

Defining and Assessing Workforce Fragility in Boston

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Executive Summary

According to recent reports from the Bureau of Labor Statistics, unemployment levels in the United States are nearing 5.0%, and US economy seems to have recovered from the Great Recession. The City of Boston, in particular, boasts an unemployment rate of 3.7% and can be considered a striking example of this recovery. However, academics are intrigued about the nature of this recovery and the kinds of jobs that are being created. Some literature points to a disproportionate growth in low-wage jobs compared to middle- and high-income ones (Lowrey, 2014). Additionally, the growth in start-up and technology sectors raises questions about the overall quality of jobs in the current economy. Most notably, employment opportunities like those offered by Uber have turned on its head the traditional notion of a 9-5 job.

In order to dig deeper into these questions about the nature and quality of work, the CIPA capstone team worked on a project for the Boston Redevelopment Authority (BRA). The goal of this project was to define what constitutes ‘fragile’ work and estimate the number of such ‘fragile’ workers in the Boston area. This project ties in neatly with the BRA’s overall mission to “plan the future of Boston by building a more resilient, prosperous, and vibrant city” and “to understand the current environment of the city.”

Our team started with studying the academic literature that exists on the subject. While we did not find current literature on “fragile work”, there is a good deal of literature on precarious work, temporary work and research that explores the informal sector. In our literature review, we were able to identify common themes across the varying definitions of fragility and precarity.

The team then synthesized the key overarching themes from the various sources into a single definition of fragility with three key components:

- Unlivable income

- Lack of benefits, and
- Lack of full-time work.

Going further, we constructed a spectrum of fragility which would make it possible to estimate the numbers of those workers who were truly in perilous working conditions. Workers were divided into three levels of fragility based on whether they displayed one, two or all three of the above characteristics.

In order to build estimates of the number of fragile workers in the Boston area and examine the trends in the number of such workers over the past two decades, we used two data sets: the Bureau of Labor Statistics' Current Population Survey (CPS) and the US Census Bureau's American Community Survey (ACS). In both these surveys, we looked at income, number of hours worked and employee sponsored health-care. While the variables income and part-time work are direct components of our definition of fragility, we used employee-sponsored health care as an indicator for employee sponsored benefits, given the paucity of data regarding other the other benefits.

In order to gain a long-term perspective, we looked at data starting from the year 2000 for the CPS dataset and beginning 2005 for the ACS dataset. The sample size for both the surveys is large enough to yield statistically significant conclusions. The smaller CPS survey is able to attain a 95% confidence level with an interval of 3% for all years. The large ACS, however, is able to provide even statistically stronger conclusions at a confidence level of 99% with an interval of 2% at the metropolitan level.

Despite the constraints imposed by the availability of data we strove to include data for as many years as possible. Hence, the trends for the unlivable wage and part-time work variables were studied from 2005-2014 (ACS) and 2000-2015 (CPS). The number of workers with

employer-sponsored health insurance and number of full time workers with employer sponsored health insurance variables were looked at for 2008-2014 (ACS) and 2000-2013 (CPS).

While the CPS data for the 2000-2013 period does indicate an upward trend in terms of total fragility (32.0%-39.6%) the trends for the 2008-2014 (ACS) and 2008-2013 (CPS) time periods are inconclusive.

Introduction

Modern day Boston has become a beacon among U.S. cities for a dynamic economy, reliable growth, and innovative public policy. The city is a hotbed for innovation driven by its dozens of universities. Rather than being over-reliant on outdated industries, the city's technology sector has grown by 9% since the recession alone, and the city is an anchor of the state's booming venture-funded startup economy, notable considering that Massachusetts receives the second most venture capital of any state in the U.S. (PricewaterhouseCooper 2015). Suffolk County, made up almost entirely by the City of Boston, also has enjoyed a much lower unemployment rate than the nation and state during and after the recession, hovering around an average of 4.6% in 2015 (BLS 2016). The most recent Bureau of Labor Statistics data also indicates that the Boston metro area enjoyed an average wage 36% greater than the U.S. average in May of 2015. By most measures, the city has done well compared to other major cities in the U.S.

However, this study attempts to delve deeper using available public survey data to explore the number of individuals who have remained in poor work positions despite Boston's impressive growth. Importantly, this research centers on the nature of work and work benefits in

the city in an attempt to explore the subject of “fragile” or “precarious” work. This concept has gained traction in the sociological and labor studies literature, and it pertains to the increasing low-quality work positions found in the economy that subject their workers to vulnerability from the lack of living wages and basic benefits. This study also attempts to build on current literature by creating a typology of fragile work based on the severity of work fragility to gain a deeper understanding of varying levels of vulnerability in the city’s workforce. This typology is underpinned by contemporary fragility research, which will be described in the section below.

Literature Review

“Fragile” work and the “fragilization” of work have become major topics in the literature on modern economic changes, globalization, and the sociology of work, and labor and workforce studies. These concepts have been developed over the last four decades by a number of scholars, resulting in alternative naming and complementary, although not identical, definitions. Fragile work and the fragilization of work have been described using a number of alternative terms including: “nonstandard,” “discontinuous,” “informal,” “insecure,” and most of all, “precarious” work.

However, all of the studies presented below relate to the same remarkable and concerning trend in employment. These quantitative and qualitative studies show that work, for many Americans, is becoming more insecure and more poorly paid. Workers are becoming more vulnerable to changes in their employment status, income, and insurance and employee benefits coverage. As a result, many workers and families are facing increased risks of ruin if they become unemployed during reorganizations at their employing organization, or during an economic recession. Importantly, a polarization is occurring (see Kelleberg 2011, 2012), wherein

there are increasing very good jobs that provide autonomy, security, and high pay and benefits, while other are becoming low quality, unreliable, and unlivable. This polarization is coinciding with this fragilization.

This review covers the findings of these studies, both U.S. based and from abroad, in an attempt to isolate the generally agreed-upon characteristics of fragile work. It is useful to note that while fragile work has been discussed since the 1970s, Arne Kalleberg's book *Good Jobs, Bad Jobs* (2011) solidified precarious work in the literature and in the narrative of the social sciences, and much productive discussion has been in response to Kalleberg's work. Kalleberg has become a central figure in this area of study, and his work has driven many of articles cited.

Major Themes in the Literature

A review of the literature found that three major characteristics indicate fragile work. They are: (1.) job instability and discontinuity, (2.) work with unlivable wages, and (3.) jobs with a lack of benefits. Many or most fragile jobs share all three traits.

Job Instability and Discontinuity

Seigmann and Schiphorst (2016) describe the increasing normalization of work that is short-term in nature. The definition is broad enough to include temporary work and flexible work arrangements. This is inclusive of contract work, which is not guaranteed long term, or self-employment (including some freelancing) (Vallas and Prener 2012; Chun 2009; Paret 2015; Quinlan, Mayhew, and Bohle 2001; Kalleberg 2012; Arnold and Bongiovi 2013; Osnowitz 2010). Many of these fragile workers lack control in working conditions or protection (such as through unions), according to Rodgers (1989).

