

Employer-sponsored Health Insurance and the Gender Wage Gap: Evidence from the Employer Mandate

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Abstract

In the United States, female workers tend to have higher medical expenditures than male workers. Due to experience rated premiums, the cost of providing employer-sponsored health insurance (ESI) therefore differs by gender. This paper examines if that cost difference contributes to the gender wage gap. Identification comes from the exogenous variation provided by the Affordable Care Act's employer mandate. Estimation uses a difference-in-difference framework with data from the Medical Expenditure Panel Survey. Findings suggest the portion of the gender wage gap attributable to ESI is smaller than existing estimates in the literature and is statistically no different to zero once individual medical expenses are included as a control. In addition, the paper's empirical approach highlights that existing work on the role of ESI in the gender wage gap does not separately identify the effect of ESI from plausible alternatives.

1 Introduction

This paper asks if employer-sponsored health insurance (ESI) contributes to the gender wage gap in the United States? ESI could cause some portion of the wage gap because the cost of ESI (for firms) is a function of employees' actual medical expenditures and females tend to have higher medical expenditures.¹ ESI therefore creates a cost wedge between males and females because employee contributions towards ESI cannot legally vary by gender.²

The cost wedge is not trivial. Cylus et al. (2011) found that annual health care spending in 2004 was 32 percent more for females than for males. Cylus et al. explain that females spend more per

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¹The full cost of ESI is pushed onto firms either via experience rating (premiums reflect the actual expenditures of employees) or self-insurance.

²The Health Insurance Portability and Accountability Act (HIPAA) forbids discriminatory distinctions in benefit generosity and employee contributions. See <https://www.shrm.org/resourcesandtools/tools-and-samples/hr-qa/pages/offeringdifferentbenefitsfordifferentemployees.aspx>.

capita than males across all payers and services. The difference is also not solely related to child-bearing with “significant variations in per person spending by gender across age groups.” Bertakis et al. (2000), Woolhandler and Himmelstein (2007), and Bertakis and Azari (2010) also report that female medical expenditures tend to be higher than males. Bertakis and her coauthors find that a large part of the difference is due to frequency of primary care visits and use of diagnostic services. In the 2006 to 2014 Medical Expenditure Panel Survey (MEPS) data used in this paper annual medical expenditures (for respondents aged 18-64 and employed) were \$3,388 for females and \$2,272 for males.

Given these medical expenditure differences, employers who offer ESI should prefer (at the margin) to hire males unless female wages are free to adjust to account for the cost of ESI.³ However, Daneshvary and Clauretje (2007), using spousal job characteristics as an IV, find little evidence to suggest that females receive lower wages than males due to ESI. Cowan and Schwab (2016) reach the opposite conclusion. They use a difference-in-difference empirical strategy that compares wage gaps between males and females at firms that do and do not offer ESI. Their estimates suggest that hourly wages are \$0.50 to \$1.50 larger for males when ESI is offered. Even though firms that do and do not offer ESI are surely different, these estimates have a causal interpretation if the identifying assumption - that unobserved effects on wages are the same for males and females - is valid.⁴

This paper makes three related contributions. First, by subjecting their empirical strategy to a series of falsification tests, the paper shows that Cowan and Schwab’s identifying assumption does not hold. That is, there are differences between firms that do and do not offer ESI that tend to increase wage gaps between workers for reasons that are unrelated to ESI. Then, the paper uses exogenous variation provided by the Affordable Care Act’s (ACA) employer mandate to obtain improved identification. Because the employer mandate required all firms with more than 50 employees to offer coverage from 2014 onward, it creates a natural experiment to test if females are paid less due to employers having to offer ESI. Using the employer mandate for identification avoids comparisons across firms who do and do not offer ESI.

³ESI is just one of many potential causes of the observed gender wage gap, for more on other causes see Waldfogel (1998), Altonji and Blank (1999), Blau and Kahn (2000), Mulligan and Rubinstein (2008), Manning and Saidi (2010), Bertrand et al. (2010), or Goldin (2014)

⁴Cowan and Schwab’s general empirical strategy is borrowed from Bhattacharya and Bundorf (2009), who examine how ESI affects obese workers’ wages.

Lastly, because MEPS contains data on individual medical expenditures, this paper's empirical approach can test if males and females who have similar medical expenses face similar labor market outcomes. This is an important extension to the literature because, even if females are paid less when ESI is offered, it is not clear the causal relationship is between gender and wages or between individual medical expenditures and wages. In either case average female wages will be lower due to ESI. However, one would reflect a relationship between gender and wage outcomes where the cost of ESI is shared among females at the group level while the other implies a potentially efficient system of wages and benefits tailored to the individual regardless of gender. The difference is subtle but important for understanding policy implications. It could be that females who have low medical expenditures will be statistically-discriminated against because of the higher expenditures of other females. In such a situation it would be easy to make a case for a policy response to "level the playing field." On the other hand, if males and females with similar medical expenses face similar reductions in wages, then market forces are at work: males and females with larger medical expenditures are paid relatively lower wages.

A limitation of this paper's approach is that relying on the employer mandate for identification ensures that the paper's estimates reflect anticipatory effects. Employers were informed of the mandate in early 2010 and, because they cost more to cover, theory predicts that forward-looking employers would reduce their demand for females in the lead up to implementation - employing fewer females, paying females a lower wage, or both. A forward-looking approach is appropriate because employment is an ongoing relationship. Moreover, while the mandate did not bite until 2014, the cost of coverage was to be based on employee characteristics during 2013.⁵ For this reason, firms seeking to minimize the cost of compliance with the mandate would have had to react prior to 2013. Garrett and Kaestner (2015), Mathur et al. (2016), and Even and MacPherson (2018) also search for anticipatory responses to the employer mandate. They examine if the employer mandate caused an increase in part-time employment because it applied only to employees who work more than 29 hours per week. Garrett and Kaestner and Mathur et al. find little effect on

⁵In February 2014, penalties for non-compliance were postponed until 2015 for firms with more than 100 employees and to 2016 for firms with fewer than 100 employees. The estimates presented in the paper include data from 2014 because the announcement of the delay was made two months after the supposed implementation date muting its potential impact on employment decisions. Estimates differ only mildly when excluding 2014. In any case, delays and uncertainty surrounding the employer mandate would tend to work against finding significant effects.

part-time employment levels. On the other hand, Even and MacPherson's work suggests that about 700,000 workers are in involuntary part-time employment due to the ACA's passage.⁶

An advantage of focusing on anticipatory effects is that it avoids having to consider other ACA provisions which might affect labor market outcomes after 2014. The most obvious of these would be the ACA's health insurance exchanges. These exchanges provide affordable coverage options outside of employment. Examining the period after 2014 could cloud identification if these exchanges or other ACA provisions affected self-employment patterns, job search efforts, or alleviated health coverage-related job lock differently for male and female workers (see Lennon, 2017 for more on this).

As a preview of the paper's findings, for employees who work at firms that are affected by the mandate, estimates suggest male employees earn around \$1.59 more per hour than females in the years after the mandate is announced. That is, after employers are informed that they must provide ESI to workers, the wage gap between males and females increases significantly. The effect is caused by the employer mandate if nothing else affected the wage gap between males and females after 2010, such as general labor market trends. Adding support to a causal interpretation, robustness checks show that the gender wage gap is not increasing during this time period at firms who are unaffected by the mandate.

In addition, individual medical expenditures appear to be important. The estimated effect of ESI on the gender wage gap decreases to \$1.18 per hour and is no longer statistically different from zero when controls for medical expenditures at the individual level are included. The effect of individual medical expenses is estimated to be a \$0.16 reduction in hourly wages for each unit difference in log medical expenditures and is significant at the 1% level. If a full-time worker works about 2,000 hours per year, a \$0.16 per hour effect amounts to just a \$320 difference in annual wages for a log unit difference in medical expenditures (roughly a doubling of medical expenditures, for example: \$2,000 versus \$1,000). However, estimating the level and robustness of medical expenditure pass-through at the individual level is not a goal of this paper.

