Low-Wage but not Low-Skilled:
Occupational Skills and the $15 Hourly Wage

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Executive Summary

Compared with their peers in 1968 most U.S. workers have experienced deterioration in their standard of living.

- *The real value of the minimum wage has shrunk by 25 percent since 1968.*
- *Workers in the retail sector saw a real wage decline of 25 over the same time period.*
- *For transportation and warehouse workers real wages fell by 32 percent.*
- *Overall, real wages for U.S. workers rose by just 2.3 percent from 1968 to 2015.*

Employment in low-wage jobs is expected to continue to grow.

- *There are six service sector employees for every goods-producing worker, up from 5:1 in 2008 and 4:1 in 2000*
- *39 million workers are employed in five low-wage occupations (sales, food preparation/service, building/grounds maintenance, personal services and health care support), as many workers as there are in "knowledge" and "creative class" occupations combined.*
- *Of the 50 occupations projected to gain the largest number of jobs from 2014 to 2024, 80 percent of them pay less than the median family income of $54,000 per year.*

Low-wage occupations require sets of skills that are often unrecognized in the labor market.

- *Skills usually associated with managerial and knowledge work: critical thinking, active learning, problem-solving, time management and decision-making are also important for low-wage jobs. Workers in low-wage occupations earn higher wages the more important these skills are to their jobs.*
- *On the other hand, while important to low-wage occupations, soft skills (social, interactive, communicative skills) are penalized in low-wage occupations. This penalty disappears for high-wage work for which social skills are also important.*
- *Skills associated with manufacturing and manual labor are not rewarded in the labor market. Workers in occupations for which these skills are important receive a wage penalty the more important those skills are to their jobs.*

Accounting for the skills of low-wage workers would result in wage levels more than $15 an hour.

- *Using managers' evaluations of occupational skills for eight low-wage occupations – Restaurant cook; Combined food preparation and serving worker including fast food; Waiter/Waitress; Home health aide; Stock clerk; Retail salesperson; Cashier; and Hairdresser and hairstylist – the average skill-based average hourly wage was found to be $16.52.*