This instability and discontinuity harms workers and families because it subjects them to incredible risk as employment is not guaranteed, and thus incomes for survival are in constant threat. Chris Tilly (1991) explains that involuntary part-time work (where one works part-time instead of full-time because that is what is available) is often used to cut costs and, often done so through a low-wage secondary form of employment. This leads us to our second characteristic: low and unlivable wages.

Work with Unlivable Wages

Most scholars of precarious work would agree that fragile work is accompanied by low-income work. While much work has discussed the increased discontinuity of work in general, such as startup growth, in tech work, consulting, and freelance work (see Arnold and Bongiovi 2013), much of the literature reiterates that it is low-income jobs that can be considered fragile (see Rubiano 2013; Vallas & Prener 2012; Kalleberg 2012). The increase in jobs offering low wages creates significant strain on workers regarding their ability to purchase necessary services and goods needed for survival, such as health care services. Low wages are often accompanied by the last component of fragile work: a lack of benefits.

Jobs with a Lack of Benefits

Low wage jobs also are often not accompanied by important employee benefits such as healthcare or pension plans (Vihene et al, 2016; Paret 2015; Vallas & Prener 2012). Lewchuk, de Wolff and King (2003) describe the strain associated with a lack of employment benefits in Canada and found that precarious work often leads to increased illness and health problems associated with a lack of health benefits (such as drug and vision plans). Sirvio et al (2012) finds similar negative effects on wellbeing. Kalleberg's seminal 2011 book remains particularly

concerned with the lack of benefits of these workers. Siegmann and Schiphorst (2016) and Standing (2011) also recognize that the lack of benefits is entirely characteristic of precarious work in the global north.

To reiterate, these criteria are also reinforced in a number of other important reports, including the International Labor Organization's report on precarious work, and the recent United Way report, "*The Precarity Penalty*." Fragile work has taken the national and international spheres by storm, and now a number of other scholars have contributed to narrowing the definition (for more on this narrowed approach to precarious/fragile work classification, see Rubiano 2013, Standing 2011, or Vosko 2006).

Common Groups in Fragile Labor

The literature mentions a number of particularly vulnerable groups. Racial minorities and women are much more likely to be fragile workers than the general population (Kalleberg 2012; Young 2010; Fudge and Owens 2006). Migrant communities are significant participants in fragile work, which puts them at great risk of financial ruin (Paret 2015). Largely, uneducated individuals are also the most vulnerable to having no other option than to accept fragile work (Vono de Vilhena et al 2016).

In our research we found 5 general groups of individuals who qualify as fragile workers: part-time workers, temporary workers, low-income wage workers, low-income self-employed individuals, and individuals with no employee benefits. These categories almost perfectly align with Quinlan, Mayhew, and Bohle's (2001) study on precarious work and health and occupational safety. Generally, precarious work ought to meet all three conditions: part-time work, less-than livable wage and lack of employer sponsored benefits, although there may be occasional exceptions. For example, a startup entrepreneur could be occasionally part-time and

not receive any employment benefits (as she or he is the owner), but may receive a very high income- high enough to easily purchase health insurance and contribute to a pension and high enough to build up significant savings. Most scholars would not consider this case to be an instance of fragile work. However, in almost all cases, fragile work will meet all three conditions, part-time work, lack of employer-sponsored benefits and a less-than livable wage. Fortunately, there is data on the number of individuals in these categories of work in Boston. The findings regarding fragile workers in Boston will be discussed in the ‘Data Analysis and Findings’ section.

Methodology

To explore workforce fragility trends in Boston, this study focuses on three important components of fragile work: lower pay, part-time work, and a lack of benefits. While much of this data is publically available for Boston city and the Boston Metropolitan area, little public work has been done to explore the extent to which workers are fragile. In other words, exploring how many workers are paid unlivable wages and are part-time, or how many are paid unlivable wages and do not receive critical benefits helps illustrate in detail the extent to which Boston workers’ lives are vulnerable to disaster due to medical emergencies, a loss of employment, or a significantly negative financial shock.

To obtain results that could yield observations with a number of qualifiers for fragile work, and be statistically significant we needed to use an extensive survey with strong response rates and publicly available microdata for our analysis. The Bureau of Labor Statistics’ Current Population Survey (CPS) and the American Community Survey (ACS) of the U.S. Census Bureau ask questions that can categorize respondents into fragile and nonfragile workers. Their

publicly available microdata is critical to accomplishing this. We used Integrated Public Use Microdata Series (IPUMS-CPS) data, which integrates data from the CPS. For ACS microdata, we used Public Use Microdata Sample (PUMS) produced by the Census Bureau.

The Current Population Survey data can only be subdivided into metropolitan area, which limits the statements that can be made about fragility in the City of Boston. However, these results can be a useful comparison to the American Community Survey, which presents findings both in terms of metropolitan area and by city. Results including only city resident yields the most relevant results for this study. Both surveys proved useful in exploring how fragility has changed in the Boston area as a whole, and the CPS proved a useful comparison to ACS data on the workers who live in the city's borders.

In terms of time series, we used CPS data from 2000 to 2015, and the ACS data from 2005 to 2014. Importantly, both surveys attained the number of randomly selected yearly observations to make statistically strong conclusions. The smaller CPS survey is able to attain a 95% confidence level with an interval of 3% for all years. The larger ACS, however, is able to provide even statistically stronger conclusions at a confidence level of 99% with an interval of 2% at the metropolitan level. This strength is also reflected in data for the City.

Both the CPS and the ACS rely on a complex stratified sampling scheme, with some records representing more cases than others. Persons with some characteristics are intentionally over-represented. Thus, it is essential to use the provided weighting variables to get accurate estimates of the total population. The personal-level IPUMS-CPS microdata has a weight variable, "WTSUPP", and ACS PUMS data also assign personal weights for each response using a weight variable, "PWGTP". We apply these weighting variables in all of our percentage results.

To generate our reports, we presented the weighted percentage of workers earning unlivable wages, working part-time, and working without employer-sponsored health insurance for each year. The numerators are the weighted sum of the target group, while the denominators are the weighted sum of the total workers who are employed in that year.

Most importantly to this study, we pursued a tri-level categorization of fragility. This categorization revises current understandings of fragility to recognize that working conditions create different levels of vulnerability. In other words, some workers are more fragile than others.

This assessment defines indicators of fragility to include the following variables mentioned below. The coordinate question variables on the CPS and ACS, respectively, are listed in parentheses:

1. Part-time work, or working below 35 hours a week in CPS and in ACS (Response “HINSEMP”; Response “WKW”).
2. Works for an hourly wage below the year’s living wage as set by the City of Boston (CPS calculation wages “INCWAGE” reported divided by the total hours worked in a year, which is calculated by multiplying the reported hours worked weekly, “UHRSWORKLY”, by weeks worked in a year, “WKSWORK1”).