Instead, the paper has two goals. The first is to show that identifying the effects of employment benefits on various groups by examining wage gaps across firms that do and do not offer those benefits, an approach taken by several authors, is a questionable empirical strategy. The paper

⁶Even and MacPherson's work also extends beyond the 2014 implementation date.

accomplishes this goal by showing that the approach gives estimates that are the wrong sign for several groups with differences in medical expenditures. The paper then improves upon those estimates using the employer mandate as an alternate source of identification.

The second goal is to show that it is not clear that employers pay groups who tend to have higher medical expenditures lower wages due to ESI. To illustrate this claim, the paper shows that higher individual medical expenditures are associated with lower wages, regardless of gender, after the mandate is announced. This finding cannot be related to changes in productivity or reduced absenteeism due to improved health because the mandate does not alter the current productivity or health of MEPS respondents. The claim is not that employers are able to determine the expected medical expenditures of every individual precisely. An insurance company could not do that for individual customers, either. Instead, the claim is that employers appear to be able to infer enough about workers to broadly determine which of them have higher medical expenditures even after considering the modifying effects of gender, race, age, and other observable characteristics on expected medical expenditures.

The paper proceeds with a brief review of the relevant literature and how this paper contributes in Section 2. Section 3 explains the data used in this paper and the estimation strategy used to produce the estimates in Section 4. Section 5 examines the robustness of those estimates. Section 6 concludes.

2 Background and Literature

Passed in 2010, the Affordable Care Act contained an “employer mandate” requiring employers with more than 50 full-time equivalent employees to provide ESI to full time workers (those who work over 29 hours in a usual week) from January 1, 2014.⁷ While over 80% of MEPS respondents who work at a firm with more than 50 employees were already offered ESI, many employees could have expected to gain ESI coverage due to the mandate. However, economic theory predicts that those workers, rather than their employers, will bear the costs of that coverage.⁸

⁷The enforcement of this provision was later delayed to 2015 for firms with 100 or more employees and to 2016 for firms with between 50 and 100 employees. Firms were informed of the delay in February of 2014.

⁸Employers who did not comply would have to pay an “Employer Shared Responsibility Payment” of \$2,000 per employee (employers could exclude 30 full-time employees from the penalty calculation). Given wages can be adjusted

More formally, following Bhattacharya and Bundorf (2009) and Lennon (2018), in a competitive labor market where wages are the only form of compensation, the equilibrium wage of worker i , w_i , should equal the value of the worker's marginal product (MRP_i). If health insurance is mandated as an employment benefit, a competitive labor market would require wages to be modified to account for the new cost of coverage. Suppose a worker with medical expenditures e_i adds premium p_{ik} to firm k 's ESI costs. For simplicity, assume premiums are actuarially fair so that $p_{ik} = e_i$. An employer could choose to pool these costs across their N employees so that wages for worker i at firm k are

$$w_{ik} = MRP_{ik} - \bar{p}_k.$$

In such a case, wages are equal to the value of marginal product minus the firm-level average cost of providing coverage \bar{p}_k where $\bar{p}_k = \frac{1}{N} \sum_{i=1}^N e_i = \frac{1}{N} \sum_{i=1}^N p_{ik}$. However, this leaves arbitrage opportunities open for workers and firms. For that reason, the literature has supposed that a firm's N employees can be partitioned into $j \leq N$ subgroups. Let each of the subgroups be denoted as n_j . For $i \in n_j$, then equilibrium wages (excusing the abuse of notation) would be

$$w_{ijk} = MRP_{ijk} - \frac{1}{n_j} \sum_{i=1}^{n_j} p_{ijk} = MRP_{ijk} - \bar{p}_{jk}.$$

In such a case, the wages of each member of each group would be adjusted by the average medical expenditures of the group (\bar{p}_{jk}). This is potentially an equilibrium if the costs of searching for profitable deviations exceed the benefits.⁹

Given the theoretical predictions, Summers (1989) called for research into the empirical regularities of employment benefits such as ESI. Summers was particularly concerned that wage adjustments may not be feasible and that mandated benefits might therefore exclude certain workers from employment. In response, authors such as Gruber (1993), Sheiner (1999), Jensen and Morrisey (2001), Lahey (2012), and Bailey (2014) have found evidence that groups with higher medical expenditures experience lower wages, reduced employment levels, or both.

(workers value the coverage) and the tax treatment of employee medical expenditures, it would make little sense not to comply with the mandate.

⁹Of course, examining static equilibrium outcomes cannot capture the variety of dynamic adjustments required to achieve them. Indeed, there is no obvious reason for "firms" to exist in the framework presented here. A more general model including labor market frictions, heterogeneous workers, firm characteristics and size as choice variables, and so on, is beyond the scope of the paper.

Most relevant to this paper, Daneshvary and Clauretje (2007) were the first to report how ESI might contribute to the gender wage gap. Their empirical strategy uses 2001 MEPS data along with spouse's firm size and the presence of family insurance coverage as instrumental variables. In contrast to theoretical predictions, their estimates suggest that "[h]ealth insurance does not contribute to the unexplained portion of the gender pay gap." However, Daneshvary and Clauretje's work focused on the general challenges faced when estimating the trade off between wages and ESI. Estimating how ESI affects the gender wage gap was not the main goal of the paper.

Futhermore, Cowan and Schwab (2016) note that Daneshvary and Clauretje's approach is not ideal: "instruments for health insurance of the type used in Daneshvary and Clauretje (2007) are likely to be endogenous." To try to resolve these endogeneity problems they take a difference-in-difference approach: comparing male-female wage gaps at firms with and without ESI. Based upon NLSY79 and MEPS data from 2002 to 2008 their estimates suggest that the gender wage gap is larger by between \$0.50 and \$1.50 per hour when ESI is offered. However, violating Cowan and Schwab's identifying assumption, there are differences between firms that do and do not offer ESI which could be expected to magnify existing wage differences between groups. One example is firm size (as measured by number of employees).¹⁰ This confounds identification because firm size has been shown to increase the earnings of similarly productive workers (see Oi and Idson, 1999). If females have unobservable differences in productivity then the gender wage gap will be magnified at larger firms for reasons that are unrelated to ESI.¹¹ The problem is that ESI is much more common in larger firms ensuring that wage gaps at ESI and non-ESI firms likely differ due to both the cost of ESI and differences in firm size.¹²

Because ESI is correlated with other firm characteristics, the ideal source of identification is an exogenous change in the provision of ESI while holding firm characteristics constant. This would allow the researcher to isolate the effect of ESI from other confounding differences on the firm's demand for labor (and, in turn, on wages). The Affordable Care Act's employer mandate provides such a source of identification. Conveniently for this paper, the mandate also creates two "control"

¹⁰In their estimates, Cowan and Schwab control for firm size but do not do so differentially by gender. See footnotes to Table 3 in their paper (pp. 108).

¹¹Note that this claim does not require that females are less able.

¹²In the 2006 to 2014 MEPS data used in this paper, 23% of men who do not have ESI work at firms with more than 50 employees. In contrast, 55% of men who have ESI work at firms with more than 50 employees. In addition, the average hourly wage at firms with 50 or fewer employees is \$17.18 but \$23.24 at firms with more than 50 employees.

groups who either (1) already receive coverage from their employer or (2) are not covered by the Act's provisions. The next section describes the data and estimating equation used to estimate the effects of interest.

3 Empirical Framework

3.1 Data and Sample Selection

The empirical analysis in this paper relies on data from the 2006-2014 Medical Expenditure Panel Survey. The Agency for Healthcare Research and Quality describes the MEPS as “a set of large-scale surveys of families and individuals, their medical providers, and employers across the United States.”¹³ The household component of the survey uses a revolving cohort design. A new cohort joins the survey each calendar year and stays in the sample for two years. Each survey respondent completes five interviews across that time which collect data on health care usage, out of pocket costs, and insurance coverage, along with demographic and employment information. As many variables are reported only as an annual figure, the paper focuses on the end-of-year interviews. Relevant summary statistics for males and females working at firms who do and do not offer coverage, are presented in Table 1.¹⁴

Conveniently, MEPS can be used to construct a sub-sample of respondents who must receive coverage due to the employer mandate: respondents who work at firms with more than 50 employees and are not already offered ESI by their employer. The analysis in this paper focuses on what happens to the relative wages of males and females in that sub-sample given they must be provided ESI in the near future. Note that it is not possible to create a sub-sample which identifies every MEPS respondent who will receive coverage due to the mandate. This is because MEPS does not directly ask about total employee numbers at a respondent's work. Instead, the survey asks (1) how many employees work at your work location and (2) how many locations does your employer have? This creates ambiguity for respondents who report fewer than 50 employees at their location

¹³See <http://meps.ahrq.gov/mepsweb/>.