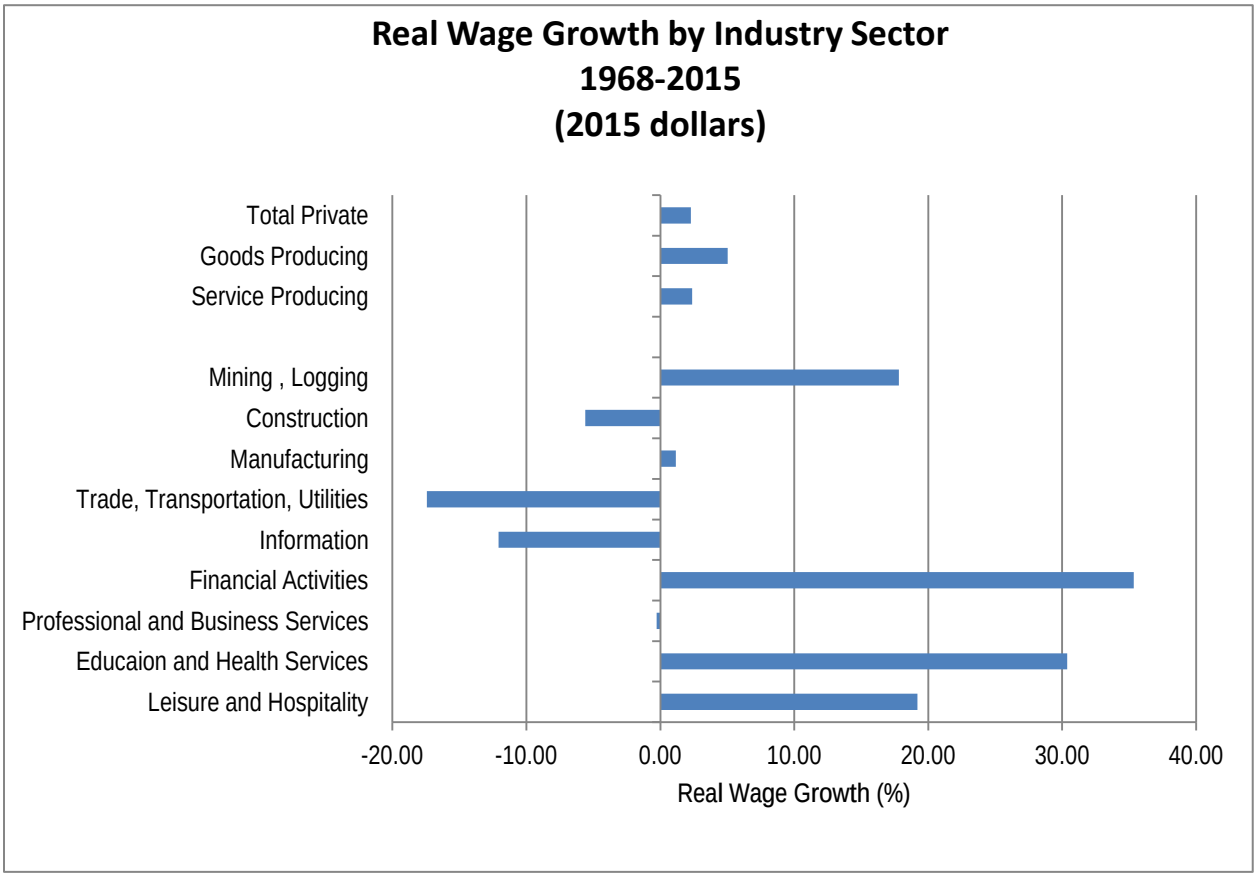
Introduction

Despite recent gains in median household income[1], workers in the United States continue to suffer through four lost decades of wage stagnation and rising income inequality. One reason is that the federal minimum wage remains disconnected from what most Americans need to sustain themselves and their families. As David Cooper of the Economic Policy Institute recently noted, the minimum wage of $7.55 is worth 25 percent less than in 1968. The minimum wage in 1968 is equivalent to $9.63 in 2016 dollars[2] The myth that the minimum wage is claimed mainly by teenagers working in fast food industries has been effectively countered by mounting evidence that most fast food workers are adults supporting a family (Allegretto, Doussard, Graham-Squire, Jacobs, Thompson and Thompson 2013).

But it's not only minimum wage workers who have had their wages squeezed. Since 1968 wage growth among production and non-supervisory workers has been anemic. Taking inflation into account, for all private sector workers, real wages have grown a mere 2.3 percent over the past 47 years (Figure 1). But even this small increase masks wage inequality between particular industries. For example, while real wages in the financial sector rose by over 35 percent workers in transportation, trade and utilities experienced a nearly 17.5 percent decline in the real wages over this period. Digging deeper into this category of work, we find that retail workers suffered a cut in wages of over 25 percent while transportation and warehouse workers fared even worse with a 32 percent wage decline. Even though leisure and hospitality wages increased from 1968-2015, the average wage in 2015 is only $12.42.

[1] "Income, Poverty and Health Insurance Coverage in the United States: 2015," U.S. Census Bureau, Release Number: CB16-158, September 13, 2016. http://www.census.gov/newsroom/press-releases/2016/cb16-158.html
[2] http://www.epi.org/publication/the-federal-minimum-wage-has-been-eroded-by-decades-of-inaction/

Figure 1



Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment, Hours, and Earnings from the Current Employment Statistics Survey.

A Future of Low-Wage Work?

Many workers in the service sector, especially those employees in low-wage jobs, have been victims of the lost decades of wage stagnation and decline. But the spread of low-wage work has even impacted workers in industries historically insulated from wage declines. In the auto industry, for example, new hires at UAW-represented plants earn $17.00 per hour (Rothstein 2015). The disappearance of unionized jobs coupled with global outsourcing helps to explain why real wages in the durable goods sector have fallen by 1.63 percent between 1968 and 2015. The difference between manufacturing and service work is that the share of service sector jobs is growing.

Currently there are six service sector employees for every goods-producing worker, up from 5:1 in 2008 and 4:1 in 2000. Nearly as many workers - 39 million - are employed in five low-wage occupations

(sales, food preparation/service, building/grounds maintenance, personal services and health care support) as in the so-called "knowledge" and "creative class" occupations combined.[3] The growing ranks of service sector workers have led to a two-tier economy comprised of high-wage and low-wage segments.

Additionally, the rise of low-wage service sector jobs has exacerbated the trend towards wage polarization (Dwyer 2013). And these are among the very jobs that are expected to grow the most in the next decade. Of the 50 jobs expected to grow the most between 2014 and 2024, 56 percent of them pay below the national annual median wage of $35,540. Furthermore, 80 percent of the largest growing jobs pay less than the median family income of $53,482 per year (Table 1).[4] If present conditions remain, unless the demand for these services outpaces the supply of service labor, we should expect to see wages continue to stagnate or decline even further.

Putting Low-Wage Workers on a Different Path: The "Fight for $15"

In response to these trends labor and community activists have joined forces to demand a pay raise for the lowest paid individuals in the country perhaps best exemplified by fast food industry workers' "Fight for $15." Arguments made on behalf of the "Fight for $15" campaign are similar to those used to advocate for raising the minimum wage, namely that rising wages will reduce turnover, improve

[3] These occupations are (SOC codes in parenthesis): Management (11-0000), Business and Financial Operations (13-0000), Computer and Mathematical (15-0000), Architecture and Engineering (17-0000), Life, Physical, and Social Science (19-0000), Legal (23-0000), Education, Training, and Library (25-0000), Arts, Design, Entertainment, Sports, and Media (27-0000), Healthcare Practitioners and Technical (29-0000).

[4] Source: Bureau of Labor Statistics, National Occupational Employment and Wage Estimates http://www.bls.gov/oes/tables.htm; American Community Survey, U.S. Census Bureau.