The ACS are designed to divide weeks worked in a year into different layers, such as 30-39 weeks or 40-49 weeks, so we are unable to calculate the total hours worked in a year for each respondent. Instead, we identify workers earning annual wages (“WAGP”) less than \$35,000 in 2014 dollars. We use the adjustment factor for income and earning dollar amounts (“ADJINC”) to adjust “WAGP” into 2014 dollars.

3. Worker who do not receive healthcare benefits from an employer (“HINSEMP”; “HINS1”). The use of employer supported health insurance as a general proxy for benefits access is a highly imperfect variable. It is, however, the best proxy among public data on benefits to gain an understanding on the number of jobs that do not offer critical, basic benefits to employees. Health insurance is probably the most essential and basic of employer benefits.

Being a worker belonging to many of these categories increases one’s fragility. For example, it is one problem to not have access to employer sponsored health insurance. It is another to be without employer sponsored insurance and paid below a living wage. It is quite another to additionally be reliant on part-time work. Thus, a worker having only one of these fragile characteristics is categorized as Level 1 fragility. A worker belonging to precisely two (any two) belongs to Level 2 fragility, which is more vulnerable than Level 1. The most vulnerable by far is the worker who is part-time, paid below the hourly living wage, and additionally does not enjoy basic employer benefits. This Level 3 worker is the hyper type of a fragile worker (see Figure 1 below).

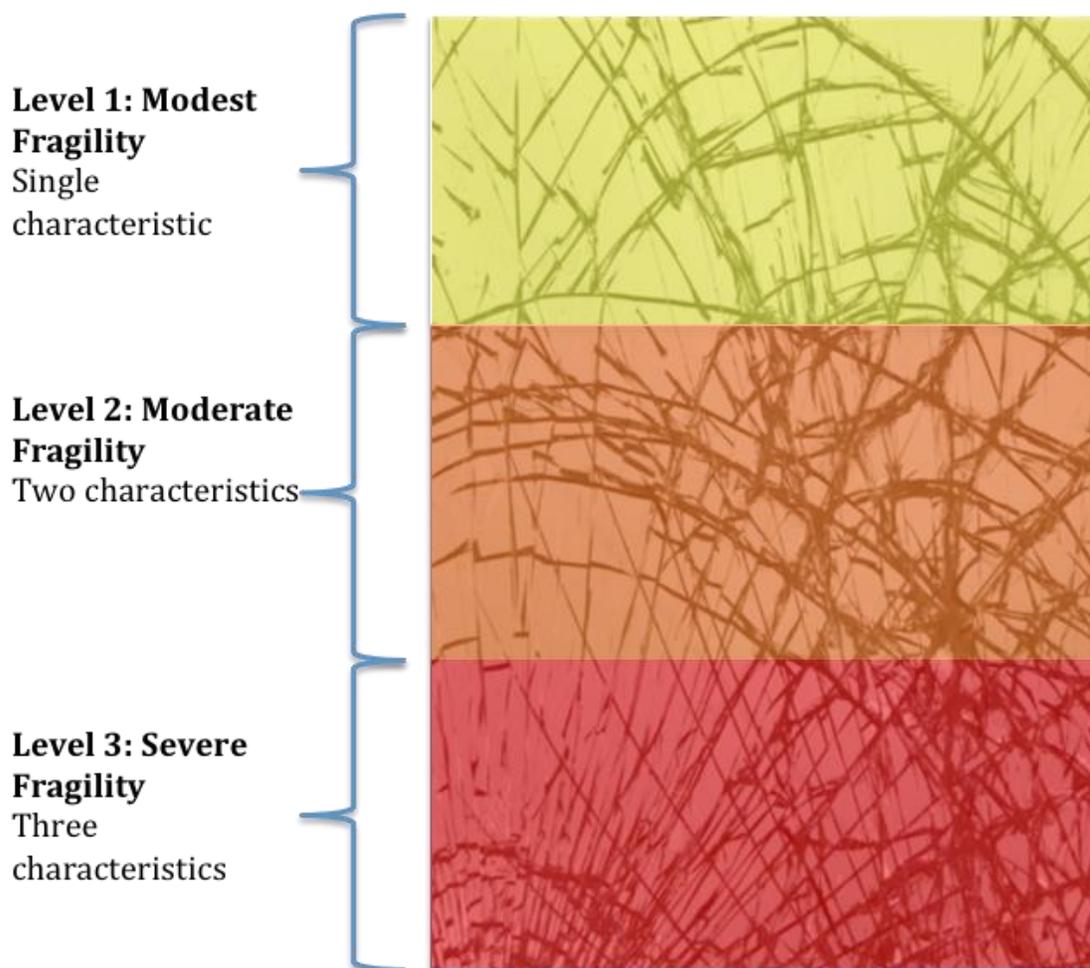


FIGURE 1: Levels of Fragility

Data Analysis and Findings

CPS and ACS survey data reveal slightly increasing numbers of fragile workers in the Boston metropolitan area (from 2000-2015 and from 2005-2014 respectively). In addition, the severity of fragility among fragile workers has also increased.

Current Population Survey (2000-2015) Findings: On the Metropolitan Level

CPS data indicates that the proportion of fragile workers in the Boston metro area has generally remained the same over the past decade, although the extent of fragility seem to have changed along with macroeconomic changes, such as the 2007 Great Recession. In addition, the factors behind fragility have also changed.