¹⁴The data description in this section borrows liberally from Lennon (2017).

Table 1: Selected Summary Statistics by Gender, ESI, and Time Period from MEPS 2006-2014

2006-2010	All	N=57,353	Males (no ESI)	N=13,609	Males (ESI)	N=17,655	Females (no ESI)	N=14,368	Females (ESI)	N=15,673
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Hourly Wages										
All	20.72	14.36	16.46	12.31	26.93	16.25	14.57	10.47	22.25	13.24
White	20.89	14.48	16.48	12.14	27.26	16.30	14.66	10.63	22.62	13.38
Black	18.02	11.66	14.77	10.10	22.36	13.08	13.08	8.68	19.80	11.40
High School (or less)	14.72	8.28	13.46	7.92	19.45	9.35	10.97	5.57	15.50	7.34
College (or more)	26.26	16.41	22.45	16.59	32.19	17.90	19.03	13.07	25.98	14.25
Female	0.5									
Holds ESI from Employer	0.55									
Female × Holds Coverage	0.53									
Offered ESI from Employer	0.68		0.1				0.15			
Female × Offered Coverage	0.68									
White	0.75		0.79		0.76		0.75		0.7	
Black	0.16		0.13		0.14		0.17		0.21	
Married	0.59		0.6		0.67		0.58		0.52	
Age	41.24	11.78	39.57	12.28	42.66	11.17	40.16	12.06	43.01	11.26
High School or Less	0.47		0.61		0.41		0.53		0.36	
More than High School	0.42		0.32		0.45		0.39		0.89	
More than College	0.11		0.07		0.14		0.08		0.15	
Employer Size 0-49	0.54		0.77		0.45		0.69		0.42	
Employer Size 50-99	0.12		0.08		0.12		0.11		0.13	
Employer Size 100-199	0.59		0.04		0.07		0.04		0.07	
Employer Size 200-299	0.1		0.05		0.12		0.07		0.12	
Employer Size 300-399	0.02		0.01		0.03		0.01		0.03	
Employer Size 400+	0.17		0.06		0.22		0.08		0.24	
Annual Medical Exp.										
All	2926.83	8536.95	1735.19	6835.16	2756.57	9723.37	2939.13	7657.41	4062.97	9063.03
White	3026.75	8611.22	1772.07	6650.01	2936.24	10016.05	3069.84	7786.23	4234.61	9121.75
Black	2769.99	8662.61	1651.71	8438.52	2280.13	8374.98	2508.82	7369.32	3831.00	9455.90
High School (or less)	2329.59	7884.18	1313.97	6657.08	2402.59	8409.10	2397.55	7599.17	3555.67	9452.42
College or more	3476.00	9067.81	2415.58	7036.15	3019.41	10582.37	3579.12	7712.59	4359.62	8837.22
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2011-2014	All	N=49,529	Males (no ESI)	N=12,792	Males (ESI)	N=14,385	Females (no ESI)	N=13,111	Females (ESI)	N=12,836
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Hourly Wage										
All	19.75	13.74	15.47	11.18	25.95	15.52	13.79	9.92	22.46	13.22
White	19.72	13.64	15.31	10.65	25.95	15.40	13.85	9.91	22.73	13.29
Black	17.38	11.54	14.15	10.14	22.15	13.06	12.26	7.55	20.23	11.70
High School (or less)	13.82	7.60	12.60	6.25	18.48	9.08	10.32	4.67	15.38	7.84
College (or more)	24.18	15.50	19.90	15.01	30.20	16.76	17.05	12.17	25.38	13.87
Female	0.49									
Holds ESI from Employer	0.51									
Female × Holds Coverage	0.49									
Offered ESI from Employer	0.65									
Female × Offered Coverage	0.65									
White	0.7		0.75		0.72		0.7		0.66	
Black	0.18		0.16		0.16		0.19		0.22	
Married	0.54		0.52		0.62		0.5		0.49	
Age	40.98	12.03	39.38	12.38	42.87	11.4	39.27	12.22	43.34	11.47
High School or Less	0.42		0.56		0.37		0.47		0.3	
More than High School	0.48		0.38		0.5		0.47		0.55	
More than College	0.1		0.06		0.13		0.07		0.15	
Employer Size 0-49	0.56		0.76		0.46		0.7		0.43	
Employer Size 50-99	0.12		0.08		0.12		0.11		0.13	
Employer Size 100-199	0.06		0.04		0.07		0.04		0.07	
Employer Size 200-299	0.1		0.05		0.11		0.07		0.12	
Employer Size 300-399	0.02		0.01		0.03		0.01		0.03	
Employer Size 400+	0.15		0.05		0.2		0.07		0.21	
Annual Medical Exp.										
All	2802.57	9602.28	1648.62	7037.78	2731.69	10587.73	2725.64	9234.81	3986.53	10255.21
White	2940.09	9872.77	1700.40	7276.17	2895.40	10381.15	2917.31	10277.68	4303.35	10544.41
Black	2626.91	9916.06	1441.58	6162.28	2531.95	13732.09	2330.54	5948.46	3576.42	10447.68
High School (or less)	2060.11	8184.70	1225.80	5765.44	2494.48	11355.77	2003.04	7309.38	2943.66	7177.52
College (or more)	3359.82	10508.63	2225.17	8435.81	2881.37	10137.74	3383.39	10643.84	4430.92	11280.67

Summary statistics are split into two time periods 2006-2010 and 2011-2014 because of the use of the ACA's mandate on coverage passed in 2010 for identification later in the paper. The statistics are based on the MEPS sample aged 18-64 from 2006 to 2014 as noted. The number of observations refers to the number of observations for which hourly wages was reported. As such, the sample only considers those who report that they worked for a wage during the survey period.

but also that their employer has more than one location. To avoid any potential bias, the estimation sample includes only respondents who work at firms who are certainly affected by the mandate.¹⁵

In addition, those under 27 are excluded from the estimates because the ACA's dependent coverage mandate affected younger workers' labor supply (see Antwi et al., 2013, Depew, 2015, Hahn and Yang, 2016, and Goda et al., 2016). Workers aged 60 and over are also excluded because they could be expected to retire prior to or very shortly after the mandate's implementation.

Lastly, the paper's main estimates focus on the first end-of-year interviews for Panels 11 through 19 of the MEPS covering from the end of 2006 to the end of 2014. Pooling the sample and ignoring the panel nature of the data is indicated to be problematic by a Breusch-Pagan Lagrange multiplier test. Moreover, Hausman tests indicate a fixed rather than random effects estimation would be appropriate. However, a fixed effects approach cannot be used to study the effect of gender as it is invariant in the data. For this reason, the data is treated as a repeated cross-section by dropping the second interview with each respondent. As wages and employment do not change markedly between each year for many respondents, repeating the analysis with only those dropped observations produces almost identical findings.