Table 1: Top 50 Largest Growing Jobs 2014-2024

Occupation	Job Growth (thousands)	2014 median annual wage ($)
Personal care aides	458	20,980
Registered nurses	439	67,490
Home health aides	348	21,920
Combined food preparation and serving workers, including fast food	344	18,910
Retail salespersons	314	21,780
Nursing assistants	262	25,710
Customer service representatives	253	31,720
Cooks, restaurant	159	23,100
General and operations managers	151	97,730
Construction laborers	147	31,910
Accountants and auditors	142	67,190
Medical assistants	139	30,590
Janitors and cleaners, except maids and housekeeping cleaners	136	23,440
Software developers, applications	135	98,260
Laborers and freight, stock, and material movers, hand	125	25,010
First-line supervisors of office and administrative support workers	121	52,630
Computer systems analysts	119	85,800
Licensed practical and licensed vocational nurses	117	43,170
Maids and housekeeping cleaners	112	20,740
Medical secretaries	108	33,040
Management analysts	103	81,320
Heavy and tractor-trailer truck drivers	99	40,260
Receptionists and information clerks	98	27,300
Office clerks, general	96	29,580
Sales representatives, wholesale and manufacturing, except technical	93	55,730
Stock clerks and order fillers	93	23,220
Market research analysts and marketing specialists	92	62,150
First-line supervisors of food preparation and serving workers	89	30,340
Electricians	86	51,880
Maintenance and repair workers, general	84	36,630
Teacher assistants	79	24,900
Elementary school teachers, except special education	78	54,890
Computer user support specialists	75	48,620
Personal financial advisors	74	89,160
Physical therapists	72	84,020
Landscaping and groundskeeping workers	72	25,030
Sales representatives, services, all other	71	51,700
Childcare workers	69	20,320
Waiters and waitresses	69	19,250
First-line supervisors of retail sales workers	68	38,310
Cashiers	67	19,310
Billing and posting clerks	67	35,050
Teachers and instructors, all other	67	28,960
Secretaries and administrative assistants, except legal, medical, and e	64	33,910
Carpenters	60	42,090
Bartenders	60	19,530
Industrial machinery mechanics	60	49,690
Dental assistants	59	35,980
Emergency medical technicians and paramedics	59	31,980
Hairdressers, hairstylists, and cosmetologists	58	23,660
Total	6,409	
Mean		41,118
Median		32,510

Source: Bureau of Labor Statistics, Employment Projections, http://www.bls.gov/emp/ep_table_102.htm

productivity, and help lift the working poor out of poverty thereby reducing state subsidies to low-wage employers (Workers Organizing Committee of Chicago n.d.; National Employment Law Project 2012; Allegretto, Doussard, Graham-Squire, Jacobs, Thompson and Thompson 2013; Economic Policy Institute 2013; National Employment Law Project 2015).

Yet another argument put forth in the struggle for $15 gives voice to the worth and dignity of laborers who perform low-wage work. The claim that low-wage work is valuable is in conflict with the market-based notion that low-wage work is paid in accordance with its (low) economic value. This corresponds to the dominant paradigm in economics that equates low wages with low skill. But what if low-wage work requires heretofore unrecognized skills? If skills are linked to social status and educational credentials then only certain types of work will be designated as skilled work: symbolic analysts (Reich 1992), non-routine, abstract workers (Autor and Dorn 2013), knowledge workers (Glaeser and Saiz 2004) and creatives (Florida 2003) for example. By contrast, case studies of low-wage occupations consistently reveal a range of skills including, among others, time management, active listening, adaptive learning, coordination, negotiation, persuasion and empathy (Thompson, Warhurst, Callaghan 2001; Rose 2004: Braun 2013). If there are unrecognized or undervalued skills involved in low-wage work then low-wage workers deserve a raise because raising the wage of low-wage workers would better align wages with the skill content of their jobs.

The Skills of Low-Wage Workers

The objective of this study is to examine the effects of different types of skill on wages. The wage is defined as the 2010 annual median occupational wage (Bureau of Labor Statistics, Occupational Employment Statistics). The Occupational Information Network (O*NET) data set – formerly known as the Dictionary of Occupational Titles – contains data on the importance of 35 skills to over 782 U.S. occupations.

Occupations are evaluated by industrial and organizational psychologists on the basis of the importance of a skill to a particular occupation.[5] The 35 skills are defined in Appendix 1 using the evaluation form completed by occupational analysts. The skills are scored from 1 to 5 and are then standardized to a scale of 0 (not important) to 100 (very important). 402 occupations contained a complete set of skill scores, wage data and control variables for gender composition, racial/ethnic composition, immigrant occupational share, industry sector, and unionization rates.[6] The sample occupational data represents over 89 percent of U.S. employment. The distribution of occupations in the sample closely matches the distribution of occupations in the U.S. labor market with the exception of production occupations. Since this report focuses on service sector jobs the under-representation of production occupations in the sample should not affect the main conclusions.[7] Finally, the sample is representative of the data sets from which the sample data was selected.