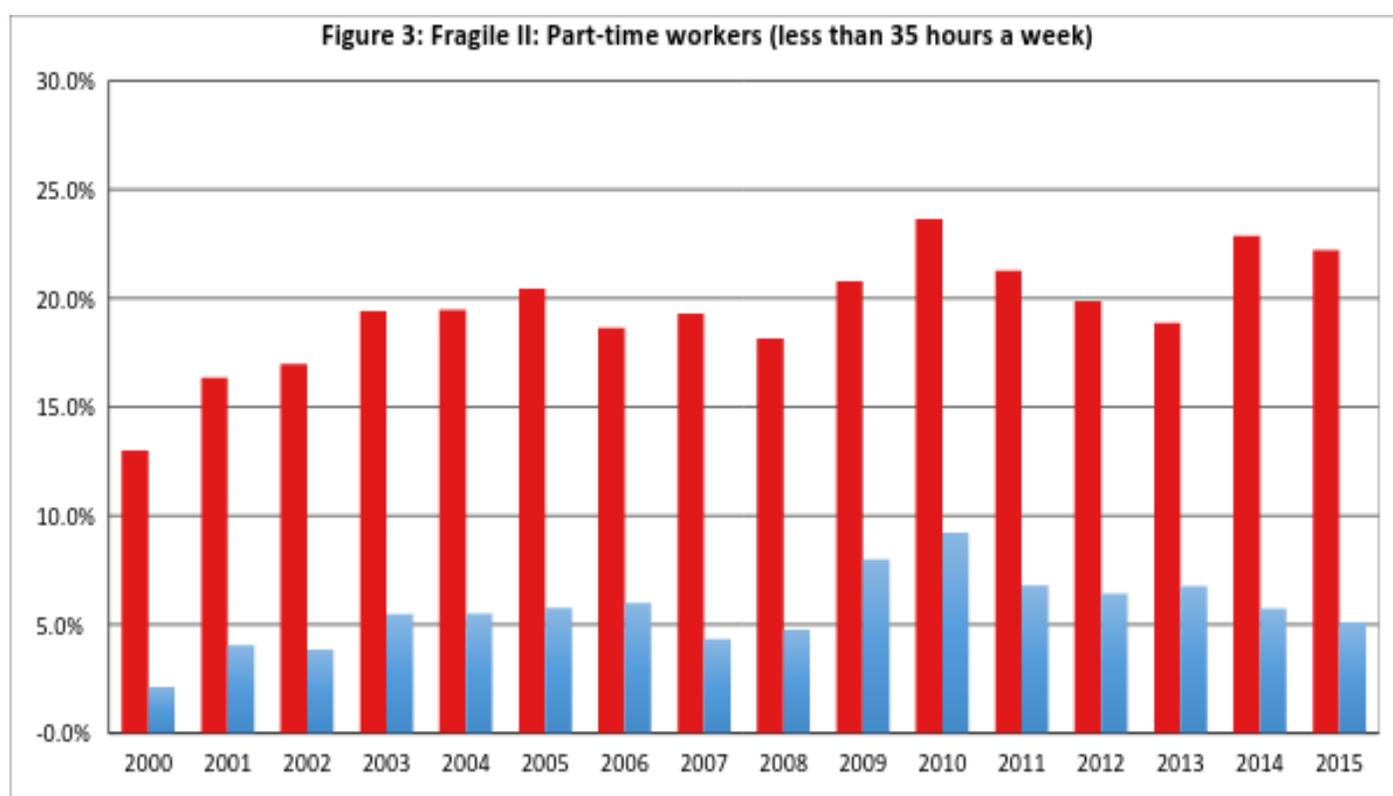
Since 2000, the proportion of Boston worker's working for a wage below the living wage has gone from 17% to 22%. The most recent data from 2015 indicates that this rate is even larger than the proportion with unlivable wages during and after the Great Recession. (Note: During this period, the living wage increased slightly with inflation and to adjust to city policy changes).



Source: Current Population Survey

Region: Boston Metropolitan Area

Part-time work has seen the largest increase over time. While part-time work accounted for 13% of all jobs in 2000, it now accounts for roughly 22% of jobs in the Boston metropolitan area. While part-time work is not necessarily a social problem, it becomes one when individuals seeking full-time employment are unable to attain part-time work. While the CPS does not discuss this work-choice component, the ACS does. This will be explored in a later section.

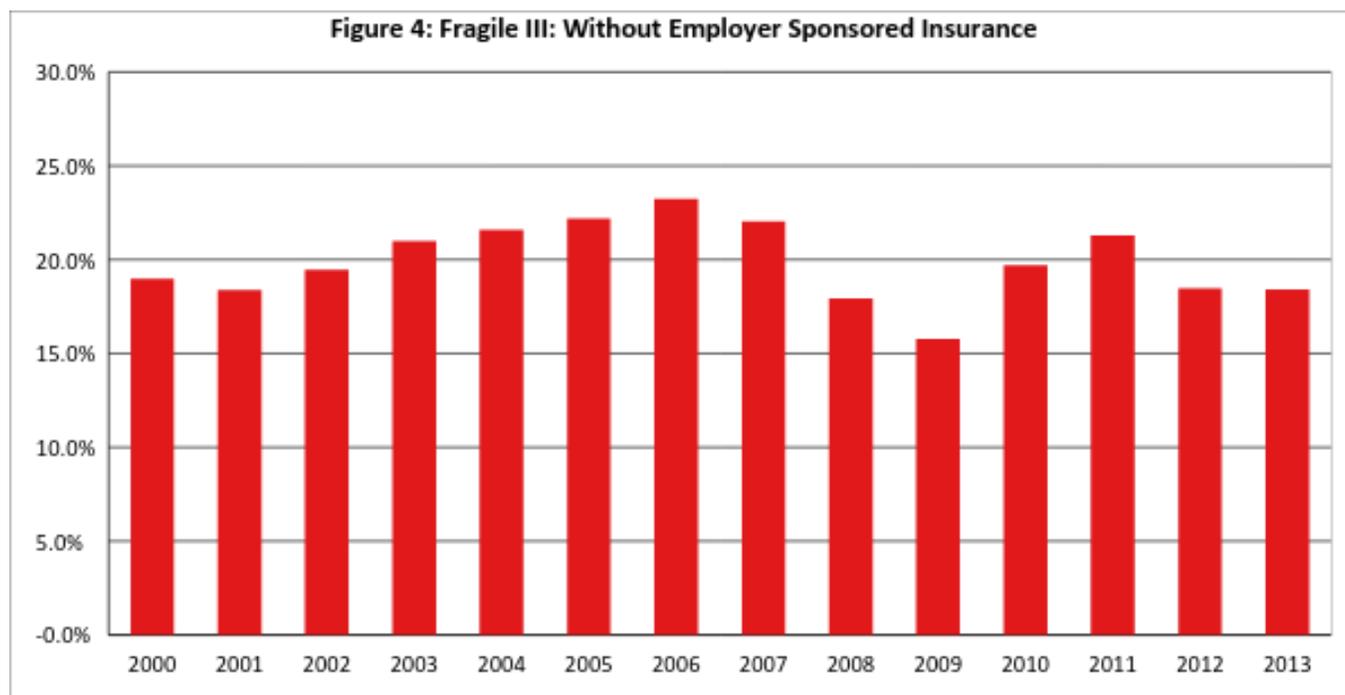


Source: Current Population Survey

Region: Boston Metropolitan Area

The final component of fragile work pertains to access to important employer-supported benefits, such as healthcare, pension plans, and childcare assistance. Because current publically

accessible data normally does not track these alternative forms of compensation, but does track access to healthcare, this must act as an imperfect proxy. In this area, the Boston metro has seen a general improvement since 2000. In 2013, access to employer sponsored insurance has increased slightly year to year, from 80% in 2000 to 81.7% in 2013. In this area, workers as a whole have become less fragile with more affordable, stable health insurance offered through their employers.

