases} 0, & RCA_{io} < 1 \\ 1, & RCA_{io} \geq 1 \end{cases} \quad (2)$$

Where M is the industry-occupation matrix of total employment, o is the occupation occupation and i is the industry. In other words, when i is connected to o , there are more employees performing o in i than can be expected just by the size of o . Where $RCA > 1$ for all M_{io} provides the foundation to calculate two measures of variety, diversity and weighted diversity.

Diversity is the count of the number of specialized occupations in an industry defined as:

$$k_i = \sum_o M_{io} \quad (3)$$

From the M_{io} matrix, a bipartite network can be built to understand the relatedness

between two occupations, in which i is connected to o if there are more employees performing o in i than can be expected just by the size of o . The assumption is that if two industries significantly hire the same occupation, those occupations have similar skillsets. The Adamic-Adar Index is used to measure the similarity of occupations, the relatedness between industry i_n and i_m , by measuring the frequency of common neighbors [Adar & Adamic \(2005\)](#). The similarity between i_n and i_m , where k_z is the degree of nodes and the matrix represents an undirected weighted network;

$$AA_{i_n i_m} = \sum_{Z \in N(i_n) \cap N(i_m)} \frac{1}{\log N(Z)} \quad (4)$$

The choice of a similarity index determines the weight between two occupations within the network, which is not trivial. In the context of using occupations within industries there are two issues that can be problematic, the varying sizes of an industry and secondly, the specialization of an occupation is an important component to the characteristic of the industry. Typical measures for similarity such as cosine similarity, Jaccard indexes, conditional probability of links, or Euclidean distances do not account for these issues. These measures do not take into account the specialization of an occupation nor discount the fact that janitors are in every industry. The aim is to distinguish which jobs are responsible for coordinating knowledge. Almost every occupation likely works in an environment with a janitor, but for most occupations, we are not responsible to coordinate the janitor's task. The goal is ensure that the occupation identified as central to a variety of other jobs is because they help coordinate knowledge rather than that there are certain common jobs that are likely to be connected to most other occupations. Using the Adamic-Adar index corrects for this issue because occupations that are unique are weighted more heavily than common occurring jobs in the network. [1b](#) illustrates this point among education related occupations (see [??occdetail](#) for larger graph). Who among us values doesn't value a good administrator? University professors often work with administrator managers and for certain fields, public relations managers - those professions tend to coordinate the knowledge of a variety of specialized professors.

The weights in the weighted network for each year (2003-2015) is the standardized Adamic-Adar index. [1a](#) and [1b](#) visualize the occupation space network for 2015. Purely for visualization purposes, weak weight links are filtered by only drawing the top .0005% of the similarity weights in the data. Following, a minimum spanning tree is applied using this filtered weighted network to populate the remaining edges. The threshold is arbitrary and purely based on trying to create a sparser and therefore more visible network. To best represent broader occupation categories, the Louvain community algorithm is applied to populate 5 communities or groups, which represents the color of the nodes. The size of the nodes is proportional to the total employment of that occupation. The details of this visualization technique is provided in the appendix.

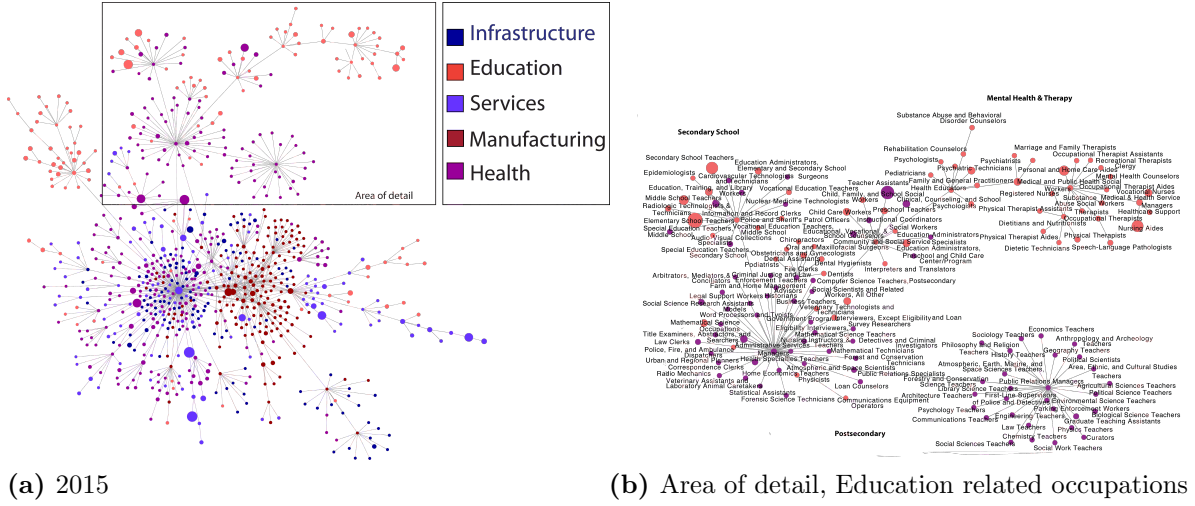


Figure 1: Occupation-Industry Networks, see Appendix for enlarged 1b

While the visualizations are useful to ensure that our relatedness measure is intuitive and provides a map of the occupation space of the USA, the main purpose of this network methodology is to derive weights on occupations that work with a variety of other types of skills. The simple diversity measure is a good indicator of knowledge diversity, but it does not take into account that hostesses and waiters are have more related knowledge than waiters and fire inspectors. This is even more important with this dataset since there are over 700 occupations. It's important to be able to make the distinction between chief executives and general operations managers, but also recognize that those jobs are very similar and shouldn't necessarily be counted as equally distinct. Hence why I utilize the Adamic-Adar relatedness by including it as a weight to our diversity measure. The weighted industry diversity measure is the diversity of an industry multiplied by the average normalized similarity weight (using the adamic adar index) between two occupations in an industry defined as:

$$wk_i = \sum_o M_{io} * \sum_i \frac{\sum_o AA_{oo}}{|N_{io}|} \quad (5)$$

Finally, Entropy, or Shannon's Law, is another measure of variety, which takes into account the probability occupation o is likely to be in that industry, which is defined as:

$$E_i = - \sum_{i=o} s_o \ln(s_o) \quad (6)$$

These three measures of industry input variety, diversity, weighted diversity, and entropy, are our main variables of interest to be used in our estimation techniques and reflect the variety of skillsets in an industry. Table 1 shows the correlation matrix of our calculated variety variables in 2014 and the percent of management in an industry.

Our calculated variables highly correlated with each other, but the adjustments in their

Table 1: Cross-correlation Table for Variety Measures

Variables	Entropy	Weighted Div	Div	mngmt pct
Ent	1.000			
Weighted Div.	0.819	1.000		
Div	0.863	0.778	1.000	
Mngmt %	0.601	0.663	0.522	1.000

definitions as discussed are important to capture a knowledge coordinator in a truly diverse industry. Managers who have traditionally played a role in labor, knowledge and firm organization remain a vital part of knowledge management. With more complex industries there may also be a higher percentage of managers within industries for this very fact. The high correlation between our variables and the percent of management in an industry validates the intuition that the calculated variety variables likely capture the relationship between knowledge variety and the need for more coordination of such resources.

3 Estimation

3.1 Mixed Effects Model

The main hypothesis this model tests is, if there is a higher variety of knowledge will there will be a coordination premium reflected in wages? We utilize a mixed effects model to see this general relationship across the economy, but also use the random effect estimators to estimate which occupations are likely to have this premium and what skills do those occupations possess. Thus, our main interest is estimating the effect of knowledge coordination premiums on wages and if measures of variety can explain part of this variation. The mixed effects model applies fixed effects estimators to minimize biasedness due to unobservable constant variables that effect our entire sample, while at the same time allows random effects estimators at the occupational level. In other words, the random effect estimators of diversity are free to vary by occupation allowing us to estimate these differences. Additionally, an added feature is that the model is able to take into account our nested dataset structure. The mixed effect model is as follows:

$$\ln \bar{w}_{oit} = \beta_1 Var_{oit} + \gamma_{1,o} Var_{oit} \beta_n X'_{oit} + \gamma_{1,o} Var_{oit} + \gamma_{2,o} LP_{oit} + \lambda_t + u_{oit} \quad (7)$$

The β parameters are the fixed effects estimates that are common across our sample, the γ parameters represent the random effect estimator for each occupation, o , and u_{oit} is the composite error term. Robust standard errors are applied at the occupational level to deal with potential heteroskedasticity. The model specifies the random effect estimators to be labor productivity and the measure of variety so that each of these parameters have an estimated slope and intercept for every occupation. This is applied because previous research has shown that labor productivity can vary by industry ([Krueger & Summers](#)

(1988), [Abowd et al. \(2012\)](#), [Thaler \(1989\)](#)). Furthermore, the model directly tests the hypothesis that knowledge coordination premiums depends on the variety that an occupation is exposed. For every occupation, we have the intercept and slope for the measure of variety and labor productivity. A likelihood ratio test is also applied to ensure the correct model specification concerning the particular random effect parameters chosen and the standard deviations of these parameters are significant in all our regressions (see Appendix). These estimated random effects are used later in this paper to create a ranking of occupations who receive this knowledge coordination premium.

Year dummies, λ_t , are included to control for any shocks that occur across the labor market during the observed time period (2004 - 2014), such as the financial crisis of 2008 that greatly impacted the US labor market. Our dependent variable (\bar{ind}) is the natural log of annual real wages in US dollars at time t for occupation o in industry i . For all wage variables, I calculate real wages using the CPI index. Var , Variety, is a measure of variety as defined earlier. To compare the effect among our knowledge variety definitions and ensure that knowledge variety has a general effect no matter the particular definition, a regression is estimated for each measure, diversity, weighted diversity, entropy and percent of management.

The control variables, X'_{oit} , at the industry level include industry size, industry employment growth rates, labor productivity (Data from the Division of Industry Productivity Studies (DIPS) in the Office of Productivity and Technology at the Bureau of Labor Statistics, [Bureau of Labor Statistics \(2015a\)](#)), and the concentration of establishment size in an industry measured with Herfindahl index (data from the statistics of US Businesses (SUSB), [Bureau \(2015\)](#)). After merging the additional datasets, there are 161 industries and 700 occupations remaining. Previous research has indicated that the size and concentration of an industry can affect the average wages of workers. In more concentrated industries, firms and establishments are more likely to have similar compensation policies and larger firms tend to pay more ([Brown & Medoff \(1989\)](#)) due to rent-sharing (ie industries and establishments that have higher profit rates who will share this with workers ([Abowd et al. \(2012\)](#)) and workers will feel they are fairly compensated and work harder ([Thaler \(1989\)](#)).

The controls at the occupational level are the occupation employment size and occupation employment growth rates. A fast growing occupation may represent a job that is in high demand and potentially signal that the demand of that job outpaces the supply. This could potentially impact the wages of that occupation group, which is why it is include as a control. The occupation size may also represent the bargaining power a job may have. If an occupation is common and large across the economy, the ability of a worker to negotiate their salary is smaller than a worker who has a specialized skill set and hence, why we choose to include this proxy in the model. Summary statistics of all variables in our model is in the appendix.

3.2 Data

The main dataset used is the Occupation Employment Statistics (OES) provided by the Bureau of Labor Statistics (2015b). This choice is made because this dataset, as opposed to IPUMS or CPS, provides statistics for 6-digit occupations for each 4-digit industry. Additionally, the OES asks the establishment rather than employer about wages. This removes a common issue of underreporting income, which often occurs in self-reported earned income studies Deaton (1997). Wage data are collected in 12 wage band categories and are censored above \$190,000 and below the national minimum wage. The 10th, 25th, 50th, 75th and 90th percentile wages are provided, as well as, the average for each occupation and industry pair.

While this survey has been in existence since 1977, the NAICS classification system for industry identification drastically changed in 1997, as well as the standard occupational classification (SOC), which changed in 2003. Hence, this dataset is compiled starting in 2003. In 2010, there was a small change in classification for 42 occupations. To smooth over this effect, occupation codes are reverted to the original 2003 classifications. Only 4 occupations may have an over representativeness in their employment as they have two codes added together. However, these occupations are a very small part of the labor force and have a declining presence in the labor market.

Additionally, for the years after 2009, the BLS provides additional information about the ownership of establishments by industry code starting in 2009. To ensure a comparable time series, all ownership types are combined within an industry type, adding total employment and a weighted average income. Our main focus is on disaggregated enterprise industries, thus, local, state and federal government are excluded from the analysis. One limitation to using this dataset is that the publicly available data is not at the micro enterprise level data, but rather aggregated data by occupation and industry. Thus, this paper will not discuss worker level characteristics, but rather, focus on occupation and industry characteristics. This is done to measure the level of labor variety within an industry more accurately, which requires information at the most detailed level of occupations, ie the 6-digit level of SOC. Other datasets typically used to measure intra-industry wages tend to have broadly categorized industries or occupations profiles, such as the American Community Survey (ACS), IPUMS or census data.