3.2 Estimation

The paper uses the MEPS data described above in a difference-in-difference framework to estimate the effect of ESI on the wages of male and female MEPS respondents who are employed at firms affected by the employer mandate. The estimating equation is of the following form;

$$HourlyWage_{it} = \beta_0 + \beta_1 Gender_{it} + \beta_2 AfterACA_{it} + \beta_3 AfterACA_{it} \times Gender_{it} + \Pi X_{it} + \epsilon_{it}$$

In the equation, $HourlyWage_{it}$ is the hourly wage of person i at time t . The gender dummy ($Gender_{it}$) controls for the general relationship between wages and gender across the sample period. In all estimates $Gender_{it} = 1$ for males, therefore a positive coefficient indicates male wages are greater than female wages. The $AfterACA_{it}$ term controls for changes in wages that affect males

¹⁵In the eight years of data used in the paper, 40,418 respondents report working at a firm that has fewer than 50 employees. Of these, 7,562 report that there are fewer than 50 employees at their work location, the employer has more than one business location, and that they are not already offered health coverage by their employer. It is not possible to know which of those 7,562 workers belong in the sample and which do not and therefore they are all excluded from the analysis.

and females similarly in the years after the ACA was announced. In the estimates presented, $AfterACA = 1$ for 2011 and subsequent years because the ACA was not announced until three months into 2010. If firms were able to react to the ACA more swiftly, then the estimates presented are a lower bound on the true effects. The coefficient on the interaction term gives a measure of how wages change differently by gender after the ACA is announced. If nothing else affects the wages of males and females differently after the ACA was announced, then the estimated coefficient has a causal interpretation. The estimating equation is completed by allowing for a set of typical demographic controls X_{it} such as age, sex, education, marital status, race, location, and industry.

This approach avoids comparing wage differences across firms that differ in a myriad of ways in addition to ESI. To illustrate the importance of this difference, the paper also replicates and updates Cowan and Schwab's analysis. Cowan and Schwab's estimating equation is;

$$HourlyWage_{it} = \beta_0 + \beta_1 Gender_{it} + \beta_2 ESI_{it} + \beta_3 ESI_{it} \times Gender_{it} + \Pi X_{it} + \epsilon_{it}$$

Here, the only difference is an ESI dummy rather than a time ($AfterACA$) dummy. The ESI term captures any changes which affect all workers equally at firms that offer ESI. The co-efficient on the interaction of the gender and ESI terms in the estimating equation gives a measure of the effect of ESI on wages as a function of gender, if the identifying assumption holds. However, if whatever is driving the gender wage gap (discrimination, unobservable differences in productivity, and so on) is also a function of firm characteristics that are correlated with ESI then identification becomes clouded. In such a case, a difference-in-difference estimation of the effect of ESI and gender on wages will partly reflect a mechanical association that is not *caused* by ESI.

The next section begins with a replication of the approach taken by Cowan and Schwab. Then, a series of falsification tests and new estimates using the ACA's employer mandate illustrate how and why the mandate improves identification.

4 Empirical Findings

4.1 Estimates Using Firms With and Without ESI

The first two columns in Table 2 are a replication of Cowan and Schwab’s main findings with and without demographic, location, and industry controls. Throughout the paper, the coefficients of interest are presented both with and without controls to add context and provide confidence that the observed effects are robust and not due to careful choice of specification. The estimates use 2006-2014 MEPS data in combination with the difference-in-difference estimating equation laid out in Section 3. The dependent variable is hourly wages in each specification. The interaction term “Offered ESI \times Male” suggests that males experience relatively higher wages when employed at firms who offer ESI. That is, as Cowan and Schwab found, the gender wage gap tends to be larger when ESI is offered. Strictly speaking, Cowan and Schwab use “holds coverage.” MEPS asks respondents if they are offered ESI and whether or not they take that coverage but estimates change little using one or the other as take-up is 85-90% (see Table 1). The estimates in this paper use “offered coverage” for two reasons. One, the employer mandate requires firms to *offer* coverage, workers don’t have to take the offer. Two, employees who do not accept the offer of coverage at time t are usually free to do so at time $s > t$.

In the second pair of estimates (columns three and four) the estimating equation is altered slightly. It substitutes a continuous measure of firm size (in hundreds of employees) for the dummy for ESI. The third column represents estimates without demographic, location, and industry controls while the fourth column includes a complete set of controls. In that fourth column, the term “Male \times Employees” shows that for every one hundred employees hourly wages increase \$1.10 per hour for all workers and by an additional \$0.15 for men. It is hard to explain these findings without suggesting firm size and productivity are related.¹⁶ As ESI is typically offered at all larger firms it is not clear that ESI is the *cause* of Cowan and Schwab’s findings. Note that this paper is not attempting to explain away Cowan and Schwab’s findings via firm size. The paper is agnostic about the source of firm size-related wage differences. The value of the exercise is that it shows that ESI is only one of potentially many *different* determinants of wages for workers at firms with ESI compared to those without ESI.

¹⁶This is a common finding, again, see Oi and Idson (1999).

Table 2: Replication of Cowan and Schwab's Main Findings, MEPS 2006-2014 Data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage
Offered ESI	9.643*** (0.159)	4.638*** (0.158)			8.065*** (0.258)	3.608*** (0.248)	5.776*** (0.118)	3.595*** (0.133)
Male	1.807*** (0.168)	2.330*** (0.174)	3.084*** (0.168)	3.601*** (0.156)		3.428*** (0.136)		3.403*** (0.136)
Offered ESI × Male	2.363*** (0.248)	1.776*** (0.225)						
Employees (100's)			1.843*** (0.0559)	1.096*** (0.0499)				
Male × Employees			0.404*** (0.0874)	0.151** (0.0746)				
Caucasian					0.999*** (0.211)	-0.111 (0.214)		
Offered ESI × Caucasian					3.127*** (0.297)	2.287*** (0.272)		
College Educated							4.574*** (0.196)	4.477*** (0.189)
Offered ESI × College							6.386*** (0.250)	5.537*** (0.238)
Observations	38,438	38,243	38,438	38,243	34,357	34,195	38,438	38,438
Demographic Controls	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effect	No	Yes	No	Yes	No	Yes	No	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Size	No	Yes	No	Yes	No	Yes	No	Yes
Region Fixed Effect	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All dollar amounts were adjusted to 2014 dollars using the CPI (www.bls.gov). Controls include gender, marital status, age (cubic), race, location, industry, and education as appropriate given the co-efficient of interest in the specification.

Cowan and Schwab consider that “it is possible that the provision of ESI is correlated with other job characteristics that lead to a larger female wage gap in those firms that provide it than in firms that do not.” They examine how female wages respond to other employment benefits as a check on that theory.¹⁷ They focus on benefits that are not generally costlier by gender and find no association between gender and wages as a function of those benefits. If Cowan and Schwab were to find such a relationship then it would suggest that other differences between firms that offer fringe benefits and those that don't are driving their results. However, each of their estimates also controls for ESI and its interaction with gender. If ESI is generally offered by firms who offer other employment benefits, it becomes difficult to separate the effects. That is, the estimated effect of other employment benefits on female wages could be larger and statistically significant if the ESI terms were eliminated from the estimates. If so, and because these benefits are not costlier by gender, that would leave two possibilities. One, these other benefits are proxying for the presence of ESI and the effect that ESI has on female wages. Alternatively, these benefits are only offered at

¹⁷Other benefits in the NLSY79 data included training programs, profit sharing, retirement plans, childcare, dental insurance, flexible work schedules, life insurance, and parental (not maternity) leave.

firms where differences in wages between males and females are already large for other reasons. In either case, the falsification exercise cannot do what Cowan and Schwab are asking it to do.

Additionally, Cowan and Schwab's empirical strategy can be directly tested by appealing to other groups of workers with differences in wages and medical expenditures. In Table 1, the 2006-2014 MEPS data suggests that white workers are paid more per hour than black workers but medical expenditures are slightly lower for blacks.¹⁸ If ESI causes the gender wage gap to widen, then ESI should reduce or at least not exacerbate the black-white wage gap. The estimates from an exercise to test this claim are presented in the fifth (no controls) and sixth columns (including controls) of Table 2.¹⁹ The prediction would be that firms with ESI should have a slightly smaller black-white wage gap. However, estimates show that the gap in hourly wages is \$2.28 larger at firms with ESI.

Similarly, college graduates have both higher medical expenditures (see Table 1) *and* higher wages than non-graduates.²⁰ This means that ESI should be associated with relatively lower wages for college-educated employees if Cowan and Schwab's approach to identification is correct. Instead, in columns seven (no controls) and eight (including controls), the estimates show that ESI is associated with larger wages for those with a college degree.