Factor analysis was applied to the 35 O*NET skills order to identify commonalities and to reduce the number of variables used to estimate wages. This resulted in the reduction of the 35 occupational skills to 5 composite skills (Table 2): (1) Cognitive and Managerial; (2) Manual/Technical; (3) Social Communicative; (4) Resource Management; (5) Computer Technology. The goal of this study is to estimate occupational wages based on the importance of skills. By contrast many economic models of wage determination use years of education as a proxy for skill. The advantage of this data set is that it employs direct measures of skill. Furthermore we find that education (measured by minimum education qualifications and experience) is highly correlated with Cognitive and Managerial skills (r = 0.86).

[5] Note that the O*Net skill measures include skill level in addition to skill importance. Skill level is evaluated against a benchmark that frames the subsequent skill score. This creates a potential bias that reinforces the identification of high-wage occupations with higher level skills. Even in the absence of bias, in a related study of caring skills, skill importance and skill level scores were found to be highly correlated (Pietrykowski forthcoming).
[6] Unionization data was only available for 382 of the 402 occupations in the sample.
[7] The sample data also under-represents unionized occupations but that is largely because five heavily unionized occupations in the railroad industry are not included in the sample.

Table 2
Skill Groups Derived from Factor Analysis of O*NET Evaluator Scores

Cognitive and Managerial	Manual/Technical	Social Communicative	Resource Management	Computer Technology
Critical Thinking	Operation Monitoring	Coordination	Mgmt. of Material Resources	Technology Design
Active Learning	Operation and Control	Negotiation	Mgmt. of Financial Resources	Programming
Learning Strategies	Equipment Maintenance	Active Listening		Mathematics
Complex Problem Solving	Quality Control Analysis	Social Perceptiveness		
Judgment & Decision Making	Repairing	Service Orientation		
Instructing	Equipment Selection	Persuasion		
Monitoring	Trouble-shooting			
Systems Evaluation	Installation			
Time Management				
System Analysis				
Mgmt. of Personnel Resources				
Operations Analysis				
Science				
Speaking				
Reading Comprehension				
Writing				

So, if skilled labor adds value to the product created or the service rendered we would expect that all five composite skills should have a positive impact on wages. However, not all skills are valued equally. For example, feminist economics research has shown that caring labor skills actually receive a wage penalty. Caring labor is often found in work requiring social interaction and attention to the feelings of others. The Social Communicative variable most closely captures these aspects of care work. So, in accordance with feminist theory we would expect to find a negative return to Social Communicative skills (England, Budig and Folbre 2002; Pietrykowski forthcoming). In addition, if Manual/Technical skills are closely associated with the manufacturing sector we might expect a wage penalty for several possible reasons. First, if these skills involve routine tasks that are being automated we would expect the demand for manual skills to fall thereby depressing the wage (Autor and Dorn 2013). Also, if manufacturing jobs can be more easily outsourced to other countries the global supply of labor will push

U.S. manufacturing wages down (Firpo, Fortin and Lemieux 2011). Finally, falling unionization rates weaken worker bargaining power (Western and Rosenfeld 2011). The remainder of skill categories - cognitive and managerial skills, financial and material resource management skills, and computer skills - should all be associated with higher occupational wages.