3.3 Mixed Effects Model Results

Table 2 are the fixed effects results from our mixed effects model. Each regression highlights a particular measure of variety, starting with regression one is entropy, then weighted diversity, following diversity and finally, the percent of management occupations in the industry. The establishment market power/concentration in an industry is measured by the Herfindahl index (HH), the labor productivity of the industry (LP) is defined as the total revenue divided by number of employees, the industry size is calculated by the total number of employees in that industry, and the occupation size is the total number of people of that occupation in the entire labor market.

In all of the specifications, every measure for knowledge coordination premium is positive and statistically significant - occupations in more knowledge diverse settings receive a coordination premium. Diving in a bit further, a one unit increase of entropy, which is a very large jump as its standard deviation is .58, is associated with a 10.7 % expected increase in average industry income, approximately. For each additional new occupation in an industry, there is an associated 0.21% expected increase in average industry income, approximately. An increase of one additional new occupation (weighted) in an industry has an associated 0.9% expected increase in income, approximately. Keep in mind that the maximum weighted diversity measure is 14.4 and the standard deviation is 3.68. A one percentage point increase in the percent of management in an industry is associated with a 2.05% expected increase in income, approximately. Knowledge coordination premiums seem to have a large effect on income, in the case of weighted diversity, its effects can range from 0.25% to 13.26% when applied to our actual dataset ranges. Indeed, more diverse industries are associated with higher wages.

Table 2: Fixed Effects Results with Wages as Dependent Variable

	(1)	(2)	(3)	(4)
HH	0.550*** (0.039)	0.591*** (0.040)	0.474*** (0.037)	0.633*** (0.041)
LP	0.0000297 (0.000)	0.0000901 (0.000)	0.000128** (0.000)	-0.0000771 (0.000)
Ind Size	0.000507 (0.001)	0.000127 (0.001)	-0.0179*** (0.001)	-0.00761*** (0.001)
Ind Growth	0.0751*** (0.009)	0.136*** (0.009)	0.0661*** (0.009)	0.127*** (0.009)
Occ. Growth	0.00102 (0.002)	0.000914 (0.002)	0.000911 (0.002)	0.00111 (0.002)
Occ. Size	-0.00235 (0.010)	-0.00567 (0.010)	-0.00119 (0.010)	-0.0107 (0.010)
Ent	0.107*** (0.004)			
Weighted Div.		0.00920*** (0.000)		
Div			0.00213*** (0.000)	
Mngmt %				2.055*** (0.120)
Constant	4.845*** (0.112)	5.079*** (0.111)	5.224*** (0.110)	5.255*** (0.109)

Standard errors in parentheses

Robust-clustered standard errors

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The concentration of establishments in an industry, labor productivity, industry growth and occupational growth all have a positive affect on wages. The positive and significant effect of the concentration of an industry on average industry wages and reaffirms previous research on the effect industry size on wages [Brown & Medoff \(1989\)](#). Industry size unexpectedly has a negative affect in two of our regressions, while industry growth has a positive and significant affect, possibly indicating that fast growing industries have higher revenue growth which then translates to workers via the fair wage hypothesis. Labor productivity was expected to have a positive affect from theory as the marginal effect of productivity should equal the marginal effect of wages (hence, higher labor productivity should also have higher wages), but its affect remains unclear as the sign

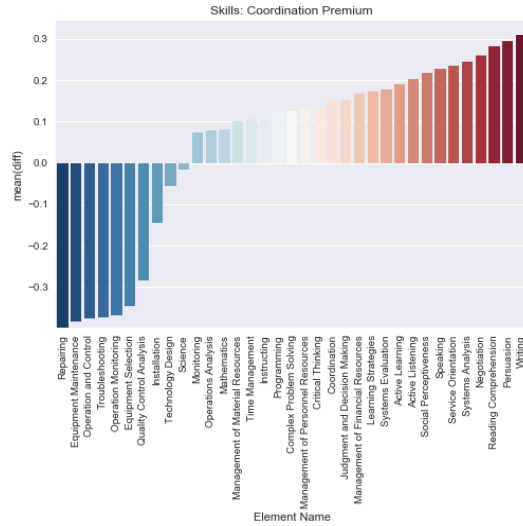
changes depending on the measure of variety and only in the case of weighted diversity is the affect positive and significant. Occupational size is not significant and negative. This could reflect the demand of an occupation in that if there are many people working in that occupation it is easier for firms to replace that worker thus reducing bargaining power for that job, which ultimately affects the average wages. The high supply of that occupation pushes down average wages, however our results remain inconclusive on whether there is an affect. Occupational growth, similarly, does not have affect.

4 Knowledge Coordination Skills, Tasks & Abilities

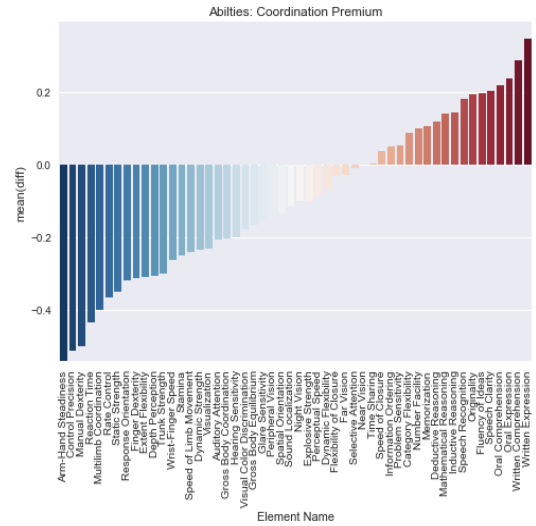
Some occupations will receive a higher compensation for knowledge coordination than other occupations due to the nature of their occupation. Our fixed effects estimates tested to see if a secretary who works in a university gets paid more than a secretary in an accounting firm, which was found to be valid. But, do secretaries earn a higher coordination premium than a sales associate? To answer this question, I utilize the estimated random effect of weighted diversity from our mixed effects model. For each occupation there is an estimated slope from the random effect parameters. For each measure of variety, the random effect slope parameter by occupation is provided in the Appendix. The weighted diversity is chosen as the variety measure of choice because it takes into account the relative similarity between occupations and likely to best capture how much variety of knowledge exists in an industry.

Most interestingly, every occupation can be linked to skills, abilities, work activities and knowledge characteristics from the O*NET dataset which can ultimately be linked to the random effect estimates. This allows us to understand beyond which occupations have knowledge coordination premiums, but also what are the particular tasks, activities, skills and knowledge that go into knowledge coordination by comparing jobs who receive the highest knowledge coordination premiums, ie the top quarter of the random effect estimates, compared to jobs who receive the lowest premiums, ie the bottom quarter estimates.

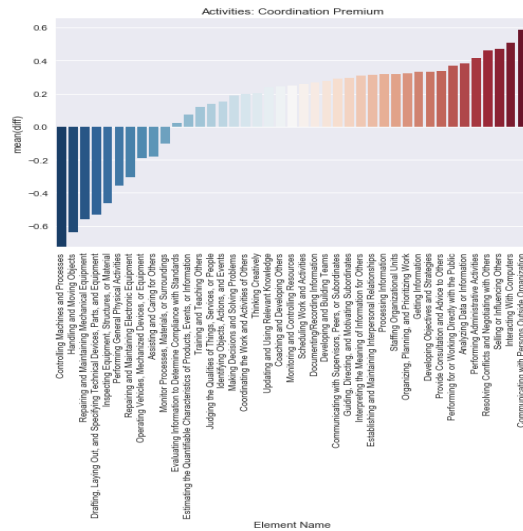
Skills, abilities, activities and knowledge are measured on a scale between 1-7 of importance for each occupation. There are 52 possible abilities, 35 possible skills, 41 work activities and 33 types of knowledge. After combining the estimates with the O*NET dataset, 496 occupations remain [U.S. Department of Labor & Administration \(2016\)](#). I take the average of each skill, ability, activity and knowledge importance for the high estimate group and the low estimate group. By taking the difference of the averages from the high coordination premium group from the low coordination premium group we can understand the important skills for coordinators. The results are presented in figures [2a](#) - [2d](#).



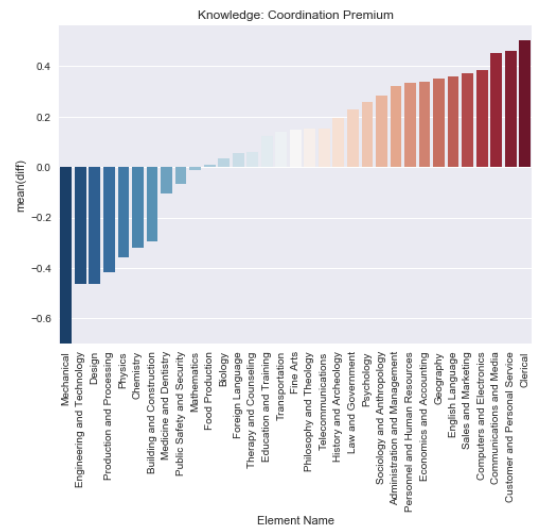
(a) Skills that Pay: Low vs High Diversity Premium Occupations



(b) Abilities that Pay: Low vs High Diversity Premium Occupations



(c) Activities that Pay: Low vs High Diversity Premium Occupations



(d) Activities that Pay: Low vs High Diversity Premium Occupations

Figure 2: Knowledge Coordination Premium Skills, Activities, Abilities and Knowledge

There is overwhelming support that communication and management skills in all categories are essential to knowledge coordination. Knowledge coordination premiums are associated with social, communication, reasoning, coordinating and listening activities. Important skills to have are writing, persuasion, reading comprehension, negotiation, social perceptiveness, active listening, systems evaluation, active listening, learning strategies, management of financial resources, coordination, management of personnel resources, judgement and decision making, critical thinking, complex problem solving, programming, instructing and time management. Abilities needed are written expression, written comprehension, oral expression, speech clarity, fluency of ideas, originality, speech recognition, inductive reasoning, mathematical reasoning, deductive reasoning, memorization, number facility, category flexibility, problem sensitivity, speed of closure, information ordering and time sharing. Activities are communicating with persons

outside an organization, interacting with computers, performing admin. activities, performing or working directly with the public, selling or influencing others, resolving conflicts and negotiating with others, analyzing data or information, establishing and maintaining interpersonal relationships, provide consultation or advice to others, staffing organizational units, processing information, and gathering information. Broad knowledge associate with coordination are clerical, communications and media, customer and personal service, computers and electronics, english language, personnel and human resources, economics and accounting, sale and marketing, administration and management, law and government, and sociology and anthropology. For robustness, we repeated this exercise for all our measures of variety and find that similar skills, abilities, activities and knowledge remain among the most important, although the rankings changed.

5 Conclusion

Knowledge management has always been essential part of the economy - after all it is the organization of people who hold knowledge and transform ideas to products (physical or a service). For industries that have more variety of knowledge and skillsets, managing these resources become more important and essential to utilize efficiently. In this paper, I provided a few measures of knowledge variety within an industry using an industry-occupation network. Using a mixed effects model, I estimated knowledge coordination premiums and found that there is a positive and significant association with knowledge variety and average industry wages. I used the random effect parameters to estimate knowledge coordination premiums by occupation and connected these estimates to a data set on skills, abilities, activities and knowledge. This revealed that communication skills are essential for occupations that are paid a knowledge coordination premium.

The future of the importance of certain skills related to knowledge coordination remains unclear. Many of the particular tasks uncovered are also tasks that could be automatized in the future, such as speech clarity. Nonetheless, organizing people, ideas and knowledge will always remain vital in the labor market. Whether these organization skills will be paid more or less in the future is unclear, but at the same time each of us knows the value of a good secretary who is often the central node of operations in an institute. Automating personal skills, negotiation or persuasion seem much more less likely to happen in the future. While some aspects of coordination might be undervalued, interpersonal skills have and will likely remain an important skill, especially for occupations, such as a project manager, who have to manage a variety of knowledge streams.