The same basic analysis using any two groups that tend to have different wages (young versus old workers, married versus single workers, and so on) finds that ESI is associated with larger wage differences between the two groups regardless of medical expenditures across the groups. Note that this does not imply that ESI has no effect on wages. It suggests only that other characteristics of firms that offer ESI have a significant role in wage determination. To obtain clean identification, an exogenous change in ESI status is required that keeps other firm characteristics constant. This is precisely what the ACA's employer mandate does. By requiring employers to provide ESI it forces employers to consider the medical expenditures of their employee pool and to economize along this new dimension as they see fit.

¹⁸White and black workers have a well-established wage gap - see citeAltonji1999 for an overview.

¹⁹The sample is restricted only to whites and blacks for these estimates.

²⁰For more on the college wage premium see Goldin and Katz (2007).

4.2 Estimates Using Employer Mandate for Identification

Table 3 reports estimates of the ESI-related gender wage gap using the ACA's employer mandate for identification. Instead of comparing the gender wage gap at firms that do and do not offer ESI, the estimates in Table 3 examine how the wage gap between males and females changes after the ACA is announced for workers affected by the mandate. Panel A of Table 3 reports the findings based upon the MEPS sub-sample of respondents who are not already offered ESI who report working at a firm with more than 50 employees. These are the main estimates of interest. If males are less costly to cover, then male wages at firms who must provide ESI due to the mandate should increase relative to females.

The estimates in the first two columns of Panel A show the gender wage gap increases at firms who must provide coverage due to the employer mandate in the years after the ACA was announced. The \$1.59 effect is statistically significant at the 5% level in the specification with a full set of controls in column two. The effect is causal if nothing else effects the wages of males and females differently at these firms after 2010. Given the estimates presented are in 2014 dollars, the size of the estimates align reasonably well with the \$.50-\$1.50 range Cowan and Schwab suggest (which were in 2002 dollars). Using the CPI (www.bls.gov) to convert from 2002 to 2014, Cowan and Schwab's estimates would be \$0.66-\$1.97.

In estimates not presented here, the observed effect on the gender wage gap increases to \$2.01 but is no longer statistically significant from zero when the sample is restricted to recent hires (those who report tenure less than 2 years when responding to MEPS). This suggests that a large portion but not all of the increase in the gender wage gap at affected firms is happening via changes in wages paid to recent hires. However, the sample is too small to be effectively stratified by tenure. Restricting to tenure of no more than two years leaves fewer than 300 observations in total across the four "After ACA" years (2011, 2012, 2013, and 2014).

The estimates presented help to resolve concerns with the existing literature on this topic but do not address the important question of group versus individual level effects. In column three of Panel A of Table 3, the estimation in column two is repeated but adds a control for medical expenditures at the individual level and its interaction with the passage of the ACA's mandate.²¹ In

²¹ Again, observations from 2011 and onward are considered post-ACA as many employment and salary decisions were already in place for 2010 before the ACA was announced.

Table 3: Estimates of ESI-induced Gender Wage Gap, ACA Mandate, MEPS 2006-2014 Data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A - MEPS Respondents without ESI	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage
After ACA (Post 2010)	-2.667*** (0.876)	10.15 (9.643)	11.63 (9.682)	-1.439 (1.022)	12.28 (9.793)	-1.572** (0.787)	12.69 (9.803)
Male	0.300 (0.589)	0.803 (0.590)	1.289** (0.602)		1.521*** (0.403)		1.813*** (0.404)
ACA × Male	1.077 (0.777)	1.593** (0.776)	1.175 (0.791)				
Log Medical Expenditure			0.191*** (0.0469)				
ACA × Med. Exp.			-0.162*** (0.0619)				
Caucasian				1.851*** (0.595)	0.820 (0.578)		
ACA × Caucasian				-0.910 (0.803)	-1.072 (0.814)		
College Educated						7.217*** (0.629)	6.406*** (0.614)
ACA × College Educated						-2.130*** (0.820)	-1.827** (0.787)
Observations	2,738	2,722	2,722	2,533	2,518	2,738	2,738
Panel B - MEPS Respondents with ESI	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage
After ACA (Post 2010)	-0.972* (0.546)	8.149 (8.182)	9.001 (8.163)	-1.256* (0.642)	7.220 (8.443)	-1.647*** (0.469)	4.524 (8.633)
Male	4.561*** (0.329)	4.019*** (0.300)	4.316*** (0.307)		3.715*** (0.227)		4.245*** (0.230)
ACA × Male	-1.011** (0.476)	-0.521 (0.434)	-0.550 (0.442)				
Log Medical Expenditure			0.197*** (0.0319)				
ACA × Med. Exp.			-0.0104 (0.0446)				
Caucasian				4.642*** (0.373)	1.963*** (0.332)		
ACA × Caucasian				-0.586 (0.535)	-0.283 (0.487)		
College Educated						12.84*** (0.275)	11.63*** (0.278)
ACA × College Educated						-1.534*** (0.396)	-1.400*** (0.401)
Observations	16,628	16,570	16,570	14,657	14,606	16,628	16,628
Demographic Controls	No	Yes	Yes	No	Yes	No	Yes
Industry Fixed Effect	No	Yes	Yes	No	Yes	No	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	
Firm Size	No	Yes	No	Yes	No	Yes	
Region Fixed Effect	No	Yes	Yes	No	Yes	No	Yes

Panel A focuses only on those who are not already offered ESI. Panel B focuses on those who work at a firm that offers ESI already to ensure the effects seen in Panel A are because of the ACA's mandate. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All dollar amounts were adjusted to 2014 dollars using the CPI (www.bls.gov). Controls include gender, marital status, age (cubic), race, location, industry, and education as appropriate given the co-efficient of interest in the specification.

the specification, the “ACA × Male” effect decreases in size and is no longer statistically significant when controls for individual medical expenditures are introduced. This suggests that gender is acting as a proxy for individual medical expenditures so that when estimations do not control for both gender and individual expenditures, differences in spending across genders are soaked up by the gender term. The estimates suggest there is a \$0.16 per hour wage offset for each log unit difference in medical expenditures (a \$320 difference in annual wages). This relatively small pass-through is perhaps not that surprising given medical expenditures (such as insurance premiums) paid by firms are tax deductible, some of the cost would be borne by employees via cost sharing, and some firms might have lots of turnover giving them little incentive to make adjustments in advance of the mandate.²² In addition, the estimates rely on anticipatory effects. Future medical expenditures are surely more predictable at the group level than at the individual level. For example, by definition, medical expenditures associated with one-off events at the individual level provide no information on future medical expenditures. Individuals who have expenditures that are ongoing and predictable might see a greater pass-through of medical expenditures. Without a longer panel, it is not possible to examine if this is the case.

What is interesting is that research on the effects of ESI on wages has used differences in health status and/or medical expenditure across broad groups to identify wage effects. None of those papers, including Gruber (1993, 1994), Sheiner (1999), Jensen and Morrissey (2001), Bhattacharya and Bundorf (2009), Cowan and Schwab (2011), Lahey (2012), and Bailey (2013, 2014) examine if members of the group they study are affected equally. The estimates in Table 3 suggest employers might form expectations of individual or at least sub-group costs (this could be based on absenteeism, physical characteristics visible at interview, and/or employee behavior). This is arguably easier in smaller firms, precisely the type of firm affected by the ACA’s employer mandate given larger firms typically already offered ESI. However, as mentioned earlier, estimating the level and robustness of medical expenditure pass-through at the individual level is not a goal of this paper.