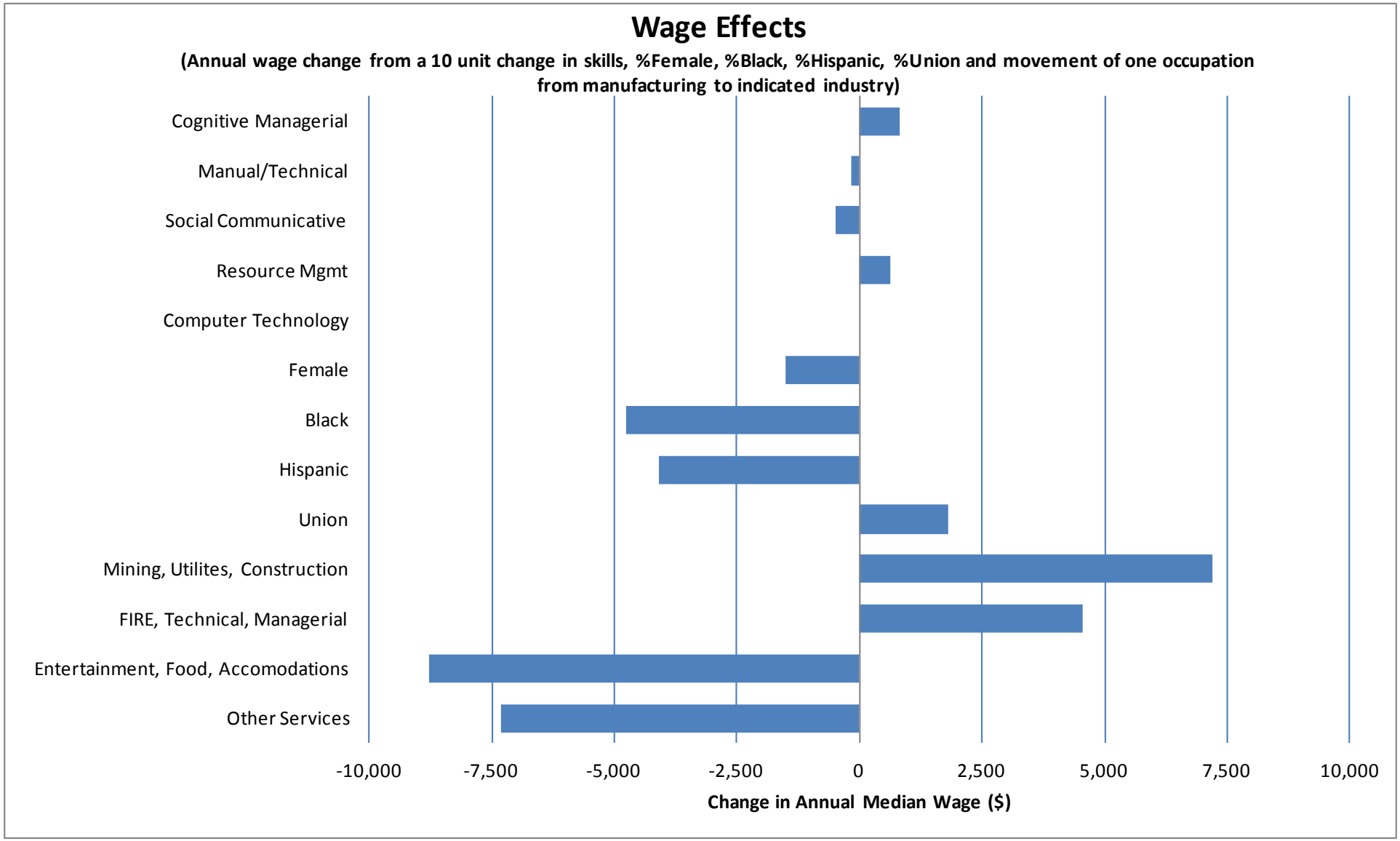
Ordinary least squares (OLS) regression analysis was used to estimate the 2010 annual median occupational wage.[8] In addition to the five composite skills scores, the following control variables were used in the regression analysis: percent female, percent Black, percent Hispanic, percent occupational share of immigrant employment, percent unionized, and industry indicator (dummy) variables.

The estimated return to skills is illustrated in Figure 2. There is an annual wage bonus of $823 in return for a 10 point increase in Cognitive Managerial skills. There is also a positive return of $628 for a 10 point gain in Resource Management skills. On the other hand there is a wage penalty of $496 for a 10 point increase in the Social Communicative skill score whereas a 10 point increase in Manual/Technical skills depresses wages by $170. Interestingly there is no wage effect of an increase in Computer Technology skills. The wage effect for computer-related skills may be captured by the inclusion of industry control variables since the computer technology skill variable is statistically significant only when the industry control variables are excluded from the model. Occupations using computer technology skills, if re-located to the FIRE (finance, insurance, and real estate)/technical /managerial industry sector, would result in a $4,540 annual wage increase.[9]

[8] The log of the annual median wage was used in order to adjust for the smaller number of high wage occupations in the distribution (positive skew).

[9] Note that the industry variables are compared to a selected benchmark industry (manufacturing). The variables % Immigrant, Trade/Transportation, Education/Health, and Government were not statistically significant and therefore had no effect on wages in this model.

Figure 2


Wage Effects
(Annual wage change from a 10 unit change in skills, %Female, %Black, %Hispanic, %Union and movement of one occupation from manufacturing to indicated industry)
Cognitive Managerial
Manual/Technical
Social Communicative
Resource Mgmt
Computer Technology
Female
Black
Hispanic
Union
Mining, Utilites, Construction
FIRE, Technical, Managerial
Entertainment, Food, Accomodations
Other Services
-10,000
-7,500
-5,000
-2,500
0
2,500
5,000
7,500
10,000
Change in Annual Median Wage ($)

So, different sets of skills are rewarded or penalized such that cognitive skills and those skills associated with the management of people, physical resources and finances receive a wage premium. One issue that these results raise is the extent to which managerial responsibilities are a return to skill or a return to power and social status in the corporate hierarchy. Thomas Piketty (2014) argues that growing wage inequality between the top of the income distribution and everyone else reflects a power imbalance in favor of those super managers who are in the position to divert larger shares of labor income to themselves.

On the other hand the wage penalty associated with social and communicative skills can be explained by the devaluation of skills associated with caring labor. The penalty remains even after controlling for the sex composition of occupations so this devaluation may also have a class-based component as well. Workers in occupations where social skills are important may be perceived to be in lower status jobs (e.g. retail sales, food services). Finally manual and technical skills characteristic of jobs in manufacturing also receive a wage penalty. Unionized occupations however pay a wage premium. So, one explanation for the negative return to manual and technical skills can be found in the precipitous decline in unionization among manufacturing workers from over 20 percent in 1990 to less than 10 percent in 2015.[10] But here, too, part of the explanation for a wage penalty could be linked to a social class-based devaluation of manual skills which is different from the idea that skills become obsolete due to automation, disuse or declining product demand (Crawford 2006; Janßen, Backes-Gellner 2009).