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6 Appendices

6.1 Visualizing network graphs

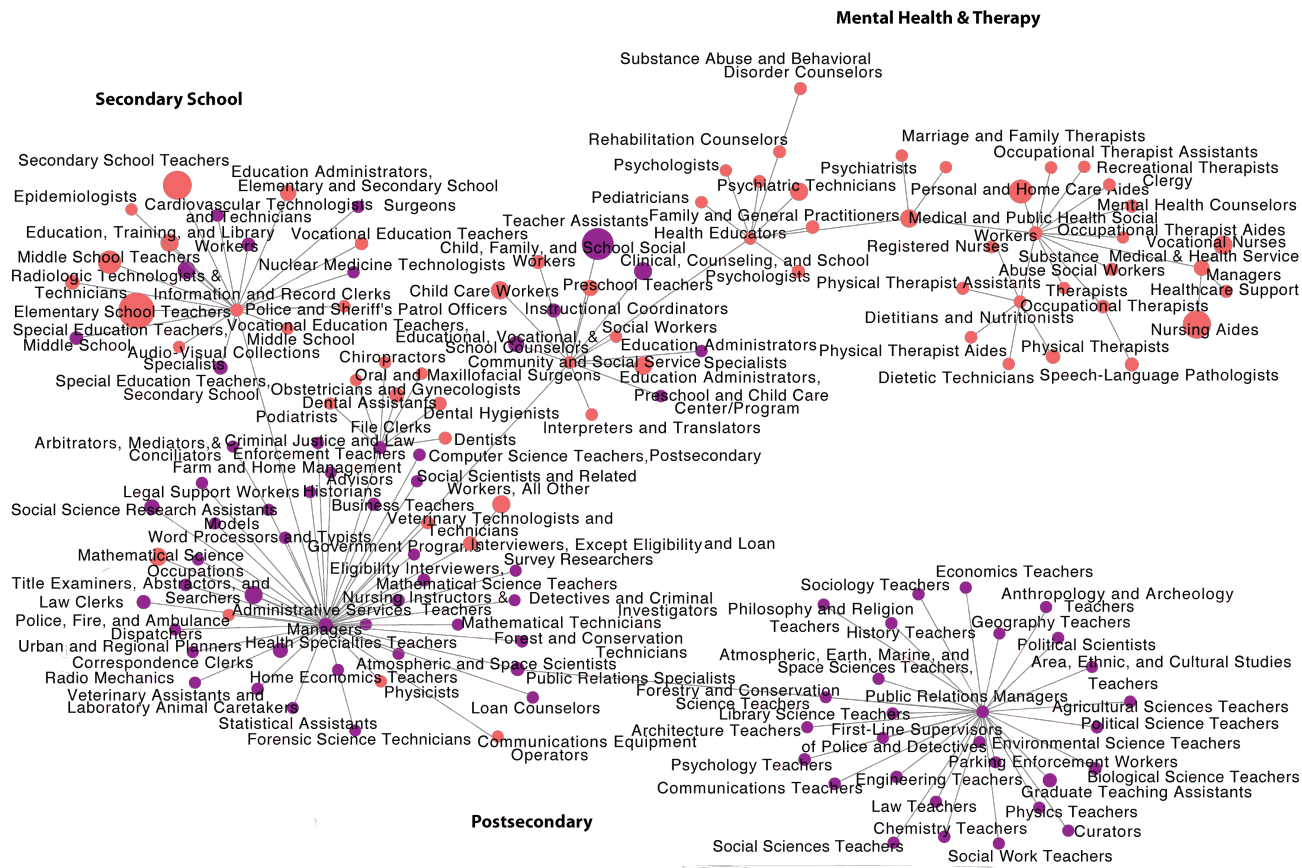
For every year of our industry occupation matrix/data, 2003 - 2015, I create undirected network graphs of the labor market. I project on either the industry or occupation side. In this paper, the relevant projection is on the occupation side as I am more interested in understanding occupational similarity rather than industry similarity. Nonetheless, the author also has similarity statistics and networks on the industry side and if interested, please contact the author directly.

For every year, I calculate the 93 percentile of the similarity index distribution (ie weight). For consistency, I decided to chose a percentile, which means the actual cut-off threshold changes depending on the relative weight of the year. However, the choice of the percentile is arbitrary and purely based on reducing the number of edges so the network graph is not too dense visually. Additionally, I use a minimum spanning tree (MST), also known as Kruskal's algorithm, as our layout algorithm ([1956](#)). The method uses the weights of the edges to prioritize which links are connected visually. Typically, this method finds an edge of the least possible weight that connects any two edges. Instead, I use the algorithm to find the largest possible weight that connects any two edges. It starts by connecting two nodes with an edge that has the largest weight and continues to look for the next largest weight that does not create a cycle until the entire tree is connected. Our method doesn't affect the statistics that are used for our measures of variety and is purely used for the purpose of visualizing the network.

Our community detection algorithm is the much used Louvain method [Blondel et al. \(2008\)](#). The method searches for high modularity partitions in large networks. The method begins by having each node as a community, it then considers a nodes links and evaluates the gain of modularity for placing it one community and removing it from another. Based on the gain, the algorithm decides which community the node best belongs. This continues until the local maxima of modularity is reached. I utilize the weights from the Adamic-Adar index and choose a resolution of .95. The resolution is arbitrary and is only used to help ensure I define communities that do not contain only a few occupations.

I use cytoscape to create the graphs based on the network edge list and weights calculated from the MST and community algorithms. I touch up these graphs using Adobe InDesign to add text and alter some edge distances so that occupation names can be more clearly read.

Figure 3: Area of Detail from 1a, Education Related Occupations



6.2 Industry Variety Statistics

Table 3:

Stat	Entropy	Div	W. Div	Mngmt %
Mean	2.99	73.98	12.81	0.05
SD	0.58	27.54	5.41	0.02
Min	0.82	8.00	0.38	0.01
Max	3.81	132.00	21.53	0.10
p25	2.80	56.00	9.54	0.03
p75	3.40	96.00	17.21	0.06

Source: Author's own calculations

Table 5: Industry Variety Measures

Industry Name	Entropy	Div	Mgt %	W. Div.
Other Electrical Equipment and Component Manuf...	3.59	102.0	0.06	21.53
Industrial Machinery Manufacturing	3.62	96.0	0.08	21.07
Commercial and Service Industry Machinery Manu...	3.80	111.0	0.07	20.72

Table 5: Industry Variety Measures

Industry Name	Entropy	Div	Mgt %	W. Div.
Electric Lighting Equipment Manufacturing	3.54	84.0	0.07	20.34
Electrical Equipment Manufacturing	3.50	101.0	0.06	20.09
Other General Purpose Machinery Manufacturing	3.48	111.0	0.06	19.89
Medical Equipment and Supplies Manufacturing	3.55	129.0	0.06	19.70
Soap, Cleaning Compound, and Toilet Preparatio...	3.19	79.0	0.06	19.49
Cutlery and Handtool Manufacturing	3.44	80.0	0.06	19.41
Other Fabricated Metal Product Manufacturing	3.47	119.0	0.05	19.38
Nonferrous Metal (except Aluminum) Production ...	3.54	96.0	0.05	19.10
Agriculture, Construction, and Mining Machiner...	3.43	108.0	0.04	19.05
Ventilation, Heating, Air-Conditioning, and Co...	3.19	91.0	0.05	19.03
Communications Equipment Manufacturing	3.61	91.0	0.09	18.99
Forging and Stamping	3.41	82.0	0.05	18.89
Plastics Product Manufacturing	3.38	99.0	0.05	18.89
Pharmaceutical and Medicine Manufacturing	3.60	109.0	0.07	18.68
Navigational, Measuring, Electromedical, and C...	3.73	127.0	0.08	18.25
Pesticide, Fertilizer, and Other Agricultural ...	3.29	67.0	0.07	18.21
Semiconductor and Other Electronic Component M...	3.43	96.0	0.06	18.18
Paint, Coating, and Adhesive Manufacturing	3.19	68.0	0.08	18.08
Converted Paper Product Manufacturing	3.10	80.0	0.05	18.04
Steel Product Manufacturing from Purchased Steel	3.46	80.0	0.05	18.02
Resin, Synthetic Rubber, and Artificial Synthe...	3.42	84.0	0.06	18.02
Other Chemical Product and Preparation Manufac...	3.25	70.0	0.06	17.87
Engine, Turbine, and Power Transmission Equipm...	3.30	90.0	0.06	17.82
Other Miscellaneous Manufacturing	3.65	132.0	0.06	17.71
Boiler, Tank, and Shipping Container Manufactu...	3.29	81.0	0.05	17.60
Spring and Wire Product Manufacturing	3.56	78.0	0.06	17.49
Rubber Product Manufacturing	3.24	78.0	0.04	17.49
Motor Vehicle Parts Manufacturing	3.19	100.0	0.04	17.40
Professional and Commercial Equipment and Supp...	3.58	107.0	0.08	17.32
Metalworking Machinery Manufacturing	3.23	80.0	0.06	17.32
Other Nonmetallic Mineral Product Manufacturing	3.55	89.0	0.05	17.21
Glass and Glass Product Manufacturing	3.30	74.0	0.04	17.17
Basic Chemical Manufacturing	3.30	101.0	0.06	17.17
Coating, Engraving, Heat Treating, and Allied ...	3.04	76.0	0.06	17.12
Hardware Manufacturing	3.35	64.0	0.08	16.97
Chemical and Allied Products Merchant Wholesalers	3.31	82.0	0.10	16.96
Household Appliances and Electrical and Electr...	3.55	95.0	0.09	16.75
Household Appliance Manufacturing	3.01	68.0	0.04	16.70
Metal and Mineral (except Petroleum) Merchant ...	3.20	75.0	0.07	16.59
Aerospace Product and Parts Manufacturing	3.66	123.0	0.04	16.48
Architectural and Structural Metals Manufacturing	3.23	98.0	0.05	16.45
Audio and Video Equipment Manufacturing	3.35	65.0	0.10	16.39
Miscellaneous Durable Goods Merchant Wholesalers	3.23	96.0	0.06	16.39
Alumina and Aluminum Production and Processing	3.40	76.0	0.04	16.07

Table 5: Industry Variety Measures

Industry Name	Entropy	Div	Mgt %	W. Div.
Drugs and Druggists' Sundries Merchant Wholesa...	3.24	89.0	0.07	15.92
Clay Product and Refractory Manufacturing	3.18	57.0	0.05	15.65
Grain and Oilseed Milling	3.20	70.0	0.06	15.62
Other Transportation Equipment Manufacturing	3.12	70.0	0.06	15.62
Machinery, Equipment, and Supplies Merchant Wh...	3.32	94.0	0.07	15.52
Machine Shops; Turned Product; and Screw, Nut,...	2.86	70.0	0.05	15.20
Manufacturing and Reproducing Magnetic and Opt...	3.65	63.0	0.07	15.19
Office Furniture (including Fixtures) Manufact...	3.27	84.0	0.05	15.13
Petroleum and Coal Products Manufacturing	3.45	104.0	0.05	15.00
Foundries	3.26	82.0	0.04	14.97
Paper and Paper Product Merchant Wholesalers	3.10	67.0	0.07	14.95
Beverage Manufacturing	3.19	78.0	0.04	14.94
Animal Food Manufacturing	3.21	71.0	0.06	14.87
Computer and Peripheral Equipment Manufacturing	3.18	69.0	0.09	14.86
Electronic Shopping and Mail-Order Houses	3.32	100.0	0.06	14.77
Motor Vehicle Body and Trailer Manufacturing	2.71	78.0	0.03	14.72
Natural Gas Distribution	3.81	116.0	0.06	14.71
Iron and Steel Mills and Ferroalloy Manufacturing	3.26	80.0	0.03	14.71
Other Food Manufacturing	3.17	71.0	0.05	14.66
Veneer, Plywood, and Engineered Wood Product M...	3.18	67.0	0.03	14.58
Newspaper, Periodical, Book, and Directory Pub...	3.54	95.0	0.06	14.44
Hardware, and Plumbing and Heating Equipment a...	3.03	67.0	0.07	14.38
Pulp, Paper, and Paperboard Mills	3.12	76.0	0.04	14.35
Cement and Concrete Product Manufacturing	2.83	73.0	0.04	14.02
Dairy Product Manufacturing	3.03	70.0	0.04	13.78
Furniture and Home Furnishing Merchant Wholesa...	3.08	62.0	0.08	13.62
Other Furniture Related Product Manufacturing	2.76	56.0	0.04	13.50
Railroad Rolling Stock Manufacturing	3.18	56.0	0.04	13.45
Household and Institutional Furniture and Kitc...	3.02	76.0	0.04	13.32
Sugar and Confectionery Product Manufacturing	2.93	66.0	0.04	13.19
Ship and Boat Building	3.26	89.0	0.03	13.13
Wholesale Electronic Markets and Agents and Br...	2.87	98.0	0.07	13.08
Fruit and Vegetable Preserving and Specialty F...	3.00	62.0	0.03	13.07
Software Publishers	3.05	73.0	0.10	12.95
Lumber and Other Construction Materials Mercha...	3.06	81.0	0.06	12.87
Electric Power Generation, Transmission and Di...	3.46	124.0	0.05	12.86
Printing and Related Support Activities	2.88	69.0	0.05	12.64
Oil and Gas Extraction	3.74	110.0	0.07	12.44
Apparel, Piece Goods, and Notions Merchant Who...	3.00	59.0	0.08	12.35
Lime and Gypsum Product Manufacturing	3.33	48.0	0.04	12.24
Seafood Product Preparation and Packaging	2.48	48.0	0.03	12.05
Tobacco Manufacturing	3.09	41.0	0.07	11.98
Textile and Fabric Finishing and Fabric Coatin...	2.92	50.0	0.05	11.97
Sawmills and Wood Preservation	2.88	58.0	0.03	11.81