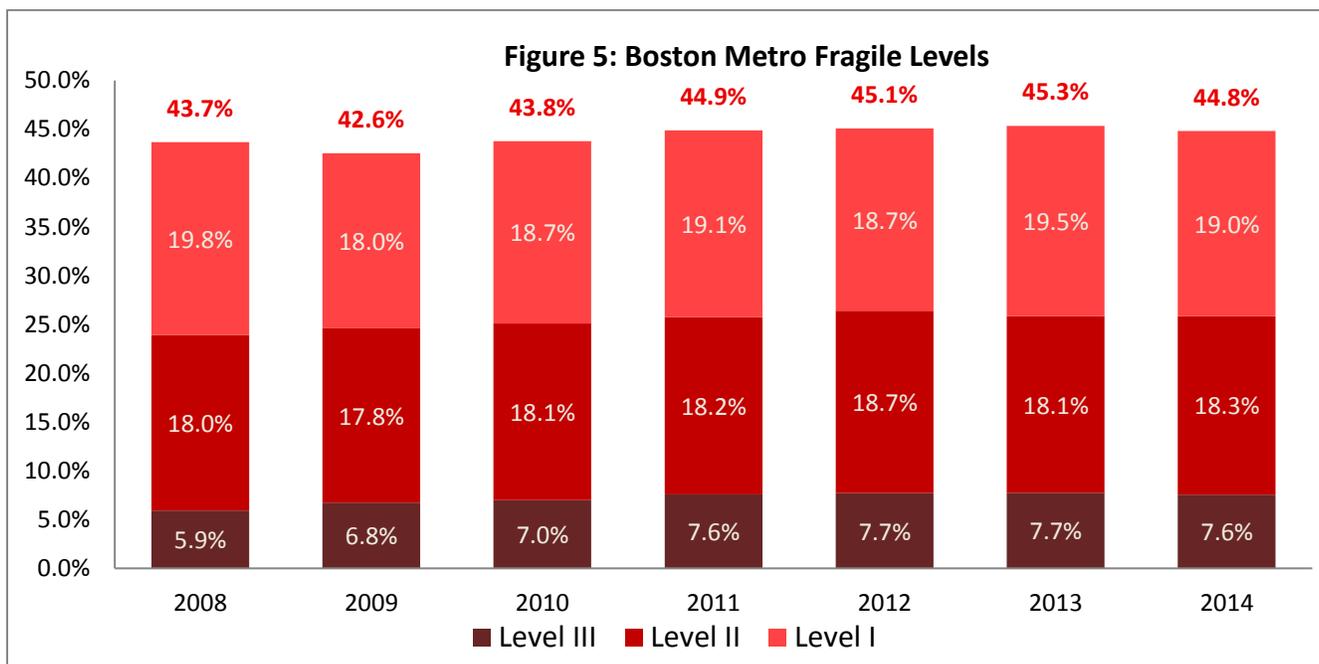


Source: Current Population Survey

Region: Boston Metropolitan Area

However, in overall fragility Metro Boston has increased, consistent with the studies on the fragile work phenomenon from across the U.S. In the time period considered below, approximately 35% of all workers in the Boston metro area can be considered fragile. In terms of the severity of fragility, Level 2 and Level 3 fragility (having two or three characteristics of

fragility co-occurring) as increased. In other words, the severity of fragile work has also increased in the city, not only the raw numbers of fragile people (as can be seen in Figure 5 below).



Source: Current Population Survey

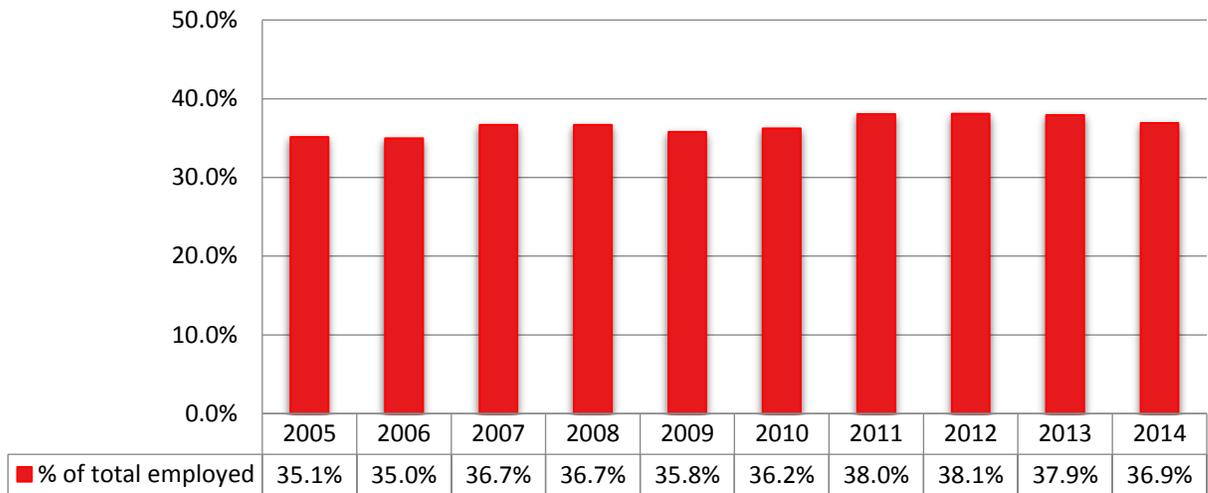
Region: Boston Metropolitan Area

American Community Survey Data (2005-2015) Findings: The Metropolitan Levels

The American Community Survey data includes data both on metropolitan level and city level. This data revealed similar trends, although more pronounced. In addition, findings were more severe. Using the ACS, we could compare the situation of the Boston metro area from two data sources, and look into that of Boston city.

As of 2014, a large 36.9% of Boston workers worked for wages below the city’s living wage. This is unchanged from 10 years prior in 2005. Interestingly, the proportion of workers living below this wage dropped after the recession, possibly because lower income workers were the first to be let go from struggling companies.

Figure 6: Fragile I: Employees Earning Wages Below \$35,000 (in 2014 dollars)

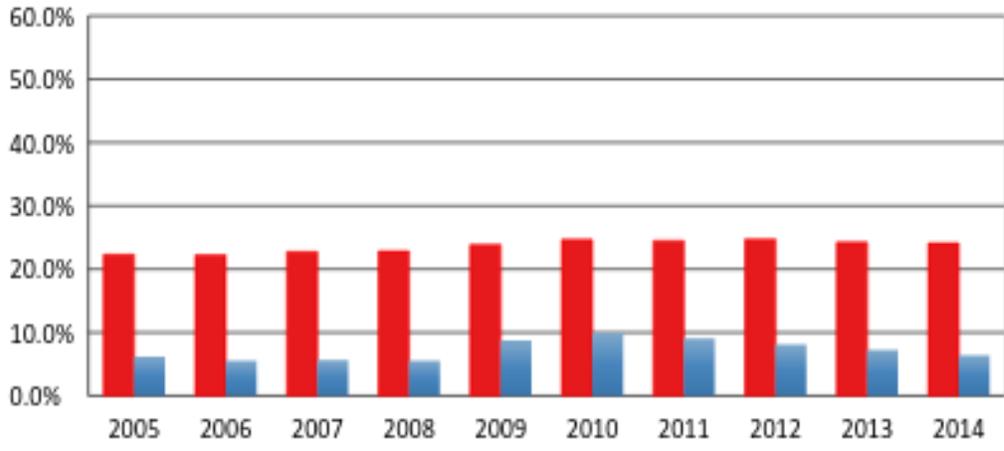


Source: American Community Survey

Region: Boston Metropolitan Area

Part-time work in Boston Metro area has generally increased over time, with a low of 22.2% in 2006 and a high in 2010 of 24.6%.