So the next step is to examine the relationship between wages and skills at different points along the wage distribution. Quantile regression analysis was used to explore the effect of skills on wages at the 10^{th} (lowest 10 percent), 25^{th}, 50^{th}, 75^{th} and 90^{th} (highest 10 percent) percentile (quantile) of the wage

[10] www.unionstats.com

distribution. The wage effects of the skills variables are reported in Table 3. As was the case for the earlier estimation and using the full set of controls, the Computer Technology skill variable was not statistically significant for occupations at any wage quantile so its effect on wages was zero.

One important result of the quantile wage analysis is the finding that the Cognitive and Managerial skills measure is important for all occupations across the wage spectrum. It is not only occupations at the high end of the wage distribution that require cognitive and managerial skills. Workers in occupations located at the bottom 10 percent and bottom 25 percent receive a wage premium of $535 and $581 respectively in return for a 10 point increase in the Cognitive and Managerial skills score. Another noteworthy finding is that both manual skills characteristic of manufacturing jobs and social interactive

Table 3
Wage Effects by Wage Quantile
(annual wage change ($) in response to a 10 unit change in skills)

	Wage Quantiles				
	0.1	**0.25**	**0.5**	**0.75**	**0.9**
Cognitive Managerial	535	581	736	741	1,010
Manual/Technical	-182	-111	0	-327	0
Social Communicative	-520	-419	-412	0	0
Resource Mgmt	0	0	0	1,336	0
Computer Technology	0	0	0	0	0
Net Return	**-167**	**51**	**324**	**1,750**	**1,010**

skills ('soft' skills) representative of service sector occupations generate a wage penalty only for low-wage occupations. Finally in occupations at the 0.75 wage quantile the return to the management of financial and physical resources is $1,336. These results reveal that low-wage workers are penalized in occupations for which skills are deemed to be important. In addition, at higher wages the absolute return to skills scores tends to increase. These results, if indicative of longer term trends, would lead to growing wage inequality.

So far we have examined the return to skills where skills reflect the assessment of O*NET evaluators: professional industrial and organizational psychologists. To see if the professional assessments

correspond to the scores that workplace managers would assign we recruited a random sample of 233 managers of workers in eight low-wage occupations: (1) Cook, restaurant; (2) Combined food preparation and serving worker including fast food; (3) Waiter/Waitress; (4) Home health aide; (5) Stock clerk and order filler; (6) Retail salesperson; (7) Cashier; and (8) Hairdresser and hairstylist. Managers were asked to fill out the same survey used by the professional O*NET evaluators (Appendix 1).

On average twenty-nine managers were surveyed for each occupation. The average manager had ten years of managerial experience. In addition, 70 percent of managers had experience working in the low-wage jobs they were asked to evaluate. So a majority of managers had first-hand knowledge of the job tasks and skills that are important to low-wage occupations.

The manager survey data was compared to the O*NET skills evaluators. The result was that managers' skills score ratings were, on average, higher than those of the O*NET skills evaluators (Table 4). The difference is statistically significant for all eight low-wage occupations. Since the eight low-wage jobs for which manager skill evaluations were collected are all located in the bottom 10 percent of the wage distribution, the quantile regression results for the 0.10 quantile were used to estimate the wage. In order to do this we calculated the wage effect resulting from an x point change in the skill score where x represents the difference between the manager score and the O*NET evaluator score. For example, the composite skills Cognitive Managerial, Manual/Technical, and Social Communicative were all statistically significant and correspond to a $535, -$182 and -$520 wage effect in return to a 10 point change in the skill score (Table 3). For each of the low-wage occupations, instead of a 10 point change in the composite skill score we used the difference between the average manager skill scores obtained from the survey and the O*NET evaluator skill score in order to calculate the skill-based estimated wage .

Table 4
Comparison of Average Manager Skill Score to Average O*NET Score
(scores can range from 0 to 100)

Occupation	Manager Survey Mean Score	O*NET Mean Score	Difference	t-statistic
Cooks, restaurant	59.01	30.8	28.21	8.92***
Combined Food Prep, including fast food	56.99	30.31	26.68	9.28***
Waiter/Waitress	60.28	28.37	31.91	8.49***
Home Health Aide	54.69	33.74	20.95	6.12***
Stockperson	51.12	24.14	26.99	9.18***
Retail salesperson	60.69	34.91	25.78	7.15***
Cashier	60.74	26.57	34.17	10.84***
Hairdresser and Hairstylist	73.62	36.49	37.14	10.12***

*** indicates 0.01 level of statistical significance

Dividing the annual wage by 2,080 (40 hours per week times 52 weeks) gives us the equivalent full-time hourly wage. The results – the estimated skill-based wage resulting from the manager skill scores – were compared to the actual wage for the eight low-wage occupations (Table 5). The average hourly wage for these low-wage occupations is $9.75 compared to $16.52 when using the manager skill scores together with the 0.10 quantile wage results. Note that all of the wage data represent 2010 occupational wages. So, for example, the real value of a skill-based wage of $14.36 for fast food workers would be $15.61 in 2015 dollars.[11]

[11] Bureau of Labor Statistics, Consumer Price Index, CPI-U.