Table 5: Industry Variety Measures

Industry Name	Entropy	Div	Mgt %	W. Div.
Other Wood Product Manufacturing	3.01	77.0	0.04	11.79
Motor Vehicle and Motor Vehicle Parts and Supp...	3.08	69.0	0.06	11.74
Cable and Other Subscription Programming	3.18	71.0	0.05	11.64
Bakeries and Tortilla Manufacturing	2.89	55.0	0.03	11.54
Wired Telecommunications Carriers	2.80	73.0	0.03	11.51
Miscellaneous Nondurable Goods Merchant Wholes...	3.04	82.0	0.06	11.27
Fabric Mills	2.81	54.0	0.04	11.20
Beer, Wine, and Distilled Alcoholic Beverage M...	2.40	41.0	0.07	11.11
Wireless Telecommunications Carriers (except S...	3.02	63.0	0.05	11.01
Motor Vehicle Manufacturing	2.01	44.0	0.02	10.72
Accounting, Tax Preparation, Bookkeeping, and ...	2.41	58.0	0.06	10.60
Grocery and Related Product Merchant Wholesalers	2.88	70.0	0.05	10.54
Petroleum and Petroleum Products Merchant Whol...	2.89	64.0	0.07	10.52
Textile Furnishings Mills	2.92	52.0	0.04	10.33
Cut and Sew Apparel Manufacturing	2.13	45.0	0.04	10.23
Other Textile Product Mills	2.72	56.0	0.04	10.19
Metal Ore Mining	3.60	82.0	0.02	9.89
Radio and Television Broadcasting	3.10	69.0	0.09	9.73
Nonmetallic Mineral Mining and Quarrying	3.29	70.0	0.04	9.55
Direct Selling Establishments	2.89	53.0	0.05	9.54
Travel Arrangement and Reservation Services	2.58	56.0	0.06	8.96
Animal Slaughtering and Processing	2.71	59.0	0.02	8.96
Footwear Manufacturing	2.24	28.0	0.03	8.93
Warehousing and Storage	2.39	56.0	0.03	8.91
Support Activities for Mining	3.12	100.0	0.03	8.91
Farm Product Raw Material Merchant Wholesalers	2.96	54.0	0.05	8.84
Fiber, Yarn, and Thread Mills	2.13	33.0	0.02	8.03
Other Leather and Allied Product Manufacturing	2.54	37.0	0.04	7.95
Coal Mining	3.20	61.0	0.02	7.40
Vending Machine Operators	2.26	32.0	0.04	7.40
Water, Sewage and Other Systems	2.77	55.0	0.05	7.31
Apparel Knitting Mills	2.52	25.0	0.02	7.16
Furniture Stores	2.09	39.0	0.03	6.94
Leather and Hide Tanning and Finishing	2.79	23.0	0.05	6.78
Apparel Accessories and Other Apparel Manufact...	2.29	32.0	0.03	6.59
Specialized Freight Trucking	1.78	41.0	0.03	6.35
Lawn and Garden Equipment and Supplies Stores	2.51	40.0	0.03	5.98
Other Miscellaneous Store Retailers	2.09	38.0	0.03	5.93
Building Material and Supplies Dealers	2.13	38.0	0.03	5.43
Automobile Dealers	2.58	52.0	0.05	5.41
General Freight Trucking	1.38	27.0	0.03	5.14
Home Furnishings Stores	1.78	37.0	0.03	4.91
Drycleaning and Laundry Services	1.87	25.0	0.02	4.87
Electronics and Appliance Stores	1.79	29.0	0.03	4.50

Table 5: Industry Variety Measures

Industry Name	Entropy	Div	Mgt %	W. Div.
Specialty Food Stores	2.57	46.0	0.02	4.34
Used Merchandise Stores	1.67	18.0	0.02	4.11
Automotive Parts, Accessories, and Tire Stores	2.19	25.0	0.03	4.02
Other Motor Vehicle Dealers	2.52	40.0	0.05	4.02
Medical and Diagnostic Laboratories	2.78	59.0	0.02	3.98
Beer, Wine, and Liquor Stores	1.31	14.0	0.03	3.95
Book Stores and News Dealers	1.32	13.0	0.03	3.84
Office Supplies, Stationery, and Gift Stores	1.55	23.0	0.03	3.62
Automotive Repair and Maintenance	2.31	32.0	0.03	3.45
Sporting Goods, Hobby, and Musical Instrument ...	1.45	35.0	0.03	3.39
Florists	1.49	14.0	0.02	3.39
Gambling Industries	3.02	72.0	0.02	3.37
Amusement Parks and Arcades	2.70	66.0	0.02	3.24
Traveler Accommodation	2.81	73.0	0.02	2.66
Other General Merchandise Stores	2.07	28.0	0.01	2.42
Department Stores	1.80	28.0	0.01	2.14
Jewelry, Luggage, and Leather Goods Stores	1.08	14.0	0.03	2.13
Grocery Stores	2.12	37.0	0.02	2.06
Health and Personal Care Stores	2.11	28.0	0.02	1.56
Clothing Stores	0.96	14.0	0.01	1.54
Shoe Stores	0.82	8.0	0.02	1.52
Special Food Services	2.51	26.0	0.01	1.24
Restaurants and Other Eating Places	2.28	20.0	0.01	1.14
Drinking Places (Alcoholic Beverages)	1.68	23.0	0.01	1.08
Gasoline Stations	1.01	15.0	0.01	0.77
Personal Care Services	1.66	16.0	0.01	0.38

Table 4:

Stats	HH	LP	Ind Size*	Ind Growth	Occ. Wage*	Emp Growth	Emp Size*
Mean	0.20	106.78	12.18	0.02	5.32	0.02	12.11
SD	0.03	20.82	1.09	0.10	0.46	0.06	1.52
Min	0.19	70.75	7.98	-0.22	4.41	-0.35	4.87
Max	0.50	296.39	16.08	1.07	6.70	1.60	15.33
p25	0.19	96.93	11.47	-0.00	4.95	-0.01	11.08
p75	0.20	113.19	12.85	0.03	5.62	0.04	13.14

Source: Author's own calculations

*Variables are in natural log units

6.3 Random Effect Parameter Estimates

Table 6: Occupation Level Random Effect Standard Deviations

Variable	(1) Entropy	(2) W. Div.	(3) Div.	(4) Mngmt %
S.D. LP	.0011*** (.0001)	.0010*** (.0001)	.0011*** (.0001)	.0010*** (.0001)
S.D. Variety	.0804*** (.0043)	.0112*** (.0006)	.0017*** (.0001)	2.7574*** (.1517)
S.D. Contant	.4289 *** (.0141)	.4214*** (.0123)	.4210*** (.0130)	.4010*** (.0122)
N	214992	214992	214992	214992
N Occupations	700	700	700	700

Each of these regression results are from the mixed effects model described in section 3.1

The fixed effects results are provided in Table 2

Standard errors in parentheses

Robust-clustered standard errors

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Cross-correlation Table for Random Effect Variety Parameters

Variables	W. Div.	Mgt %	Div	Ent
W. Div	1.000			
Mgt %	0.700	1.000		
Div	0.638	0.444	1.000	
Ent	0.613	0.433	0.838	1.000

The random effect parameters are estimated from the Mixed Effects model in Table 6

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
395091	Makeup Artists, Theatrical and Performance	0.056	9.034	0.006	0.289
419012	Models	0.044	10.038	0.007	0.317
232099	Legal Support Workers, All Other	0.043	3.932	0.006	0.356
393092	Costume Attendants	0.042	10.696	-0.001	-0.136
339021	Private Detectives and Investigators	0.041	12.031	0.005	0.237
193011	Economists	0.039	8.052	0.004	0.298
273011	Radio and Television Announcers	0.037	6.748	0.006	0.279
194041	Geological and Petroleum Technicians	0.036	5.477	0.004	0.106
251194	Vocational Education Teachers, Postsecondary	0.035	7.696	0.006	0.273
119141	Property, Real Estate, and Community Associati...	0.034	3.475	0.002	0.147
472171	Reinforcing Iron and Rebar Workers	0.034	6.136	0.005	0.268
413031	Securities, Commodities, and Financial Service...	0.034	8.422	0.003	0.263
535011	Sailors and Marine Oilers	0.034	7.459	0.003	0.158
119011	Farm, Ranch, and Other Agricultural Managers	0.033	2.454	0.005	0.205
513091	Food and Tobacco Roasting, Baking, and Drying ...	0.033	5.924	0.005	0.314
436012	Legal Secretaries	0.033	2.514	0.004	0.252
271029	Designers, All Other	0.032	7.381	0.006	0.270
191011	Animal Scientists	0.031	5.358	0.005	0.252
339099	Protective Service Workers, All Other*	0.031	7.728	0.006	0.275
472132	Insulation Workers, Mechanical	0.030	1.932	0.006	0.285
172151	Mining and Geological Engineers, Including Min...	0.029	5.217	0.004	0.288
536051	Transportation Inspectors	0.029	4.160	0.004	0.099
272012	Producers and Directors	0.029	5.024	0.003	0.184
493091	Bicycle Repairers	0.028	9.277	0.005	0.148
413011	Advertising Sales Agents	0.028	5.797	0.004	0.189
111021	General and Operations Managers	0.028	7.059	0.005	0.224
274021	Photographers	0.027	4.215	0.004	0.194
372019	Building Cleaning Workers, All Other	0.027	4.848	0.002	0.104
274012	Broadcast Technicians	0.027	-1.167	0.003	0.158
132082	Tax Preparers	0.027	0.897	0.005	0.218
191041	Epidemiologists	0.027	6.254	0.005	0.231
533099	Motor Vehicle Operators, All Other	0.027	1.141	0.005	0.165
474021	Elevator Installers and Repairers	0.026	8.715	0.006	0.118
519131	Photographic Process Workers	0.026	6.542	0.005	0.225
533041	Taxi Drivers and Chauffeurs	0.026	4.353	0.003	0.100
434051	Customer Service Representatives	0.025	5.231	0.004	0.193
131031	Claims Adjusters, Examiners, and Investigators	0.025	4.779	0.003	0.151
191099	Life Scientists, All Other	0.025	7.546	0.003	0.225
411012	First-Line Supervisors/Managers of Non-Retail ...	0.025	6.077	0.005	0.223
273041	Editors	0.024	4.990	0.003	0.168
373012	Pesticide Handlers, Sprayers, and Applicators,...	0.024	3.987	0.001	0.159
472131	Insulation Workers, Floor, Ceiling, and Wall	0.024	1.198	0.004	0.187
419099	Sales and Related Workers, All Other*	0.024	5.988	0.005	0.204
112022	Sales Managers	0.024	6.947	0.004	0.202