Figure 7: Fragile II: Part-time Workers (less than 35 hours a week)

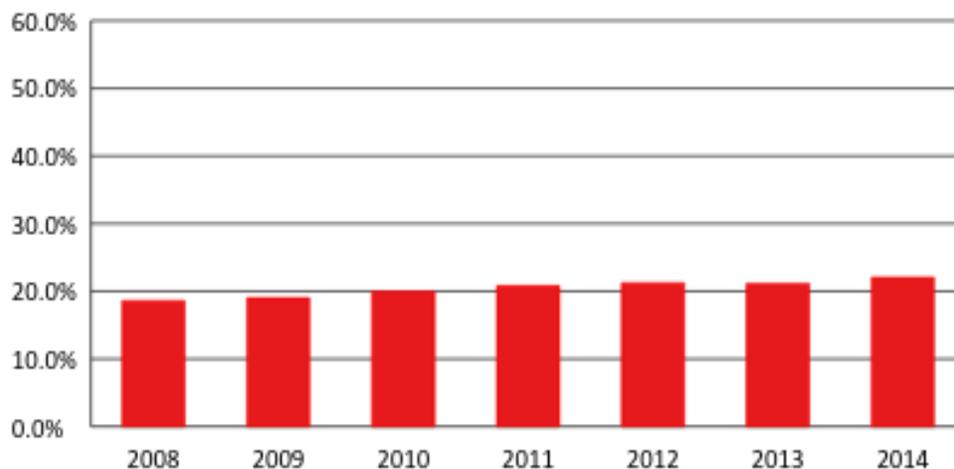


Source: American Community Survey

Region: Boston Metropolitan Area

Since data for health insurance access was first collected in 2008, the proportion of individuals without employer sponsored health insurance also grew. Nearly 22% of Boston’s workers do not have access to these basic benefits from employers.

Figure 8: Fragile III: Employees without Employer-Sponsored Health Insurance

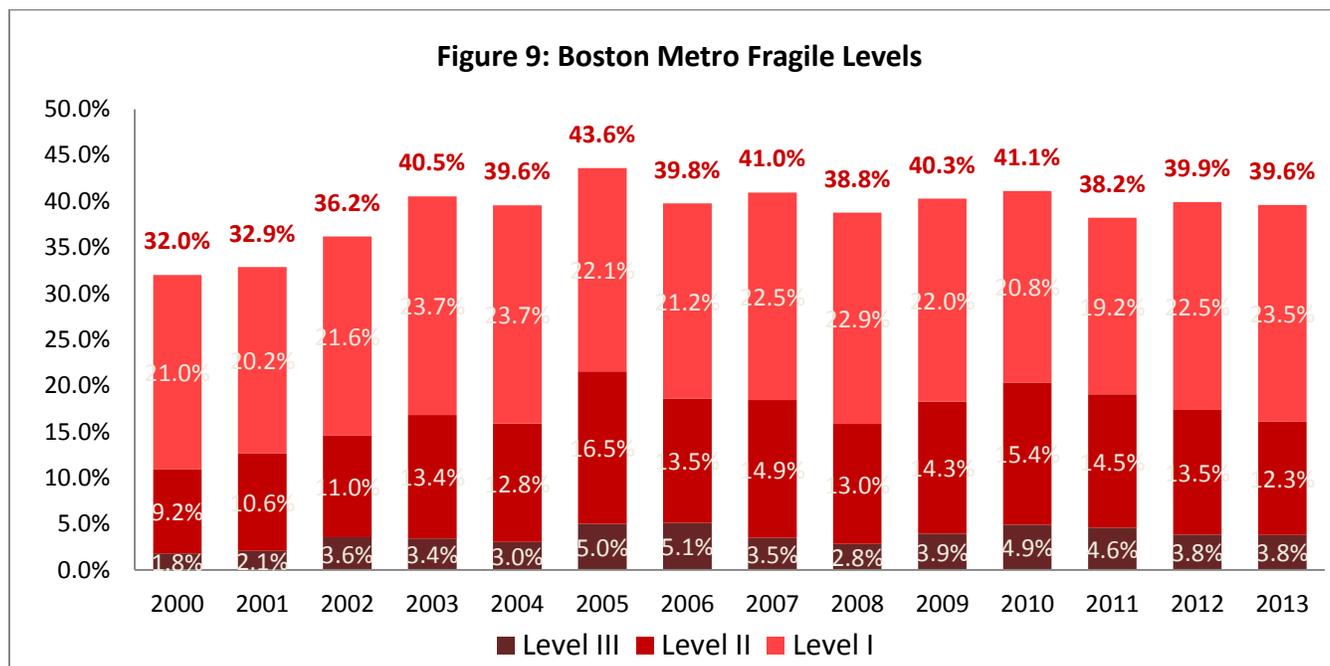


Source: American Community Survey

Region: Boston Metropolitan Area

Due to the fact that ACS does not provide data for health insurance before 2008, we were unable to accurately estimate the Level 3 fragility from 2005 to 2008. However, we could observe that proportion of Level 2 fragile workers (moderately severe) has increased since 2009, while the most severe workers have decreased slightly over time after 2011. This might suggest that a number that Bostonians who were slightly fragile were able to attain livable work. For level 1 fragile workers, we could see a significant decrease after 2008, and part of the reason is that more people actually belong to level 2 or level 3 with the health insurance data post-2008. On the other hand, this decreased proportion of Level 1 workers could simply indicate that while more fragile work increased in share of total work, this reduced proportion of Level 1 fragile workers may also reflect migration into the city of workers who have livable work, although without information on worker migration patterns this is only speculation. It is also noticeable

that the majority (fluctuating from 55% to 65%) of the level 2 group is the group of workers working part-time, paid below \$35,000, but having employer-sponsored health insurance, which is also true in the other two datasets. Overall, the total fragile workers increased from 2009 to 2013 and decreased slightly in 2014.