These results are based on a wage model in which low-wage workers receive a wage premium for Cognitive and Managerial skills and a wage penalty for Social Communicative and Manual/Technical skills. So, even in the presence of a negative return to some skills, the net effect of the manager skill scores is to raise the overall wages of low-wage workers in these eight occupations.

Table 5
Actual Wages Compared to Skill-Based Wage Estimates Using Manager Skill Scores

Occupation	Annual Median Wage	Estimated Skill-Based Annual Wage	Hourly Wage (full-time)	Estimated Skill-Based Hourly Wage (full time)
Cooks, Restaurant	22,140	33,927	10.64	16.31
Food Prep, Serving, Fast Food	17,950	29,872	8.63	14.36
Waiters and Waitresses	18,330	34,297	8.81	16.49
Home Health Aides	20,560	31,998	9.88	15.38
Stock Clerks and Order Fillers	21,290	36,148	10.24	17.38
Retail Salespersons	20,670	37,867	9.94	18.21
Cashiers	18,500	33,435	8.89	16.07
Hairdressers and Hairstylists	22,760	37,407	10.94	17.98
Average	20,275	34,369	9.75	16.52

Finally, these wage estimates include the wage penalty for social and manual skills. If we leave out the wage penalty and, instead, focus on the monetary benefit that should result from cognitive and managerial skills alone then the average skill-based wage would be $20.36. The corresponding wage for fast food workers would be $17.76 ($19.30 in 2015 dollars). This wage compares to $21.72 which is the real value of the minimum wage reflected in productivity gains since 1968 (Schmitt 2012). It also compares to the $20 an hour minimum wage paid to fast food workers in Denmark (Alderman and Greenhouse 2014).

Recall that one important finding of the wage estimates is that Cognitive Managerial skills are important for all occupations across the wage distribution such that low-wage workers receive a wage premium for these skills. As a test for the robustness of these results the 16 skills that make up the Cognitive Managerial composite skill (Table 2) were examined in more detail for the eight low-wage occupations.

The average wage was calculated for all occupations that share the same skill score with each of the low-wage occupations. In each case the average occupational wage was greater than the wage for the corresponding low-wage job. For example, critical thinking is one of the skills included in the Cognitive Managerial skill score. Of the eight low-wage occupations, hairdressers and hairstylists, along with home health aides had the highest O*NET critical thinking skill score (63 out of 100). These occupations have an annual wage of $22,760 and $20,560 respectively. The average wage for all occupations with a critical thinking O*NET score of 63 was $45,399. Two occupations - waiters and waitresses and food prep/fast-food worker - had the lowest critical thinking skill scores (44 out of 100). Their annual wage is $18,330 and $17,950 respectively. The average wage for all occupations with a critical thinking skill score of 44 was $26,991. Table 6 displays the wage difference between these low-wage occupations and the average occupation with equivalent skill scores for the entire set of Cognitive Managerial skills.

Table 6

		Occupation (wage)			
		Combined Food Prep and Serving, including Fast Food ($17,950)	**Waiters and Waitresses ($18,330)**	**Home Health Aides ($20,560)**	**Hairdressers, Hairstylists, and Cosmetologists ($22,760)**
Cognitive Managerial Skills	**Avg. Wage ($) in Occupations with Same Skill Score**	32,935	31,271	39,157	43,680
Critical Thinking	**Skill Score**	44	44	63	63
	Avg. Wage ($)	26,991	26,991	45,399	45,399
Active Learning	**Skill Score**	41	41	50	60
	Avg. Wage ($)	34,977	34,977	36,988	59,715
Learning Strategies	**Skill Score**	44	38	47	44
	Avg. Wage ($)	53,893	38,642	54,359	53,893
Complex Problem Solving	**Skill Score**	35	44	47	56
	Avg. Wage ($)	26,108	30,534	33,410	47,098
Judgement & Decision Making	**Skill Score**	47	50	50	60
	Avg. Wage ($)	31,406	34,205	34,205	56,443
Instructing	**Skill Score**	50	31	50	44
	Avg. Wage ($)	50,737	29,902	50,737	45,924
Monitoring	**Skill Score**	53	53	60	53
	Avg. Wage ($)	39,108	39,108	46,239	39,108
Systems Evaluation	**Skill Score**	25	25	25	35
	Avg. Wage ($)	31,066	31,066	31,066	36,891
Time Management	**Skill Score**	38	38	50	53
	Avg. Wage ($)	23,875	23,875	37,532	45,442
System Analysis	**Skill Score**	19	19	25	35
	Avg. Wage ($)	30,663	30,663	32,656	34,457
Management of Personnel	**Skill Score**	38	25	35	31
	Avg. Wage ($)	38,787	29,378	34,324	29,695
Operations Analysis	**Skill Score**	3	3	0	41
	Avg. Wage ($)	25,798	25,798	24,133	51,931
Science	**Skill Score**	0	0	16	22
	Avg. Wage ($)	26,712	26,712	51,103	47,329
Speaking	**Skill Score**	56	66	56	63
	Avg. Wage ($)	33,973	46,647	33,973	41,871
Reading Comprehension	**Skill Score**	41	41	50	44
	Avg. Wage ($)	23,804	23,804	32,220	34,778
Writing	**Skill Score**	28	35	53	44
	Avg. Wage ($)	29,057	28,029	48,177	28,906