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
292041	Emergency Medical Technicians and Paramedics	0.024	9.950	0.002	0.137
519197	Tire Builders	0.023	1.628	0.004	0.213
475012	Rotary Drill Operators, Oil and Gas	0.023	0.051	0.002	0.134
439031	Desktop Publishers	0.023	3.890	0.003	0.172
112011	Advertising and Promotions Managers	0.023	5.354	0.003	0.148
271019	Artists and Related Workers, All Other	0.023	7.276	0.005	0.231
399099	Personal Care and Service Workers, All Other	0.022	5.048	0.004	0.145
131121	Meeting and Convention Planners	0.022	4.490	0.004	0.195
518093	Petroleum Pump System Operators, Refinery Oper...	0.022	2.742	0.003	0.139
413099	Sales Representatives, Services, All Other	0.022	6.116	0.004	0.193
292071	Medical Records and Health Information Technic...	0.022	6.095	0.004	0.208
519132	Photographic Processing Machine Operators	0.022	5.876	0.004	0.186
171012	Landscape Architects	0.022	4.058	0.004	0.139
439111	Statistical Assistants	0.022	1.497	0.003	0.169
211099	Community and Social Service Specialists, All ...	0.022	2.112	0.003	0.090
399032	Recreation Workers	0.021	4.566	0.001	0.061
273099	Media and Communication Workers, All Other	0.021	1.780	0.004	0.159
273031	Public Relations Specialists*	0.021	5.051	0.004	0.169
419022	Real Estate Sales Agents	0.021	3.019	0.004	0.256
113011	Administrative Services Managers	0.021	5.294	0.004	0.177
253021	Self-Enrichment Education Teachers	0.021	5.430	0.003	0.151
291071	Physician Assistants	0.021	4.891	0.004	0.194
393012	Gaming and Sports Book Writers and Runners	0.021	4.468	0.004	0.167
435081	Stock Clerks and Order Fillers	0.021	3.482	0.004	0.192
499042	Maintenance and Repair Workers, General	0.021	4.056	0.004	0.174
112031	Public Relations Managers	0.021	3.345	0.002	0.170
331099	First-Line Supervisors/Managers, Protective Se...	0.020	5.207	0.003	0.146
493052	Motorcycle Mechanics	0.020	6.119	0.004	0.176
537061	Cleaners of Vehicles and Equipment	0.020	2.524	0.004	0.179
517032	Patternmakers, Wood	0.020	2.291	0.003	0.150
254031	Library Technicians	0.020	-2.543	0.005	0.156
291021	Dentists, General	0.020	4.612	0.003	0.193
513093	Food Cooking Machine Operators and Tenders	0.020	5.363	0.005	0.238
419011	Demonstrators and Product Promoters	0.020	5.422	0.003	0.115
211091	Health Educators*	0.020	5.075	0.004	0.199
411011	First-Line Supervisors/Managers of Retail Sale...	0.020	6.405	0.003	0.140
292051	Dietetic Technicians	0.019	9.023	0.003	-0.075
535021	Captains, Mates, and Pilots of Water Vessels	0.019	4.645	0.001	0.099
454023	Log Graders and Scalers	0.019	1.775	0.003	0.157
192021	Atmospheric and Space Scientists	0.019	5.127	0.004	0.207
434081	Hotel, Motel, and Resort Desk Clerks	0.019	3.040	0.002	0.086
194093	Forest and Conservation Technicians	0.019	1.612	0.004	0.192
254011	Archivists	0.019	3.678	0.004	0.160
259031	Instructional Coordinators	0.019	0.702	0.001	0.114

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
431011	First-Line Supervisors/Managers of Office and ...	0.019	4.530	0.004	0.156
152041	Statisticians	0.019	2.177	0.002	0.089
474041	Hazardous Materials Removal Workers	0.019	1.575	0.005	0.174
319096	Veterinary Assistants and Laboratory Animal Ca...	0.019	5.010	0.004	0.182
499099	Installation, Maintenance, and Repair Workers,...	0.019	3.483	0.004	0.181
152021	Mathematicians	0.019	-3.284	0.004	0.213
273043	Writers and Authors	0.019	4.060	0.003	0.155
299099	Healthcare Practitioners and Technical Workers...	0.019	5.687	0.003	0.178
434199	Information and Record Clerks, All Other	0.019	4.082	0.003	0.152
492092	Electric Motor, Power Tool, and Related Repairers	0.019	2.928	0.003	0.195
193021	Market Research Analysts	0.018	5.000	0.004	0.154
191013	Soil and Plant Scientists	0.018	3.175	0.002	0.192
119051	Food Service Managers	0.018	5.292	0.005	0.195
131199	Business Operations Specialists, All Other*	0.018	5.309	0.003	0.152
192042	Geoscientists, Except Hydrologists and Geograp...	0.018	4.791	0.001	0.067
291127	Speech-Language Pathologists	0.018	4.484	0.003	0.207
113042	Training and Development Managers	0.018	5.765	0.003	0.184
413041	Travel Agents	0.018	3.077	0.001	0.059
399021	Personal and Home Care Aides	0.018	3.497	0.005	0.216
474011	Construction and Building Inspectors	0.018	2.516	0.004	0.212
412031	Retail Salespersons	0.018	5.171	0.003	0.139
372021	Pest Control Workers	0.018	2.364	-0.000	0.132
291123	Physical Therapists	0.017	2.391	0.003	0.138
151099	Computer Specialists, All Other	0.017	4.121	0.003	0.154
412022	Parts Salespersons	0.017	4.586	0.003	0.149
171022	Surveyors	0.017	3.004	0.003	0.183
395092	Manicurists and Pedicurists	0.017	2.597	0.004	0.115
131073	Training and Development Specialists	0.017	5.764	0.004	0.168
518012	Power Distributors and Dispatchers	0.017	-0.724	0.004	0.225
254021	Librarians	0.017	1.736	0.002	0.143
119199	Managers, All Other	0.017	5.326	0.004	0.160
152011	Actuaries	0.017	4.263	0.003	0.178
475061	Roof Bolters, Mining	0.017	2.413	0.001	0.166
412021	Counter and Rental Clerks	0.017	5.388	0.003	0.114
434041	Credit Authorizers, Checkers, and Clerks	0.017	4.967	0.003	0.152
439199	Office and Administrative Support Workers, All...	0.017	3.565	0.004	0.159
131079	Human Resources, Training, and Labor Relations...	0.017	4.867	0.003	0.143
194021	Biological Technicians	0.016	6.063	0.004	0.192
435041	Meter Readers, Utilities	0.016	0.730	0.002	0.138
131021	Purchasing Agents and Buyers, Farm Products	0.016	2.238	0.003	0.179
419041	Telemarketers	0.016	3.745	0.002	0.126
434121	Library Assistants, Clerical	0.016	2.591	0.003	0.112
152099	Mathematical Science Occupations, All Other	0.016	3.997	0.003	0.168
152031	Operations Research Analysts	0.016	2.959	0.002	0.143

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
193032	Industrial-Organizational Psychologists	0.016	3.789	0.003	0.168
274011	Audio and Video Equipment Technicians	0.016	2.635	0.004	0.154
518099	Plant and System Operators, All Other	0.016	2.437	0.004	0.172
414012	Sales Representatives, Wholesale and Manufactu...	0.016	3.171	0.003	0.119
499051	Electrical Power-Line Installers and Repairers	0.016	6.470	0.003	0.251
435061	Production, Planning, and Expediting Clerks	0.016	3.391	0.003	0.149
311012	Nursing Aides, Orderlies, and Attendants*	0.016	3.078	0.001	0.081
475013	Service Unit Operators, Oil, Gas, and Mining	0.016	1.348	0.004	0.120
537062	Laborers and Freight, Stock, and Material Move...	0.016	2.695	0.003	0.143
371011	First-Line Supervisors/Managers of Housekeepin...	0.016	3.447	0.003	0.129
393099	Entertainment Attendants and Related Workers, ...	0.016	0.720	0.005	0.165
434071	File Clerks	0.016	2.573	0.003	0.144
435111	Weighers, Measurers, Checkers, and Samplers, R...	0.016	3.368	0.003	0.146
499021	Heating, Air Conditioning, and Refrigeration M...	0.016	2.924	0.003	0.148
319095	Pharmacy Aides	0.016	4.116	0.003	0.155
532021	Air Traffic Controllers	0.015	3.181	0.003	0.160
434181	Reservation and Transportation Ticket Agents a...	0.015	3.598	0.002	0.038
434151	Order Clerks	0.015	3.652	0.003	0.121
432011	Switchboard Operators, Including Answering Ser...	0.015	3.470	0.002	0.100
193051	Urban and Regional Planners	0.015	2.346	0.002	0.139
533022	Bus Drivers, School	0.015	1.766	0.002	0.095
132021	Appraisers and Assessors of Real Estate	0.015	1.865	0.001	0.090
515021	Job Printers*	0.015	2.892	0.003	0.122
372011	Janitors and Cleaners, Except Maids and Housek...	0.015	2.256	0.003	0.128
473015	Helpers—Pipelayers, Plumbers, Pipefitters, an...	0.015	3.255	0.004	0.219
352012	Cooks, Institution and Cafeteria	0.015	3.773	0.003	0.121
193099	Social Scientists and Related Workers, All Other	0.015	0.968	0.002	0.123
472161	Plasterers and Stucco Masons	0.015	2.578	0.004	0.115
537121	Tank Car, Truck, and Ship Loaders	0.015	1.063	0.002	0.083
433061	Procurement Clerks	0.015	3.565	0.003	0.125
151041	Computer Support Specialists	0.015	3.792	0.003	0.127
433011	Bill and Account Collectors	0.015	3.667	0.003	0.112
271012	Craft Artists	0.015	4.989	0.003	0.122
532022	Airfield Operations Specialists	0.015	0.522	0.003	0.149
499031	Home Appliance Repairers	0.015	3.132	0.003	0.119
472053	Terrazzo Workers and Finishers	0.015	3.400	0.002	0.135
536099	Transportation Workers, All Other	0.014	-0.577	0.002	0.016
472022	Stonemasons	0.014	4.444	0.004	0.145
499043	Maintenance Workers, Machinery	0.014	2.717	0.003	0.162
537064	Packers and Packagers, Hand	0.014	2.136	0.003	0.109
212011	Clergy	0.014	4.494	0.003	0.166
396022	Travel Guides	0.014	2.788	0.001	0.060
194011	Agricultural and Food Science Technicians	0.014	2.576	0.001	0.117
439061	Office Clerks, General	0.014	3.121	0.003	0.119

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
451011	First-Line Supervisors/Managers of Farming, Fi...	0.014	0.869	0.002	0.081
291063	Internists, General	0.014	3.785	0.004	0.226
194061	Social Science Research Assistants	0.014	3.695	0.002	0.101
111011	Chief Executives	0.014	4.077	0.002	0.106
151081	Network Systems and Data Communications Analysts*	0.014	3.821	0.003	0.134
515023	Printing Machine Operators	0.014	2.885	0.003	0.118
519111	Packaging and Filling Machine Operators and Te...	0.014	2.197	0.002	0.142
453011	Fishers and Related Fishing Workers	0.014	-1.058	0.000	0.018
119111	Medical and Health Services Managers	0.014	3.517	0.003	0.153
271025	Interior Designers	0.014	3.465	0.002	0.106
439022	Word Processors and Typists	0.014	0.606	0.003	0.129
516064	Textile Winding, Twisting, and Drawing Out Mac...	0.014	3.044	0.002	0.121
131071	Employment, Recruitment, and Placement Special...	0.014	4.355	0.003	0.140
492021	Radio Mechanics	0.014	2.663	0.004	0.171
518021	Stationary Engineers and Boiler Operators	0.014	3.847	0.004	0.189
519199	Production Workers, All Other*	0.014	1.812	0.004	0.180
291024	Prosthodontists	0.014	2.957	0.003	0.142
499098	Helpers—Installation, Maintenance, and Repair...	0.014	1.650	0.002	0.134
499093	Fabric Menders, Except Garment	0.013	1.156	0.002	0.094
373011	Landscaping and Groundskeeping Workers	0.013	3.019	0.002	0.083
433031	Bookkeeping, Accounting, and Auditing Clerks	0.013	3.141	0.002	0.106
351011	Chefs and Head Cooks	0.013	5.013	0.005	0.178
533031	Driver/Sales Workers	0.013	3.042	0.001	0.061
152091	Mathematical Technicians	0.013	4.234	0.003	0.146
519193	Cooling and Freezing Equipment Operators and T...	0.013	3.293	0.003	0.091
537199	Material Moving Workers, All Other	0.013	1.101	0.004	0.147
519191	Cementing and Gluing Machine Operators and Ten...	0.013	1.432	0.002	0.162
493041	Farm Equipment Mechanics	0.013	2.359	0.003	0.141
493042	Mobile Heavy Equipment Mechanics, Except Engines	0.013	1.820	0.003	0.149
291129	Therapists, All Other*	0.013	2.722	0.003	0.143
493051	Motorboat Mechanics	0.013	3.695	0.002	0.108
516061	Textile Bleaching and Dyeing Machine Operators...	0.013	-1.467	0.004	0.104
492093	Electrical and Electronics Installers and Repa...	0.013	3.428	0.002	0.155
131041	Compliance Officers, Except Agriculture, Const...	0.013	4.097	0.003	0.137
491011	First-Line Supervisors/Managers of Mechanics, ...	0.013	2.918	0.003	0.128
472021	Brickmasons and Blockmasons	0.013	1.119	0.003	0.138
499012	Control and Valve Installers and Repairers, Ex...	0.013	0.215	0.004	0.187
518092	Gas Plant Operators	0.013	0.567	0.003	0.182
511011	First-Line Supervisors/Managers of Production ...	0.013	3.403	0.003	0.137
436014	Secretaries, Except Legal, Medical, and Executive	0.013	2.744	0.002	0.102
393093	Locker Room, Coatroom, and Dressing Room Atten...	0.013	3.732	0.002	0.070
435071	Shipping, Receiving, and Traffic Clerks	0.013	2.246	0.003	0.116
534021	Railroad Brake, Signal, and Switch Operators	0.012	2.484	0.002	0.136
537111	Shuttle Car Operators	0.012	5.375	0.002	0.106