The estimates in columns four through seven provide additional confidence in the paper’s identification strategy. These columns present a repeat of the falsification tests using race and

²²If employers placed any positive probability on ACA repeal and/or delays, it further dampens their incentive to prepare for the mandate’s implementation.

college education from Table 2. In Table 2, the effect of ESI on racial and college-related wage gaps was the opposite to what Cowan and Schwab's approach, given the observed medical expenditure differences, would predict. The estimates in the fourth (no controls) and fifth (including controls) columns of Table 3 focus on the black-white wage gap. Given blacks tend to have lower medical expenditures in the data, the employer mandate should reduce the black-white wage gap at firms who must offer ESI in the near future. While not significantly different from zero the direction of the "ACA \times Caucasian" term is as expected. The gap between medical expenditures for these groups is small so it is not surprising that its effect is not easily detected in a sample of 2,500 or so. In contrast, the gap between medical expenditures for college and non-college graduates is quite large and the direction and size of the "ACA \times College Educated" effect in columns six (no controls) and seven (including controls) is reassuring.

Panel B repeats each of the estimates in Panel A using the data of MEPS respondents who work at firms with more than 50 workers that already offer ESI. These estimates are presented to examine if the effects seen in Panel A are caused by the employer mandate or simply reflect patterns of wages in the labor market as a whole. For firms with more than 50 workers who already offered ESI, the employer mandate does not change their incentives and therefore estimates should not show any ACA-related effects. In column two, a specification with a full set of typical controls, the effect of "ACA \times Male" is negative but not statistically different from zero. That is, the male-female wage gap, if anything, is declining rather than increasing. In column three, the interaction term suggests there are no changes in the effect of individual medical expenditures after the ACA is announced at firms who already offer coverage, as would be expected. Interestingly, the estimates seen in columns four through seven suggest that the ACA also affected the wages of college educated and Caucasian workers negatively - but not by as much - at firms who already offered ESI. This suggests that some but not all of the effects seen in columns four through seven in Panel A reflect changes in the labor market that are unrelated to the ACA.

Overall, the estimates in Table 2 suggest that Cowan and Schwab's approach likely picked up more than just the effect of ESI on wages for groups with different medical expenditures. The estimates presented in Table 3, using the ACA's employer mandate for identification, concord with a theory that ESI affects wages for groups with different medical expenditures. The fact that the effect on wages is responsive to the group differences in medical expenditures appropriately for

each group highlights the value of using the mandate for identification. The estimates also suggest that firms can and do respond to more than just group differences as the effect of gender on wages is not robust to controls for individual medical expenditures. The next section provides further falsification tests of both the identifying power of the mandate and the importance of individual medical expenditures when asking how ESI affects wages for different groups.

Note that the sub-samples of MEPS data used to estimate the coefficients in panel A and B of Table 3 could be combined into a triple-difference specification. In that case, the difference-in-difference interaction term (along with the ACA and gender dummies) would be further interacted with a dummy for ESI (where ESI=1 means the respondent was offered health coverage at their job). The estimates are presented separately for ease of interpretation.

5 Robustness

This section focuses on ensuring the ACA's mandate, rather than labor market trends or other events, is responsible for the effects observed.

5.1 Parallel Trends

The estimates seen in Table 3 appear to be causally related to the effects of the ACA's employer mandate. While this is plausible, especially given the corresponding effects seen for other groups with different medical expenditures, they may just represent trends in the labor market that are unrelated to the ACA. Figures 1 and 2 present post-estimation plots of the gender wage gap and the relationship between medical expenditures and wages by year and by offer of ESI over the 2006-2014 time period. This is essentially an event-study version of the difference-in-difference estimating equation used to produce the estimates in Section 4.

In the figures, outcomes of interest are plotted by year. Figure 1 plots the post-estimation wages of men and women who work at firms that do and do not offer ESI over time. In Figure 2 the effect of medical expenditures on wages is plotted by year for workers at firms with and without ESI. Both figures suggest workers at firms who did not offer ESI experience changes after 2010. The same changes are not easily observed for workers firms who are already offered ESI. This pattern

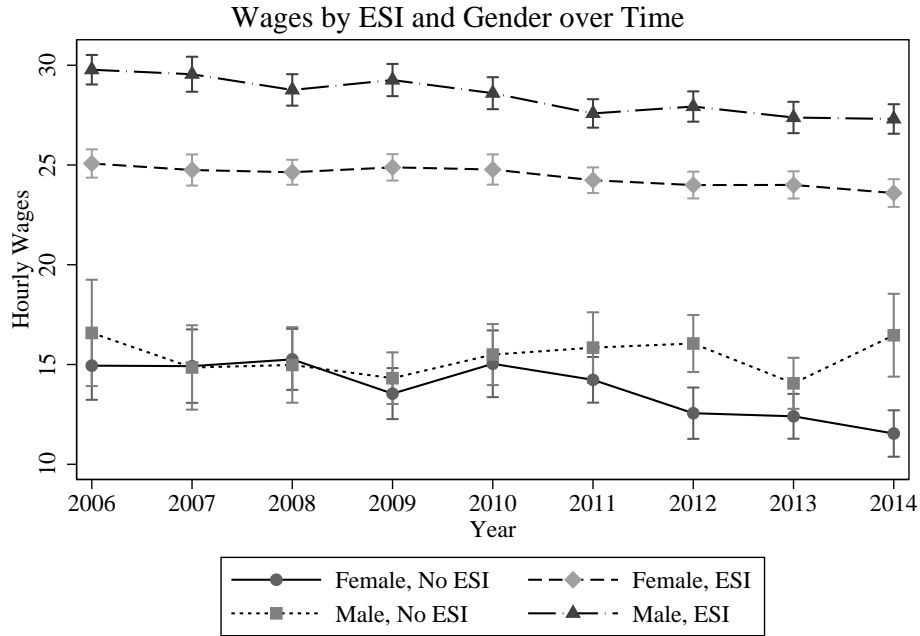


Figure 1: Post-estimation Plot of Wages by Gender and ESI Status Over Time

eases concerns that the ACA’s passage is correlated with trends in the labor market which explain the paper’s findings.

Specifically, Figure 1 shows that the gap in wages between males and females does not change much over the sample period at firms who already offer ESI. This suggests that the ACA had little to no effect on the employees at these firms, as would be expected. Given over 80% of the sample worked at firms with ESI during the time period, this also suggests that there were also no other (unaccounted for) trends affecting the labor market that affected the gender wage gap. In contrast, for workers at firms that do not offer ESI, a significant gender wage gap begins to appear after 2010 (conditional on observables, it was almost non-existent up to that point) and the gap is similar to the gap at firms with ESI by 2014 (the implementation date of the ACA’s mandate).

Figure 2 confirms that it is not only gender that matters. The figure shows the relationship between individual medical expenditures and wages over time, after controlling for observables. It suggests that, at firms that did not offer ESI already, the relationship between wages and individual medical expenditures changes after 2010 while the relationship at firms who already offer ESI is stable.

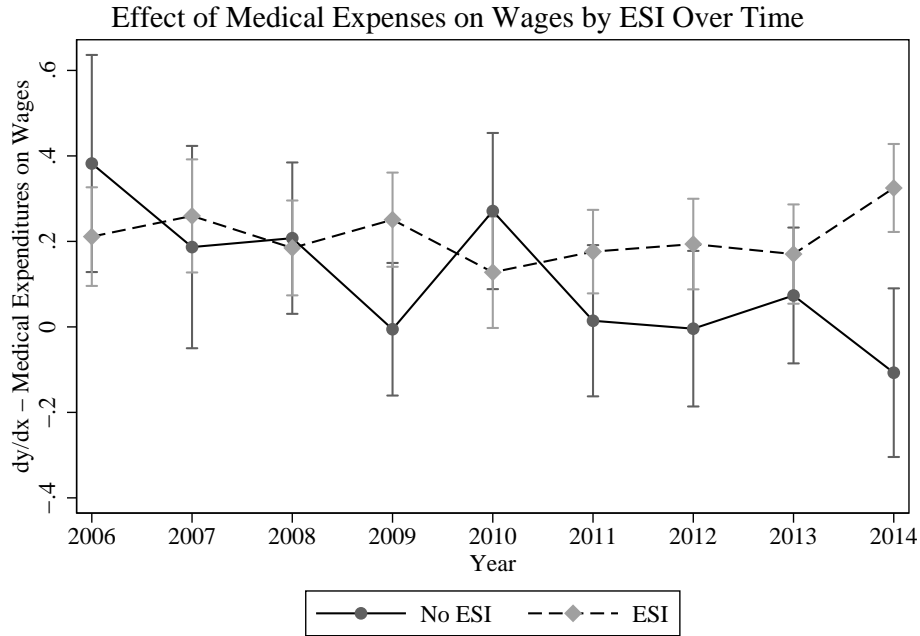


Figure 2: Post-estimation Marginal Effect of Medical Expenditures on Wages by Year and by Offer of ESI

In sum, Figures 1 and 2 highlight that it is some event that only impacted firms who did not offer ESI around 2010 or 2011 that is the causal force driving the effects seen in Section 4. It is possible that event may not have been the announcement of the ACA’s employer mandate. However, the patterns in the data and the concentration of changes in wages at firms affected by the ACA’s mandate (and on exactly those workers who cost more to cover) suggests that separating the effect of the employer mandate from some other event that could be the cause of the observed patterns would be challenging.