Conclusion: A Skills-Based Rationale for $15 an Hour

The struggle for a living wage remains vital to individual workers, their families and, moreover, to the U.S. economy. The goal of $15 an hour has garnered considerable attention and is gaining support in cities across the country such as Los Angeles, Seattle, Pittsburgh and Portland, Maine.[12] The economic arguments in favor of a $15 wage include: increased consumer demand, fewer individuals and families living in poverty, lower labor turnover (Dube, Lester and Reich 2014) and increased productivity (Rebitzer and Taylor 1995).

This report provides a skill-based rationale for increasing wages to at least $15 an hour. The results of quantile regression analysis indicate that low-wage workers have skills that are important to the successful performance of their jobs. Many of the skills usually attributed to high-wage knowledge-sector workers and managers (critical thinking, active learning, complex problem-solving, judgment and decision-making, time management) are also important for low-wage occupations. Workers across the wage distribution receive a wage premium for these skills. However, low-wage workers are penalized for 'soft skills' (e.g. social perceptiveness, active listening, persuasion, negotiation). Low-wage occupations for which these skills are important see wage reductions in return for these skills. This is not the case for high wage occupations. Finally, occupations in which skills associated with manufacturing technology (equipment maintenance, quality control, repair and equipment selection) are important also receive a wage penalty. So skills are not always rewarded in the labor market. This differential wage effect is more pronounced among low-wage occupations.

These results support the view that labor markets are embedded in social and cultural norms and existing systems of power. If this is the case then the very definition of what counts as skilled labor is influenced by existing structures of power based on class as well as gender and race such that low-wage

[12] National Employment Law Project, http://www.raisetheminimumwage.com/media-center/entry/14-cities-states-approved-15-minimum-wage-in-2015/.

work is classified as low-skill. This study presents evidence that contradicts this classification. In order to explore the skills of low-wage workers managers of workers in eight low-wage occupations were asked to evaluate the importance of the 35 O*NET skills. The manager skill scores were then used to estimate wages. These skill-based wage estimates were, on average, 69 percent higher than the market wage.

Furthermore, these skill-based wage estimates were based on a wage regression in which low-wage occupations received both a wage premium and wage penalties. So even in the presence of wage penalties for soft skills and manual skills, low-wage workers have a skill set that corresponds to a wage higher than $15 an hour. If labor market practices and policies were put in place to reward low-wage workers for these two sets of skills then the skill-based wage would be even higher.

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Appendix 1
Occupation Skills Survey

SCORE (1 to 5)	SKILLS: Importance → 1 = Not Important; 2 = Somewhat Important; 3 = Important; 4 = Very Important; 5 = Extremely Important
	Writing — Communicating effectively in writing as appropriate for the needs of the audience.
	Troubleshooting — Determining causes of operating errors and deciding what to do about it.
	Time Management — Managing one's own time and the time of others.
	Technology Design — Generating or adapting equipment and technology to serve user needs.
	Systems Evaluation — Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.
	Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.
	Speaking — Talking to others to convey information effectively.
	Social Perceptiveness — Being aware of others' reactions and understanding why they react as they do.
	Service Orientation — Actively looking for ways to help people.
	Science — Using scientific rules and methods to solve problems.
	Repairing — Repairing machines or systems using the needed tools.
	Reading Comprehension — Understanding written sentences and paragraphs in work related documents.
	Quality Control Analysis — Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
	Programming — Writing computer programs for various purposes.
	Persuasion — Persuading others to change their minds or behavior.
	Operations Analysis — Analyzing needs and product requirements to create a design.
	Operation Monitoring — Watching gauges, dials, or other indicators to make sure a machine is working properly.
	Operation and Control — Controlling operations of equipment or systems.
	Negotiation — Bringing others together and trying to reconcile differences.
	Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
	Mathematics — Using mathematics to solve problems.
	Management of Personnel Resources — Motivating, developing, and directing people as they work, identifying the best people for the job.
	Management of Material Resources — Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.

	Management of Financial Resources — Determining how money will be spent to get the work done, and accounting for these expenditures.
	Learning Strategies — Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.
	Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.
	Instructing — Teaching others how to do something.
	Installation — Installing equipment, machines, wiring, or programs to meet specifications.
	Equipment Selection — Determining the kind of tools and equipment needed to do a job.
	Equipment Maintenance — Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
	Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
	Coordination — Adjusting actions in relation to others' actions.
	Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
	Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
	Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.