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
211093	Social and Human Service Assistants	0.012	3.128	0.003	0.132
414011	Sales Representatives, Wholesale and Manufactu...	0.012	3.686	0.002	0.133
492097	Electronic Home Entertainment Equipment Instal...	0.012	3.263	0.002	0.087
291124	Radiation Therapists	0.012	2.695	0.003	0.149
191032	Foresters	0.012	1.904	0.002	0.115
412012	Gaming Change Persons and Booth Cashiers	0.012	4.624	0.003	0.144
232092	Law Clerks*	0.012	2.183	0.001	0.152
291122	Occupational Therapists	0.012	2.790	0.003	0.143
518011	Nuclear Power Reactor Operators	0.012	2.882	0.003	0.144
172171	Petroleum Engineers	0.012	3.012	0.001	0.110
173021	Aerospace Engineering and Operations Technicians	0.012	1.253	0.003	0.190
493023	Automotive Service Technicians and Mechanics	0.012	2.086	0.003	0.134
518031	Water and Liquid Waste Treatment Plant and Sys...	0.012	3.413	0.004	0.202
291031	Dietitians and Nutritionists	0.012	2.962	0.002	0.121
435032	Dispatchers, Except Police, Fire, and Ambulance	0.012	2.724	0.002	0.100
452041	Graders and Sorters, Agricultural Products	0.012	2.715	0.002	0.128
132053	Insurance Underwriters	0.012	2.642	0.002	0.136
439011	Computer Operators	0.012	2.879	0.002	0.098
472072	Pile-Driver Operators	0.012	2.742	0.003	0.138
271024	Graphic Designers	0.012	3.231	0.002	0.108
434171	Receptionists and Information Clerks	0.012	2.866	0.002	0.089
432021	Telephone Operators	0.012	1.460	0.004	0.137
131022	Wholesale and Retail Buyers, Except Farm Products	0.012	3.922	0.002	0.096
271021	Commercial and Industrial Designers	0.012	3.695	0.002	0.095
516011	Laundry and Dry-Cleaning Workers	0.012	2.445	0.001	0.046
231022	Arbitrators, Mediators, and Conciliators	0.012	2.016	0.003	0.131
492011	Computer, Automated Teller, and Office Machine...	0.012	2.581	0.003	0.118
271011	Art Directors	0.012	3.734	0.000	0.083
132052	Personal Financial Advisors	0.012	2.404	0.000	0.084
259021	Farm and Home Management Advisors	0.011	1.288	0.003	0.140
519061	Inspectors, Testers, Sorters, Samplers, and We...	0.011	2.740	0.003	0.140
112021	Marketing Managers	0.011	3.926	0.002	0.103
172031	Biomedical Engineers	0.011	2.930	0.002	0.108
373019	Grounds Maintenance Workers, All Other	0.011	1.122	0.003	0.112
292052	Pharmacy Technicians	0.011	2.655	0.002	0.106
492098	Security and Fire Alarm Systems Installers	0.011	2.993	0.001	0.108
512092	Team Assemblers	0.011	0.407	0.002	0.090
274014	Sound Engineering Technicians	0.011	3.049	0.005	0.167
273091	Interpreters and Translators	0.011	3.249	0.003	0.248
371012	First-Line Supervisors/Managers of Landscaping...	0.011	1.648	0.003	0.133
519194	Etchers and Engravers	0.011	3.263	0.002	0.093
291062	Family and General Practitioners	0.011	3.331	0.004	0.215
499062	Medical Equipment Repairers	0.011	3.242	0.002	0.147
499041	Industrial Machinery Mechanics	0.011	2.467	0.003	0.141

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
331021	First-Line Supervisors/Managers of Fire Fighti...	0.011	2.494	0.003	0.132
533021	Bus Drivers, Transit and Intercity	0.011	2.295	-0.000	0.009
534099	Rail Transportation Workers, All Other	0.011	2.376	0.002	0.124
533033	Truck Drivers, Light or Delivery Services	0.011	1.979	0.002	0.098
393011	Gaming Dealers	0.011	1.834	0.001	0.088
292012	Medical and Clinical Laboratory Technicians	0.011	2.460	0.002	0.120
519032	Cutting and Slicing Machine Setters, Operators...	0.011	1.711	0.002	0.111
534013	Rail Yard Engineers, Dinkey Operators, and Hos...	0.011	-0.528	0.001	0.077
319093	Medical Equipment Preparers	0.011	3.054	0.002	0.096
473019	Helpers, Construction Trades, All Other	0.011	1.274	0.003	0.157
493093	Tire Repairers and Changers	0.011	-1.121	0.002	0.089
194051	Nuclear Technicians	0.011	2.531	0.002	0.140
172161	Nuclear Engineers	0.011	3.377	0.002	0.139
537063	Machine Feeders and Offbearers	0.011	0.735	0.002	0.114
433051	Payroll and Timekeeping Clerks	0.011	3.251	0.002	0.090
499091	Coin, Vending, and Amusement Machine Servicere...	0.011	1.826	0.003	0.125
113071	Transportation, Storage, and Distribution Mana...	0.011	3.372	0.002	0.104
434161	Human Resources Assistants, Except Payroll and...	0.011	2.898	0.002	0.096
531011	Aircraft Cargo Handling Supervisors	0.011	3.090	0.002	0.056
516063	Textile Knitting and Weaving Machine Setters, ...	0.011	1.464	0.002	0.106
433021	Billing and Posting Clerks and Machine Operators	0.011	2.772	0.002	0.086
332021	Fire Inspectors and Investigators	0.011	-0.640	0.004	0.168
439071	Office Machine Operators, Except Computer	0.010	1.068	0.003	0.115
519195	Molders, Shapers, and Casters, Except Metal an...	0.010	3.509	0.002	0.111
514031	Cutting, Punching, and Press Machine Setters, ...	0.010	0.063	0.002	0.076
113041	Compensation and Benefits Managers	0.010	5.026	0.003	0.143
472152	Plumbers, Pipefitters, and Steamfitters	0.010	1.677	0.003	0.181
113049	Human Resources Managers, All Other	0.010	4.085	0.003	0.116
454029	Logging Workers, All Other	0.010	-0.576	0.002	0.057
512099	Assemblers and Fabricators, All Other	0.010	0.448	0.002	0.086
119151	Social and Community Service Managers	0.010	1.895	0.001	0.025
194092	Forensic Science Technicians	0.010	2.387	0.003	0.130
131111	Management Analysts	0.010	3.386	0.002	0.099
119071	Gaming Managers	0.010	2.558	0.004	0.112
132061	Financial Examiners	0.010	0.913	0.002	0.097
499095	Manufactured Building and Mobile Home Installers	0.010	3.323	0.003	0.105
173031	Surveying and Mapping Technicians	0.010	1.697	0.003	0.222
131072	Compensation, Benefits, and Job Analysis Speci...	0.010	3.073	0.002	0.094
435031	Police, Fire, and Ambulance Dispatchers	0.010	0.648	0.002	0.114
519123	Painting, Coating, and Decorating Workers	0.010	3.367	0.002	0.107
211019	Counselors, All Other	0.010	1.998	0.002	0.092
452011	Agricultural Inspectors	0.010	6.716	0.005	0.097
291011	Chiropractors	0.010	2.213	0.002	0.115
396032	Transportation Attendants, Except Flight Atten...	0.010	1.159	0.001	0.033

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
272041	Music Directors and Composers	0.010	1.834	0.002	0.125
531021	First-Line Supervisors/Managers of Helpers, La...	0.010	2.244	0.002	0.092
534031	Railroad Conductors and Yardmasters	0.010	1.680	0.002	0.117
151051	Computer Systems Analysts	0.010	3.226	0.002	0.089
131011	Agents and Business Managers of Artists, Perfo...	0.010	0.784	-0.000	-0.030
192043	Hydrologists	0.010	2.553	0.002	0.133
531031	First-Line Supervisors/Managers of Transportat...	0.010	2.425	0.002	0.101
312021	Physical Therapist Assistants	0.010	2.035	0.002	0.111
439021	Data Entry Keyers	0.010	2.110	0.002	0.083
194099	Life, Physical, and Social Science Technicians...	0.009	3.579	0.004	0.135
254013	Museum Technicians and Conservators	0.009	2.069	0.002	0.112
132031	Budget Analysts	0.009	2.238	0.001	0.093
292055	Surgical Technologists	0.009	2.369	0.002	0.110
519023	Mixing and Blending Machine Setters, Operators...	0.009	1.110	0.002	0.124
271026	Merchandise Displayers and Window Trimmers	0.009	2.684	0.001	0.046
113031	Financial Managers	0.009	3.795	0.002	0.075
519192	Cleaning, Washing, and Metal Pickling Equipmen...	0.009	-0.595	0.002	0.202
395011	Barbers	0.009	1.933	0.002	0.089
291121	Audiologists	0.009	2.726	0.001	0.091
131023	Purchasing Agents, Except Wholesale, Retail, a...	0.009	2.989	0.002	0.097
259099	Education, Training, and Library Workers, All ...	0.009	2.968	0.003	0.060
536021	Parking Lot Attendants	0.009	2.365	0.000	-0.008
373013	Tree Trimmers and Pruners	0.009	1.897	0.002	0.096
493053	Outdoor Power Equipment and Other Small Engine...	0.009	2.681	0.002	0.088
359011	Dining Room and Cafeteria Attendants and Barte...	0.009	2.331	0.002	0.067
192032	Materials Scientists	0.009	1.835	0.001	0.086
434061	Eligibility Interviewers, Government Programs	0.009	1.947	0.002	0.108
271014	Multi-Media Artists and Animators	0.009	3.102	0.001	0.067
399041	Residential Advisors	0.009	1.513	0.001	0.061
211012	Educational, Vocational, and School Counselors	0.009	1.981	0.002	0.102
372012	Maids and Housekeeping Cleaners	0.009	1.962	0.002	0.061
395093	Shampooers	0.009	1.724	0.002	0.072
472073	Operating Engineers and Other Construction Equ...	0.009	1.630	0.003	0.105
353041	Food Servers, Nonrestaurant	0.009	2.106	0.001	0.108
439051	Mail Clerks and Mail Machine Operators, Except...	0.009	1.902	0.002	0.085
519012	Separating, Filtering, Clarifying, Precipitati...	0.009	2.624	0.002	0.147
211011	Substance Abuse and Behavioral Disorder Counse...	0.009	1.974	0.002	0.090
516041	Shoe and Leather Workers and Repairers	0.009	2.230	0.002	0.045
272032	Choreographers	0.009	2.567	0.002	0.116
393021	Motion Picture Projectionists	0.009	1.898	0.002	0.072
536031	Service Station Attendants	0.009	1.566	-0.000	0.009
519031	Cutters and Trimmers, Hand	0.009	-0.114	0.002	0.085
319099	Healthcare Support Workers, All Other*	0.009	2.464	0.001	0.072
232093	Title Examiners, Abstractors, and Searchers	0.009	1.745	0.007	0.443