5.2 Firm Size and Mandate Impact

The ACA’s mandate applies only to firms with more than 50 full time employees. For that reason, the estimates presented in Table 4 repeat those in Table 3 but include only MEPS respondents who report that they work at a firm with fewer than 50 employees who does not offer ESI. As the employer mandate does not apply to those firms the estimates should be similar to the findings in Panel B of Table 3.

Table 4: Falsification Tests of ACA's Effects (Firms with <50 employees), MEPS 2006-2014 Data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage	Hourly Wage
Affordable Care Act	0.0687 (0.416)	2.138 (4.780)	1.988 (4.772)	-0.00994 (0.585)	0.288 (4.917)	-0.645* (0.361)	2.248 (4.847)
Male	2.473*** (0.275)	2.798*** (0.310)	3.007*** (0.318)		2.136*** (0.201)		2.532*** (0.208)
ACA × Male	-0.646* (0.367)	-0.743* (0.402)	-0.816** (0.412)				
Log Annual Medical Expenditure			0.0772*** (0.0251)				
ACA × Med. Exp.			-0.0228 (0.0320)				
Caucasian				0.977** (0.396)	0.324 (0.374)		
ACA × Caucasian				-0.227 (0.506)	-0.330 (0.488)		
College Educated						4.524*** (0.342)	4.312*** (0.327)
ACA × College Educated						-0.699 (0.444)	-0.405 (0.420)
Observations	9,153	9,077	9,077	8,328	8,266	9,153	9,153
Demographic Controls	No	Yes	Yes	No	Yes	No	Yes
Industry Fixed Effect	No	Yes	Yes	No	Yes	No	Yes
Firm Size	No	Yes	Yes	No	Yes	No	Yes
Region Fixed Effect	No	Yes	Yes	No	Yes	No	Yes

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar amounts were adjusted to 2014 dollars using the CPI (www.bls.gov). Controls and fixed effects are as in Table 3.

The estimates suggest that at firms with fewer than 50 employees the gap in hourly wages between males and females decreases by 74 cents per hour (significant at the 10% level) in a specification with a complete set of controls. That effect is the opposite sign to what was predicted and observed for workers at firms who were affected by the employer mandate. This lends support to the idea that the gender wage gap increase observed at firms affected by the mandate was, indeed, caused by the expected costs of complying with the mandate. If the wage gap was generally getting smaller (at all other firms) over the time period observed, then the main estimates (Panel A of Table 3) are biased towards zero. In addition, Table 4 shows that wages as a function of race, education, and medical expenditures are relatively stable after 2010 for workers who work at firms not affected by the employer mandate.

Lastly, the fact that firm size is a choice presents a threat to identification: firms close to the 50 employee cut-off might downsize in response to the ACA's mandates. The estimates in Panel A

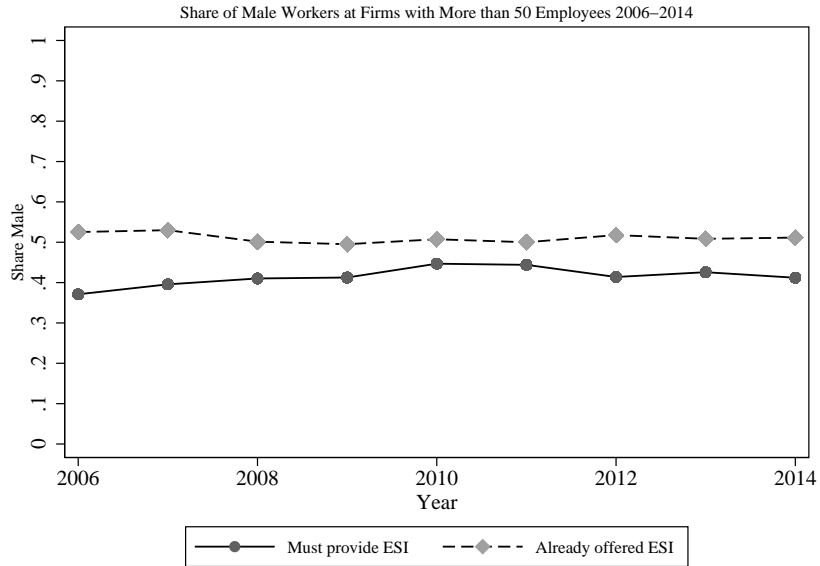


Figure 3: Share of Male Workers by Year

of Table 3 could be biased towards zero if firms who have lots of female employees downsize in order to avoid the mandate. However, the estimates are almost identical when workers at firms with fewer than 75 employees are excluded which suggests that firms downsizing in response to the mandate is not a significant source of bias.

5.3 Changes in Female Labor Supply

Cowan and Schwab consider if selection could be driving their findings. The concern they have is that females may value having ESI more than males. If so, their labor supply towards firms who offer ESI will be relatively higher than males. If that is the case, it means females pay for their coverage via a labor supply response rather than labor demand. The same would be true in this paper if females increased their relative supply of labor to firms affected by the ACA’s mandate in advance of the mandate. However, changes in labor supply do not undermine the main takeaway. In either case, females earn less due to ESI.

For several reasons, it is unlikely that the effects seen in this paper are due to changes in labor supply. One reason is an asymmetry between the knowledge of employers and their employees. The employer is likely to know if they will be subject to the mandate: will they have 50 full-time



Figure 4: Employment Tenure of Workers Over Time

employees or not after implementation, can they move towards more part-time workers to avoid providing coverage, can they increase their reliance on capital rather than labor in order to reduce their exposure, what will coverage cost the firm, how much will contributions be from employees, and so on. In addition, many individuals who work at firms without coverage would qualify for heavily-subsidized coverage on the individual exchanges.²³ As a result, the chance of obtaining employer-based coverage may not be a sufficient incentive to increase labor supply.

These claims are supported by the data which shows little change in the proportion of males and females working at firms affected by the mandate after 2010. Figure 3 shows the share of male workers over time at firms with 50 employees or more by ESI. Firms who do not have ESI already in place for employees are denoted as “Must Provide ESI”. There is little change in the share of male workers at these firms: if anything it is higher after 2010 than before. If females were increasing labor supply towards these firms, the share of males should decline.

Figure 4 shows the employment tenure of workers over time at firms affected by the ACA mandate. Identification would be threatened if female workers’ tenure patterns were very different to male workers or if they changed after 2010. The figure shows employment tenure is a little noisy

²³For more information see <https://www.healthinsurance.org/obamacare/will-you-receive-an-obamacare-premium-subsidy/> and www.healthcare.gov.

(there are only a few hundred observations each year) particularly for males. For females, tenure patterns are little different after 2010. Given the patterns in Figures 3 and 4 it is unlikely that the results seen in the paper are due to changes in female labor supply.

6 Conclusion

This paper builds upon work by Cowan and Schwab (2016) which suggests female wages are lower because females disproportionately add to the cost of ESI. First, the paper shows that Cowan and Schwab's identification strategy may have led them to uncover a mechanical relationship between ESI and wages that is caused by other firm characteristics. The paper then tests for such a mechanical relationship by replicating their approach using other groups who have well-documented wage gaps but differences in medical expenditures which should reduce rather than exacerbate the wage gap when a firm offers ESI. Examples include blacks versus whites and having a college education or not. Estimates using these alternate groups show that the presence of ESI increases the gap in wages between groups when it should have no or the opposite effect.