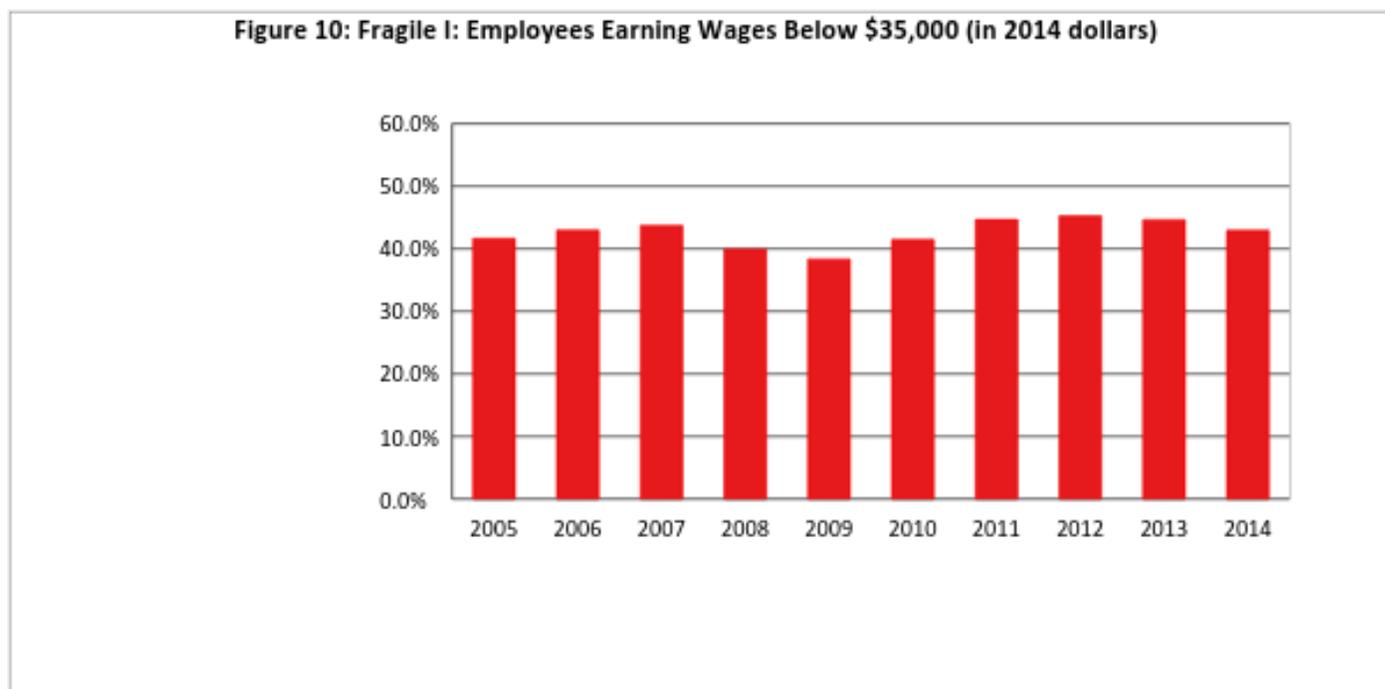


Source: American Community Survey

Region: Boston Metropolitan Area

American Community Survey Data (2005-2015) Findings: The City Level

As of 2014, a large number (42.9%) of Boston workers worked for wages below the \$35,000. This is unchanged since 10 years prior in 2005.

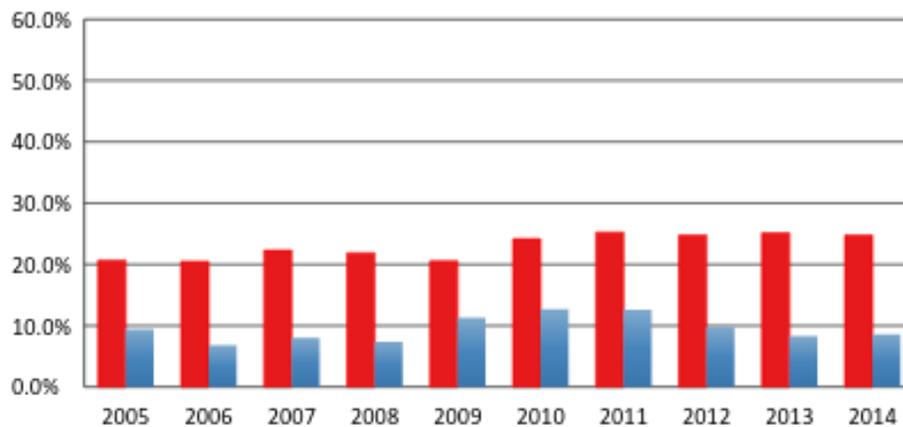


Source: American Community Survey

Region: Boston City

Part-time work in the city has always been lower than in the metropolitan area, however it has also generally increased over time, with a low of 20.7% in 2005 and a high in 2011 of 25.2%.

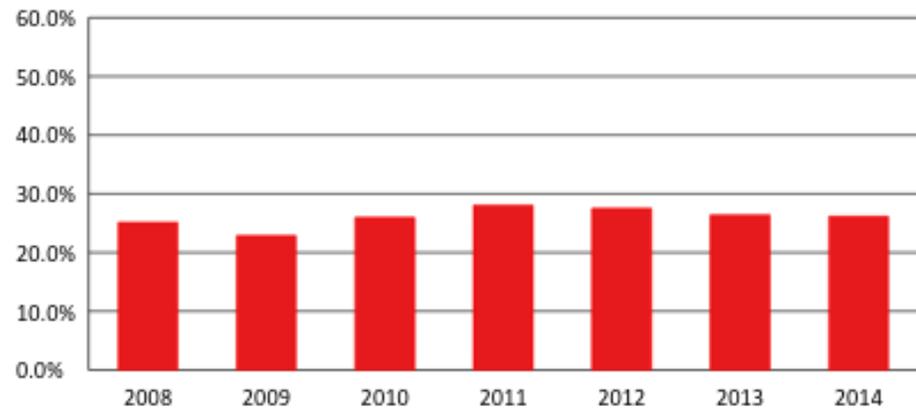
Figure 11: Fragile II: Part-time Workers (less than 35 hours a week)