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
191022	Microbiologists	0.009	3.225	0.002	0.185
291041	Optometrists	0.009	3.983	0.001	0.117
515012	Bookbinders	0.009	1.622	0.002	0.085
473014	Helpers–Painters, Paperhangers, Plasterers, a...	0.009	1.765	0.002	0.110
132051	Financial Analysts	0.008	2.861	0.001	0.082
113061	Purchasing Managers	0.008	3.612	0.002	0.073
436011	Executive Secretaries and Administrative Assis...	0.008	3.133	0.002	0.064
519083	Ophthalmic Laboratory Technicians	0.008	2.918	0.001	0.092
352019	Cooks, All Other	0.008	2.355	0.003	0.128
131081	Logisticians	0.008	2.691	0.002	0.102
535022	Motorboat Operators	0.008	3.820	0.000	0.047
299011	Occupational Health and Safety Specialists	0.008	3.153	0.003	0.134
412011	Cashiers	0.008	2.810	0.002	0.063
537032	Excavating and Loading Machine and Dragline Op...	0.008	0.547	0.004	0.157
232011	Paralegals and Legal Assistants	0.008	1.803	0.001	0.096
434141	New Accounts Clerks	0.008	1.556	0.002	0.093
119121	Natural Sciences Managers	0.008	3.884	0.003	0.161
499011	Mechanical Door Repairers	0.008	3.815	0.001	0.092
519198	Helpers–Production Workers	0.008	0.640	0.002	0.100
519051	Furnace, Kiln, Oven, Drier, and Kettle Operato...	0.008	-0.136	0.002	0.188
514071	Foundry Mold and Coremakers	0.008	1.504	0.000	0.056
516021	Pressers, Textile, Garment, and Related Materials	0.008	1.400	0.001	0.067
434021	Correspondence Clerks	0.008	-0.159	0.001	0.038
492022	Telecommunications Equipment Installers and Re...	0.008	0.905	0.001	0.051
472071	Paving, Surfacing, and Tamping Equipment Opera...	0.008	1.662	0.004	0.182
113051	Industrial Production Managers	0.008	3.412	0.003	0.115
513092	Food Batchmakers	0.008	1.571	0.001	0.100
474071	Septic Tank Servicers and Sewer Pipe Cleaners	0.008	1.591	0.002	0.091
452021	Animal Breeders	0.008	1.901	0.002	0.085
519041	Extruding, Forming, Pressing, and Compacting M...	0.008	0.264	0.001	0.086
339031	Gaming Surveillance Officers and Gaming Invest...	0.008	2.261	0.003	0.057
514199	Metal Workers and Plastic Workers, All Other	0.008	-1.859	0.003	0.138
359031	Hosts and Hostesses, Restaurant, Lounge, and C...	0.008	2.229	0.002	0.091
533032	Truck Drivers, Heavy and Tractor-Trailer	0.008	1.070	0.002	0.067
132099	Financial Specialists, All Other	0.008	2.234	0.002	0.102
472181	Roofers	0.008	8.018	0.003	0.102
173019	Drafters, All Other	0.007	3.944	0.003	0.170
292011	Medical and Clinical Laboratory Technologists	0.007	2.854	0.002	0.146
452091	Agricultural Equipment Operators	0.007	2.139	0.001	0.096
516042	Shoe Machine Operators and Tenders	0.007	1.207	0.002	0.059
534011	Locomotive Engineers	0.007	4.097	0.001	0.068
516099	Textile, Apparel, and Furnishings Workers, All...	0.007	1.164	0.001	0.038
499069	Precision Instrument and Equipment Repairers, ...	0.007	0.614	0.002	0.149
514035	Milling and Planing Machine Setters, Operators...	0.007	0.062	0.003	0.148

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
131051	Cost Estimators	0.007	2.455	0.002	0.092
474061	Rail-Track Laying and Maintenance Equipment Op...	0.007	1.677	0.002	0.116
192031	Chemists	0.007	2.256	0.002	0.159
352013	Cooks, Private Household	0.007	1.578	0.000	0.058
514072	Molding, Coremaking, and Casting Machine Sette...	0.007	-0.974	0.001	0.061
172111	Health and Safety Engineers, Except Mining Saf...	0.007	3.475	0.002	0.130
151061	Database Administrators	0.007	2.843	0.002	0.079
499092	Commercial Divers	0.007	0.151	0.003	0.102
516091	Extruding and Forming Machine Setters, Operato...	0.007	-0.202	0.001	0.097
517011	Cabinetmakers and Bench Carpenters	0.007	1.482	0.002	0.057
514194	Tool Grinders, Filers, and Sharpeners	0.007	-1.490	0.003	0.160
519121	Coating, Painting, and Spraying Machine Setter...	0.007	0.241	0.002	0.073
492091	Avionics Technicians	0.007	0.433	0.001	0.087
454022	Logging Equipment Operators	0.007	0.898	0.001	0.013
113021	Computer and Information Systems Managers	0.007	3.442	0.002	0.079
472042	Floor Layers, Except Carpet, Wood, and Hard Tiles	0.007	3.848	-0.000	0.040
393019	Gaming Service Workers, All Other	0.007	1.848	0.002	0.056
391011	Gaming Supervisors	0.006	2.915	0.002	0.104
132011	Accountants and Auditors	0.006	2.423	0.001	0.042
131032	Insurance Appraisers, Auto Damage	0.006	1.412	0.002	0.121
351012	First-Line Supervisors/Managers of Food Prepar...	0.006	1.885	0.002	0.051
493031	Bus and Truck Mechanics and Diesel Engine Spec...	0.006	0.392	0.002	0.069
173025	Environmental Engineering Technicians	0.006	1.895	0.004	0.245
292091	Orthotists and Prosthetists	0.006	1.704	0.001	0.091
474091	Segmental Pavers	0.006	1.415	0.002	0.081
231011	Lawyers	0.006	1.921	0.001	0.091
537051	Industrial Truck and Tractor Operators	0.006	0.469	0.002	0.089
514081	Multiple Machine Tool Setters, Operators, and ...	0.006	-0.266	0.001	0.061
191021	Biochemists and Biophysicists	0.006	3.313	0.001	0.107
151071	Network and Computer Systems Administrators	0.006	2.594	0.002	0.069
391021	First-Line Supervisors/Managers of Personal Se...	0.006	1.763	-0.000	0.020
537073	Wellhead Pumps	0.006	2.186	0.002	0.099
518013	Power Plant Operators	0.006	2.583	0.003	0.197
254012	Curators	0.006	1.492	0.002	0.108
172121	Marine Engineers and Naval Architects	0.006	4.632	0.004	0.203
151032	Computer Software Engineers, Systems Software	0.006	3.039	0.001	0.080
395012	Hairdressers, Hairstylists, and Cosmetologists	0.006	1.549	0.001	0.059
172061	Computer Hardware Engineers	0.006	2.792	0.000	0.061
353031	Waiters and Waitresses	0.006	0.723	0.002	0.053
537031	Dredge Operators	0.006	-0.468	0.001	0.050
339032	Security Guards*	0.006	1.585	0.002	0.055
399011	Child Care Workers	0.006	1.857	0.000	-0.002
194031	Chemical Technicians	0.006	1.279	0.003	0.151
292054	Respiratory Therapy Technicians	0.006	2.002	0.001	0.044

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
493011	Aircraft Mechanics and Service Technicians	0.006	3.787	0.002	0.140
472082	Tapers	0.006	1.429	0.002	0.074
474031	Fence Erectors	0.006	3.106	0.002	0.073
292031	Cardiovascular Technologists and Technicians	0.006	1.131	0.002	0.102
439041	Insurance Claims and Policy Processing Clerks	0.006	0.576	0.001	0.072
499063	Musical Instrument Repairers and Tuners	0.006	1.427	0.001	0.043
151021	Computer Programmers	0.006	2.757	0.001	0.065
339092	Lifeguards, Ski Patrol, and Other Recreational...	0.006	1.702	0.001	0.025
474099	Construction and Related Workers, All Other*	0.006	4.133	0.004	0.204
435021	Couriers and Messengers	0.006	1.176	0.001	0.041
537011	Conveyor Operators and Tenders	0.006	-1.677	0.003	0.175
514111	Tool and Die Makers	0.005	1.241	0.002	0.046
173026	Industrial Engineering Technicians	0.005	2.009	0.003	0.148
419091	Door-to-Door Sales Workers, News and Street Ve...	0.005	3.087	0.001	0.016
395094	Skin Care Specialists	0.005	1.837	0.001	0.059
439081	Proofreaders and Copy Markers	0.005	1.584	-0.000	-0.003
172072	Electronics Engineers, Except Computer	0.005	2.862	0.001	0.108
515022	Prepress Technicians and Workers	0.005	-0.506	0.000	0.040
319092	Medical Assistants	0.005	1.623	0.000	0.037
514012	Numerical Tool and Process Control Programmers	0.005	1.920	0.002	0.093
171021	Cartographers and Photogrammetrists	0.005	3.109	0.004	0.198
512031	Engine and Other Machine Assemblers	0.005	-0.111	0.001	0.056
475049	Mining Machine Operators, All Other	0.005	0.008	0.002	0.112
151011	Computer and Information Scientists, Research	0.005	3.093	-0.002	0.096
292056	Veterinary Technologists and Technicians	0.005	1.029	0.002	0.087
274099	Media and Communication Equipment Workers, All...	0.005	1.952	0.004	0.171
173013	Mechanical Drafters	0.005	1.476	0.002	0.082
493022	Automotive Glass Installers and Repairers	0.005	1.793	0.001	0.035
499096	Riggers	0.005	-2.399	0.004	0.071
192041	Environmental Scientists and Specialists, Incl...	0.005	1.260	0.003	0.189
433071	Tellers	0.005	0.936	0.001	0.033
292032	Diagnostic Medical Sonographers	0.005	0.700	0.003	0.150
519022	Grinding and Polishing Workers, Hand	0.004	-0.381	0.001	0.041
172011	Aerospace Engineers	0.004	4.201	0.000	0.157
472142	Paperhangers	0.004	0.684	0.001	0.077
291131	Veterinarians	0.004	1.062	0.003	0.142
512022	Electrical and Electronic Equipment Assemblers	0.004	0.713	0.001	0.057
292081	Opticians, Dispensing	0.004	1.244	0.000	0.044
454011	Forest and Conservation Workers	0.004	1.560	0.002	0.089
512021	Coil Winders, Tapers, and Finishers	0.004	-3.102	0.000	0.001
419021	Real Estate Brokers	0.004	1.468	0.003	0.101
473011	Helpers—Brickmasons, Blockmasons, Stonemasons...	0.004	0.868	0.002	0.058
332011	Fire Fighters	0.004	3.254	0.002	0.150
519011	Chemical Equipment Operators and Tenders	0.004	0.365	0.001	0.130

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
359021	Dishwashers	0.004	1.051	0.001	0.048
472031	Carpenters	0.004	1.677	0.002	0.073
191029	Biological Scientists, All Other	0.004	1.086	0.002	0.090
519196	Paper Goods Machine Setters, Operators, and Te...	0.004	1.591	0.001	0.034
352021	Food Preparation Workers	0.004	0.471	0.001	0.029
172199	Engineers, All Other	0.004	2.982	0.002	0.099
475071	Roustabouts, Oil and Gas	0.004	-0.244	0.001	0.028
452099	Agricultural Workers, All Other	0.004	-1.623	0.001	0.028
514034	Lathe and Turning Machine Tool Setters, Operat...	0.004	0.227	0.002	0.111
211015	Rehabilitation Counselors	0.004	1.566	0.002	0.111
212099	Religious Workers, All Other	0.004	1.962	0.001	0.064
517041	Sawing Machine Setters, Operators, and Tenders...	0.004	0.215	0.001	0.042
291111	Registered Nurses*	0.004	2.481	0.001	0.062
517099	Woodworkers, All Other	0.004	-0.552	0.002	0.038
452093	Farmworkers, Farm and Ranch Animals	0.004	0.467	0.001	0.055
151031	Computer Software Engineers, Applications	0.004	2.604	0.001	0.055
493092	Recreational Vehicle Service Technicians	0.004	4.320	0.001	0.072
396021	Tour Guides and Escorts	0.004	1.612	0.000	-0.015
517031	Model Makers, Wood	0.004	1.200	0.001	0.090
472061	Construction Laborers	0.004	1.566	0.002	0.085
119041	Engineering Managers	0.003	4.355	0.002	0.108
451012	Farm Labor Contractors	0.003	0.593	0.001	0.044
291051	Pharmacists	0.003	0.915	0.000	0.046
514021	Extruding and Drawing Machine Setters, Operato...	0.003	-1.516	0.001	0.026
514011	Computer-Controlled Machine Tool Operators, Me...	0.003	0.103	0.001	0.053
533011	Ambulance Drivers and Attendants, Except Emerg...	0.003	0.485	0.001	0.017
499061	Camera and Photographic Equipment Repairers	0.003	3.799	0.002	0.110
537071	Gas Compressor and Gas Pumping Station Operators	0.003	-0.197	0.005	0.263
472111	Electricians*	0.003	1.862	0.002	0.094
512041	Structural Metal Fabricators and Fitters	0.003	-0.120	0.001	0.056
519021	Crushing, Grinding, and Polishing Machine Sett...	0.003	-0.238	0.001	0.099
475031	Explosives Workers, Ordnance Handling Experts,...	0.003	0.043	0.002	0.124
192099	Physical Scientists, All Other	0.003	6.448	-0.000	0.070
471011	First-Line Supervisors/Managers of Constructio...	0.003	1.037	0.002	0.076
396011	Baggage Porters and Bellhops	0.003	1.112	-0.000	-0.000
514023	Rolling Machine Setters, Operators, and Tender...	0.003	-3.276	0.000	0.062
492094	Electrical and Electronics Repairers, Commerci...	0.003	0.529	0.002	0.090
514033	Grinding, Lapping, Polishing, and Buffing Mach...	0.003	-1.617	0.001	0.005
353011	Bartenders	0.003	1.097	0.002	0.079
492096	Electronic Equipment Installers and Repairers,...	0.003	3.669	0.002	0.092
352014	Cooks, Restaurant	0.003	0.463	0.002	0.064
472141	Painters, Construction and Maintenance	0.003	0.290	0.003	0.124
499094	Locksmiths and Safe Repairers	0.003	-0.729	0.003	0.166
172051	Civil Engineers	0.003	2.653	0.001	0.047