As females should, in theory, be paid less than males in the presence of ESI, this paper then tests that theory using an alternate source of identification: the ACA's employer mandate. The exogenous nature of the mandate makes it ideal for studying the question at hand and indeed, there appears to be a relationship between the gender wage gap and ESI. However, the paper then shows that the effect fades in size and significance once controls for individual medical expenditures are introduced. That is, males and females with lower medical expenditures should expect a smaller wage offset due to ESI.

Robustness checks show that the gender wage gap increases only at firms with more than 50 employees that did not already offer ESI to their employees after 2010.²⁴ These are precisely the firms who are affected by the ACA and precisely the time period the ACA impacts. The timing of the observed effects and the fact that the resulting wage gaps appear to converge towards the gaps at firms who already offered ESI suggest the ACA's mandate is what is driving the observed effects. Further checks show that different anticipatory responses in labor supply or changes in tenure patterns are not causing these findings.

²⁴It is tempting to try to use the 50 employee cut off as an alternate source of variation in an RD-style empirical strategy. The available data precludes such an approach. Firm size is not reported directly and is not immutable.

As a caveat, the effect of the employer mandate on wages could increase once the mandate is fully implemented and actual medical expenditures become known. However, as suggested earlier, cleanly identifying wage offsets caused by ESI after 2014 will be challenging. Any effort to identify those effects would need to account for anticipatory effects and separate the effect of the employer mandate from other ACA provisions.

In summary, ESI is likely associated with observable and unobservable firm characteristics that affect wages and productivity. This ensures identification of ESI's effect on wages is challenging. The ACA's employer mandate resolves most of these issues (but perhaps has issues of its own). However, using the mandate for identification shows that requiring ESI causes relative wages to fall for groups who are more costly to cover and vice-versa. However, the findings are weaker once controls for individual medical expenditures are introduced. This suggests that ESI potentially provides coverage to individuals at the "right" price: lower wages for those with larger expenditures and higher wages for those who do not cost employers as much to cover, regardless of gender.

References

- Altonji, J. G. and Blank, R. M. (1999). Race and gender in the labor market. In Ashenfelter, O. and Card, D., editors, *Handbook of Labor Economics, Volume 3*, pages 3143–3259. North-Holland.
- Antwi, Y. A., Moriya, A. S., and Simon, K. (2013). Effects of federal policy to insure young adults: Evidence from the 2010 Affordable Care Act’s dependent-coverage mandate. *American Economic Journal: Economic Policy*, 5(4):1–28.
- Bailey, J. (2013). Who pays for obesity? Evidence from health insurance benefit mandates. *Economics Letters*, 121(2):287–289.
- Bailey, J. (2014). Who pays the high health costs of older workers? Evidence from prostate cancer screening mandates. *Applied Economics*, 46:32:3931–3941.
- Bertakis, K. and Azari, R. (2010). Patient gender differences in the prediction of medical expenditures. *Journal of Women’s Health*, 19:1925–1932.
- Bertakis, K., Azari, R., Helms, L., Callahan, E., and Robbins, J. (2000). Gender differences in the utilization of health care services. *Journal of Family Practice*, 49:147.
- Bertrand, M., Goldin, C., and Katz., L. F. (2010). Dynamics of the gender gap for young professionals in the financial and corporate sectors. *American Economic Journal: Applied Economics*, 2(3):228–255.
- Bhattacharya, J. and Bundorf, M. K. (2009). The incidence of the healthcare costs of obesity. *Journal of Health Economics*, 28(3):649 – 658.
- Blau, F. D. and Kahn, L. M. (2000). Gender differences in pay. *Journal of Economic Perspectives*, 14(4):75–99.
- Cowan, B. and Schwab, B. (2011). The incidence of the healthcare costs of smoking. *Journal of Health Economics*, 30(5):1094 – 1102.
- Cowan, B. and Schwab, B. (2016). Employer-sponsored health insurance and the gender wage gap. *Journal of Health Economics*, 45:103 – 114.
- Cylus, J., Hartman, M., Washington, B., Andrews, K., and Catlin, A. (2011). Pronounced gender and age differences are evident in personal health care spending per person. *Health Affairs*, 30:153–160.

- Daneshvary, N. and Clauretje, T. M. (2007). Gender differences in the valuation of employer-provided health insurance. *Economic Inquiry*, 45(4):800–816.
- Depew, B. (2015). The effect of state dependent mandate laws on the labor supply decisions of young adults. *Journal of Health Economics*, 39:123–134.
- Even, W. E. and MacPherson, D. A. (2018). The Affordable Care Act and the growth of involuntary part-time employment. *Industrial and Labor Relations Review*, (Forthcoming).
- Garrett, B. and Kaestner, R. (2015). Recent evidence on the ACA and employment: Has the ACA been a job killer? *Urban Institute Working Paper*.
- Goda, G. S., Farid, M., and Bhattacharya, J. (2016). The incidence of mandated health insurance: Evidence from the Affordable Care Act dependent care mandate. *NBER Working Paper Series No. 21846*.
- Goldin, C. (2014). A grand gender convergence: Its last chapter. *American Economic Review*, 104(4):1091–1119.
- Goldin, C. and Katz, L. F. (2007). The race between education and technology: The evolution of U.S. educational wage differentials 1890-2005. *NBER Working Paper*, (12984).
- Gruber, J. (1993). The incidence of mandated maternity benefits. *American Economic Review*, 84(3):622–641.
- Gruber, J. (1994). State-mandated benefits and employer-provided health insurance. *Journal of Public Economics*, 55(3):433 – 464.
- Hahn, Y. and Yang, H. (2016). Do work decisions among young adults respond to extended dependent coverage? *Industrial and Labor Relations Review*, 69(3):737–771.
- Jensen, G. A. and Morrisey, M. A. (2001). Endogenous fringe benefits, compensating wage differentials, and older workers. *International Journal of Health Care Finance and Economics*, 1:203–226.
- Lahey, J. N. (2012). The efficiency of a group-specific mandated benefit revisited: The effect of infertility mandates. *Journal of Policy Analysis and Management*, 31(1):63–92.
- Lennon, C. (2017). The individual-specific incidence of mandated benefits: Evidence from the Affordable Care Act. *Working Paper*.

- Lennon, C. (2018). Who pays for the medical costs of obesity? New evidence from the employer mandate. *Working Paper*.
- Manning, A. and Saidi, F. (2010). Understanding the gender pay gap: What's competition got to do with it? *Industrial and Labor Relations Review*, 63(4):681–698.
- Mathur, A., Slavov, S. N., and Strain, M. R. (2016). Has the Affordable Care Act increased part-time employment? *Applied Economics Letters*, 23(3):222–225.
- Mulligan, C. B. and Rubinstein, Y. (2008). Selection, investment, and women's relative wages over time. *Quarterly Journal of Economics*, 123(3):1061–1110.
- Oi, W. Y. and Idson, T. L. (1999). Firm size and wages. In Ashenfelter, O. and Card, D., editors, *Handbook of Labor Economics, Volume 3*, volume 3, pages 2165–2214. North-Holland.
- Sheiner, L. (1999). Health care costs, wages, and aging. Federal Reserve System Finance and Economics Discussion Series Discussion Paper No. 99-19.
- Summers, L. H. (1989). Some simple economics of mandated benefits. *The American Economic Review: Papers and Proceedings of the Hundred and First Annual Meeting of the American Economic Association*, 79(2):177–183.
- Waldfogel, J. (1998). Understanding the 'family gap' in pay for women with children. *Journal of Economic Perspectives*, 12(1):137–56.
- Woolhandler, S. and Himmelstein, D. (2007). Consumer directed healthcare: Except for the healthy and wealthy it's unwise. *Journal of General Internal Medicine*, 22(6):879–881.