Source: American Community Survey

Region: Boston City

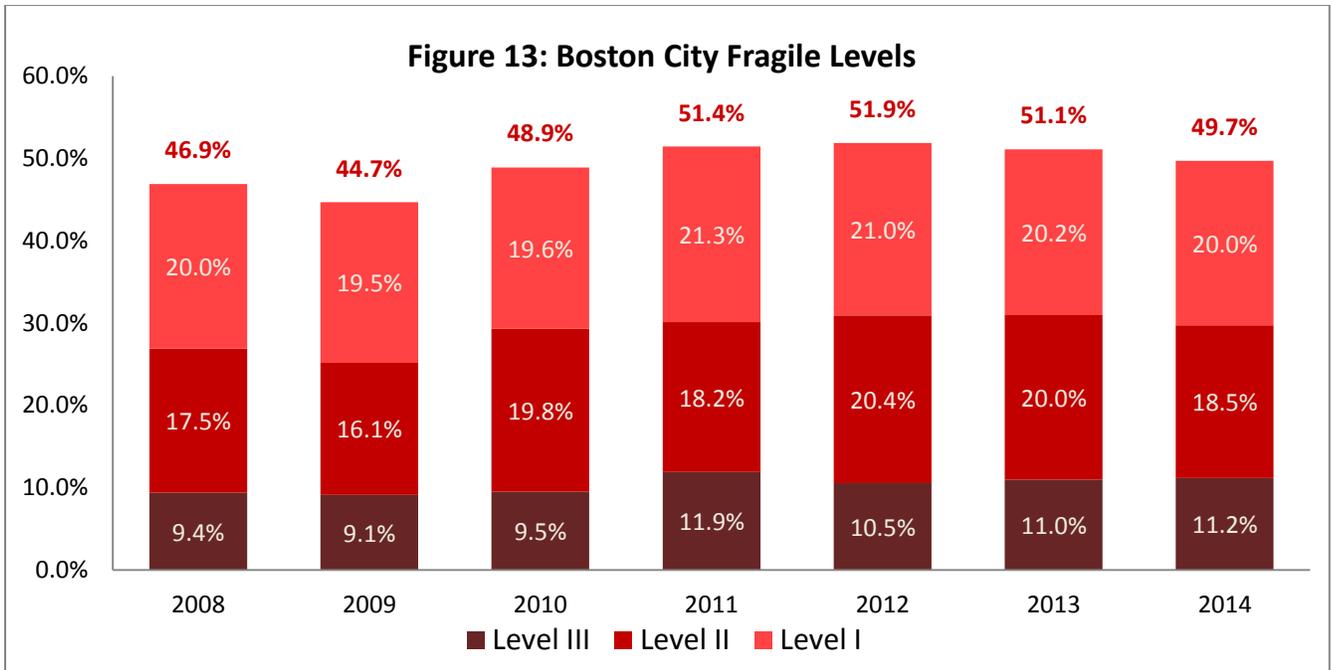
Since data for health insurance access was first collected in 2008, the proportion of individuals without employer sponsored health insurance also grew, although there has been a slight decline since 2011. In 2014 approximately 26% of Boston's workers did not have access to these basic benefits from employers.

Figure 12: Fragile III: Employees without Employer-Sponsored Health Insurance

Source: American Community Survey

Region: Boston City

Utilizing the same methods as used previously, we conducted the fragility levels analysis for Boston city as well. We observed that the total percentage of fragile workers increased from 46.9% in 2008 to 51.1% in 2013. However, the decrease in 2014 reflected in line with a potential improvement with the economic recovery in United States.



Source: American Community Survey

Region: Boston City

Conclusion

While the total number of fragile workers is stable for the Metro area, the data has shown an increase for Boston City from 2009. In particular, Boston City has a higher number of level one and level three fragile workers compared to the Metro region even after taking into consideration the weight variables.

Boston's economy reflects the concerns of sociologists and labor economists who study the issue of fragilization and precarious work in the economy: work, for a larger proportion of people, is becoming lower quality in nature, even as the numbers of worker occupants in these jobs grows. In addition, the severity of fragile work indicates that a large proportion of fragile workers are finding their situation grimmer, with little benefits or income, as well as work that is only filling a few hours a day, rather than building their resumes with full days of work experience. This is reflected in the increasing proportion of people who have one or two characteristics of fragile workers.

These shifts have impacts for all levels of government: as jobs with livable incomes and benefits occupy a smaller proportion of the Boston economy, a larger proportion of Boston's growing population may seek government services and assistance to maintain themselves. While metropolitan Boston has not been impacted as much as the city, many of these negative trends are region-wide, and will likely impact government programs and intergovernmental relationships over the upcoming years as the region is forced to address increasing problems with the quality of the jobs created in the area. Many issues regarding benefits and income are also impacting workers who are working full time, as a lower proportion of full-time workers receive employer sponsored health care through their employers. However, the increase in part-time work is the most severe of all the gains across characteristics of fragility. The growth in part-time

work may indicate an economy-wide shift toward flexible work, which could be quickly eliminated in the instance of recession. This plausible trend could bode ill in the future if firms quickly cut part-time employees during future recession, leading these workers to increased reliance on governmental units or charities for assistance.

This study creates a number of additional questions regarding the dynamics of why and how this fragilization is occurring, particularly in a region known for booming startup growth and innovation, education, and a reasonable unemployment rate. A more in-depth look should review the type of work fragile workers are engaging in, and specifically what types of industries are contributing to the creation of low-quality, unlivable work. Drivers of reduced benefits and wages could be a result of falling unionization rates, a largely nationwide trend, or perhaps a growth in the types of industries that have historically not had unions. Increasing freelance work may also be a contributor to increase fragilization of work, particularly in the context of Boston's creative economy. Regardless, the increasing rise of an increasingly precarious workforce may threaten the lives of hundreds of thousands of Boston workers, and contribute to Boston's yawning gap between the area's high-income workers with durable livelihoods, and those whose fragile welfare could shatter with future economic turbulence. However, there are reasons to be optimistic, the foremost being that all characteristics of fragility are factors that, if there is sufficient political will, can be legislated out of existence.

Moreover, we conclude that such fragility studies must be conducted all across the United States so that we get a better idea of what the average level of fragility is in the country and in the specific regions. Putting this number in the larger context by comparing Boston's level of fragility to that in other places will be essential for policy formulation.

Appendix 1:

Area Codes for Boston Metro Area (CPS and ACS Datasets):

IPUMS-CPS data has an area code “1124” for Boston Metropolitan area. ACS PUMS data define Public Use Microdata Areas (PUMAs) for geographic areas. The reference codes of PUMAs changed in 2010, which affects ACS annual data from 2012 to 2014. Boston Metro contains the following 2000 PUMAs: 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 2400, 2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200, 3301, 3302, 3303, 3304, 3305, 3400, 3500, 3600, 3700, 3800, 3900, 4000, 4100, 4200, and 4600. For 2010 PUMAs, Boston Metro is defined to include the following: 303, 304, 400, 501, 502, 503, 504, 505, 506, 507, 508, 701, 702, 703, 704, 1000, 1300, 1400, 2400, 2800, 3301, 3302, 3303, 3304, 3305, 3306, 3400, 3500, 3601, 3602, 3603, 3900, 4000, 4303, 4901, 4902, and 4903. ACS PUMS data for Boston City contains the following PUMAs both in 2000 and 2010: 3301, 3302, 3303, 3304, and 3305.

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