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
339091	Crossing Guards	0.003	0.958	0.001	0.055
499044	Millwrights	0.003	-0.198	0.001	0.060
493021	Automotive Body and Related Repairers	0.002	0.758	0.001	0.030
513011	Bakers	0.002	0.016	0.001	0.065
435011	Cargo and Freight Agents	0.002	1.840	0.000	0.013
173011	Architectural and Civil Drafters	0.002	1.071	0.002	0.095
516062	Textile Cutting Machine Setters, Operators, an...	0.002	-0.950	0.001	0.020
173022	Civil Engineering Technicians	0.002	0.214	0.001	0.102
172081	Environmental Engineers	0.002	2.301	0.001	0.055
472041	Carpet Installers	0.002	-0.502	0.004	0.149
472081	Drywall and Ceiling Tile Installers	0.002	2.670	0.002	0.080
171011	Architects, Except Landscape and Naval	0.002	3.707	0.001	0.050
515011	Bindery Workers	0.002	-0.631	0.000	0.021
514041	Machinists	0.002	0.241	0.002	0.131
291126	Respiratory Therapists	0.002	0.675	0.000	0.028
299012	Occupational Health and Safety Technicians	0.002	2.849	0.002	0.101
537072	Pump Operators, Except Wellhead Pumpers	0.002	-1.878	0.002	0.029
211022	Medical and Public Health Social Workers	0.002	1.125	0.000	0.045
472011	Boilermakers	0.001	2.660	0.003	0.143
271023	Floral Designers	0.001	0.932	0.001	0.050
319011	Massage Therapists	0.001	1.460	0.001	0.014
473013	Helpers–Electricians	0.001	0.198	0.002	0.104
271013	Fine Artists, Including Painters, Sculptors, a...	0.001	7.388	0.004	0.084
517042	Woodworking Machine Setters, Operators, and Te...	0.001	-0.315	0.000	-0.010
472051	Cement Masons and Concrete Finishers	0.001	-2.444	0.001	0.080
472121	Glaziers	0.001	1.278	0.000	-0.007
292034	Radiologic Technologists and Technicians*	0.001	-0.459	0.003	0.147
474051	Highway Maintenance Workers	0.001	0.420	0.001	0.056
519141	Semiconductor Processors	0.001	-0.062	0.000	0.082
292033	Nuclear Medicine Technologists	0.001	0.321	0.001	0.080
434111	Interviewers, Except Eligibility and Loan	0.001	0.568	-0.000	0.003
436013	Medical Secretaries	0.001	0.409	0.000	0.018
516031	Sewing Machine Operators	0.001	-0.390	0.001	0.023
513023	Slaughterers and Meat Packers	0.001	-0.668	-0.000	0.014
472211	Sheet Metal Workers	0.001	-1.833	0.001	0.015
274031	Camera Operators, Television, Video, and Motio...	0.001	0.005	-0.001	-0.052
172141	Mechanical Engineers	0.001	2.442	0.001	0.071
519082	Medical Appliance Technicians	0.001	0.394	-0.000	-0.003
271022	Fashion Designers	0.000	0.097	-0.000	-0.039
514022	Forging Machine Setters, Operators, and Tender...	0.000	-0.914	0.000	0.029
472151	Pipelayers	0.000	-4.870	0.003	0.131
413021	Insurance Sales Agents	0.000	3.133	0.002	0.112
499064	Watch Repairers	0.000	-0.070	0.000	0.010
392021	Nonfarm Animal Caretakers	-0.000	-0.531	0.004	0.169

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
391012	Slot Key Persons	-0.000	1.028	-0.001	-0.052
292099	Health Technologists and Technicians, All Other*	-0.000	0.044	0.000	0.027
353022	Counter Attendants, Cafeteria, Food Concession...	-0.000	-0.490	0.000	0.008
353021	Combined Food Preparation and Serving Workers,...	-0.000	-0.767	0.000	0.008
452092	Farmworkers and Laborers, Crop, Nursery, and G...	-0.000	-0.644	0.001	0.017
194091	Environmental Science and Protection Technicia...	-0.000	0.934	0.005	0.208
172112	Industrial Engineers	-0.000	2.127	0.001	0.049
173012	Electrical and Electronics Drafters	-0.000	2.393	0.002	0.144
119081	Lodging Managers	-0.000	-0.112	-0.001	0.129
352015	Cooks, Short Order	-0.001	-0.915	0.000	0.021
192012	Physicists	-0.001	5.497	-0.002	0.174
396012	Concierges	-0.001	0.259	-0.001	-0.014
172071	Electrical Engineers	-0.001	2.512	0.001	0.090
292061	Licensed Practical and Licensed Vocational Nurses	-0.001	0.377	-0.000	0.011
172131	Materials Engineers	-0.001	1.962	0.002	0.085
499045	Refractory Materials Repairers, Except Brickma...	-0.001	-1.568	0.000	0.103
475041	Continuous Mining Machine Operators	-0.001	-5.191	0.001	0.127
516052	Tailors, Dressmakers, and Custom Sewers	-0.001	-0.188	0.001	0.004
475051	Rock Splitters, Quarry	-0.001	-2.616	-0.000	-0.012
319091	Dental Assistants	-0.002	1.583	-0.000	0.034
274013	Radio Operators	-0.002	-3.441	0.001	0.139
434011	Brokerage Clerks	-0.002	-2.759	0.003	0.140
432099	Communications Equipment Operators, All Other	-0.002	2.052	0.006	0.168
252011	Preschool Teachers, Except Special Education	-0.002	-0.886	0.001	0.036
132071	Loan Counselors	-0.002	2.404	0.002	0.131
473012	Helpers–Carpenters	-0.002	-0.058	-0.001	-0.019
271027	Set and Exhibit Designers	-0.002	-0.242	0.000	0.011
434031	Court, Municipal, and License Clerks	-0.002	0.138	0.000	0.034
475021	Earth Drillers, Except Oil and Gas	-0.002	-2.525	0.002	0.074
191012	Food Scientists and Technologists	-0.002	2.127	0.001	0.006
359099	Food Preparation and Serving Related Workers, ...	-0.002	-0.463	0.001	0.002
512091	Fiberglass Laminators and Fabricators	-0.002	0.534	0.000	-0.012
132041	Credit Analysts	-0.002	1.115	0.000	0.019
311011	Home Health Aides	-0.002	-0.998	0.000	0.018
472221	Structural Iron and Steel Workers	-0.003	-2.118	0.003	0.078
514191	Heat Treating Equipment Setters, Operators, an...	-0.003	-2.212	0.001	0.036
499052	Telecommunications Line Installers and Repairers	-0.003	-3.494	0.002	0.056
454021	Fallers	-0.003	-1.586	0.000	-0.010
513021	Butchers and Meat Cutters	-0.003	-0.301	0.001	0.022
519122	Painters, Transportation Equipment	-0.003	-0.599	0.000	-0.003
514193	Plating and Coating Machine Setters, Operators...	-0.003	-2.095	0.002	0.048
512093	Timing Device Assemblers, Adjusters, and Calib...	-0.003	0.734	0.002	0.083
516051	Sewers, Hand	-0.003	-1.429	0.000	-0.007
119021	Construction Managers	-0.003	0.964	0.001	0.095

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
537021	Crane and Tower Operators	-0.003	-0.018	0.002	0.045
273042	Technical Writers	-0.003	3.345	0.001	0.049
393091	Amusement and Recreation Attendants	-0.003	-0.995	0.001	0.038
312022	Physical Therapist Aides	-0.004	-1.129	0.000	0.026
419031	Sales Engineers	-0.004	3.615	0.000	0.024
191042	Medical Scientists, Except Epidemiologists	-0.004	-0.355	-0.001	-0.040
172041	Chemical Engineers	-0.004	1.557	0.001	0.102
514121	Welders, Cutters, Solderers, and Brazers	-0.004	-1.636	0.001	0.035
352011	Cooks, Fast Food	-0.004	-1.903	0.001	0.033
131061	Emergency Management Specialists	-0.004	6.590	0.003	0.184
173029	Engineering Technicians, Except Drafters, All ...	-0.004	1.607	0.002	0.074
173023	Electrical and Electronic Engineering Technicians	-0.004	0.928	0.001	0.056
514061	Model Makers, Metal and Plastic	-0.005	1.653	0.002	-0.001
475011	Derrick Operators, Oil and Gas	-0.005	0.327	0.003	0.099
516093	Upholsterers	-0.005	-2.254	0.001	0.017
514192	Lay-Out Workers, Metal and Plastic	-0.005	-2.824	0.000	0.049
519081	Dental Laboratory Technicians	-0.005	-0.222	-0.000	0.021
172021	Agricultural Engineers	-0.005	0.295	-0.002	0.033
514032	Drilling and Boring Machine Tool Setters, Oper...	-0.006	-0.816	0.002	0.044
434131	Loan Interviewers and Clerks	-0.006	2.103	-0.001	0.051
493043	Rail Car Repairers	-0.006	-5.096	0.005	0.195
492095	Electrical and Electronics Repairers, Powerhou...	-0.006	-1.250	0.002	0.092
512023	Electromechanical Equipment Assemblers	-0.006	-0.077	0.001	0.004
518091	Chemical Plant and System Operators	-0.006	-1.710	0.003	0.106
519071	Jewelers and Precious Stone and Metal Workers	-0.006	-0.554	-0.001	-0.039
517021	Furniture Finishers	-0.006	-1.009	-0.001	-0.053
516092	Fabric and Apparel Patternmakers	-0.007	4.533	-0.001	-0.059
173027	Mechanical Engineering Technicians	-0.007	0.949	0.002	0.064
513022	Meat, Poultry, and Fish Cutters and Trimmers	-0.007	-1.272	-0.002	-0.042
132072	Loan Officers	-0.007	3.716	0.001	0.072
537081	Refuse and Recyclable Material Collectors	-0.007	-1.750	-0.003	-0.104
193022	Survey Researchers	-0.007	-1.453	0.001	-0.012
535031	Ship Engineers	-0.007	0.714	-0.001	-0.030
291069	Physicians and Surgeons, All Other	-0.007	-2.589	0.001	0.101
393031	Ushers, Lobby Attendants, and Ticket Takers	-0.007	-1.699	0.002	0.120
433041	Gaming Cage Workers	-0.008	-2.368	0.004	0.104
514062	Patternmakers, Metal and Plastic	-0.008	-0.464	0.002	0.187
514122	Welding, Soldering, and Brazing Machine Setter...	-0.008	-2.356	0.002	0.011
514052	Pourers and Casters, Metal	-0.009	-5.326	-0.002	0.066
319094	Medical Transcriptionists	-0.009	-1.710	0.001	0.119
291199	Health Diagnosing and Treating Practitioners, ...	-0.009	-3.963	-0.000	0.042
475099	Extraction Workers, All Other	-0.009	0.005	0.002	0.076
173024	Electro-Mechanical Technicians	-0.010	0.349	0.002	0.056
273021	Broadcast News Analysts	-0.012	1.049	-0.003	-0.078

Table 8: Random Effect Slope estimates by Occupation and Variety Measure

Code	Occupation	W. Div	Mgt %	Div	Ent
537033	Loading Machine Operators, Underground Mining	-0.012	-3.422	0.001	0.108
399031	Fitness Trainers and Aerobics Instructors	-0.013	-2.239	-0.001	-0.018
514051	Metal-Refining Furnace Operators and Tenders	-0.013	-5.432	0.001	0.178
512011	Aircraft Structure, Surfaces, Rigging, and Sys...	-0.013	4.293	0.003	0.223
274032	Film and Video Editors	-0.015	0.469	-0.000	-0.043
475081	Helpers–Extraction Workers	-0.016	-2.014	-0.001	0.008
273022	Reporters and Correspondents	-0.016	3.142	-0.002	-0.003
273012	Public Address System and Other Announcers	-0.017	-3.111	-0.001	-0.003
472044	Tile and Marble Setters	-0.017	-2.569	-0.003	-0.095
472043	Floor Sanders and Finishers	-0.022	-2.590	-0.003	-0.148
475042	Mine Cutting and Channeling Machine Operators	-0.023	-5.482	-0.001	-0.042
537041	Hoist and Winch Operators	-0.023	-3.357	0.002	0.050
392011	Animal Trainers	-0.026	-8.720	0.008	0.318
119012	Farmers and Ranchers	NaN	NaN	NaN	NaN
119039	Education Administrators, All Other	NaN	NaN	NaN	NaN
251199	Postsecondary Teachers, All Other	NaN	NaN	NaN	NaN