The Economics of Work Schedules

under the New Hours and Employment Taxes

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Abstract

The Affordable Care Act introduces three economically distinct taxes on employment and income, and almost half of the workforce will face one of them. The new taxes push some workers to work more hours per week (for the weeks that they are on a payroll), and others to work less, with an average weekly hours effect that tends to be small and may be in either direction. A conservative estimate of the law’s average long run employment rate impact is negative three percent. The ACA’s tax wedges and ultimately its behavioral effects vary substantially across groups, with the elderly experiencing hardly any new disincentive and unmarried household heads experiencing tax disincentives that are about twice the average. My estimates suggest that about five percent of the workforce will work less than the legislated 30-hour threshold solely to avoid implicit and explicit full-time employment taxes included in the ACA.

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For the first time in 2014, millions of workers face implicit federal taxes on their employment. More workers will face employment taxes in 2015 when assessable employers owe penalties on the basis of the number of full-time employees on their payrolls. Both of these taxes are provisions of the Affordable Care Act of 2010 (hereafter, ACA), which also includes new implicit income and hours taxes on top of the longstanding taxes on incomes and payroll. This paper assesses the magnitude, direction, and economic characteristics of the hours, employment, and income tax wedges created by the ACA.

The tax wedge results are startling. Almost half of the working population is directly affected by at least one of the new incentives, not to mention the indirect effects on others as the labor market adjusts. The ACA’s tax wedges vary substantially across groups, with the elderly experiencing hardly any new disincentive and unmarried household heads (including one-person households) experiencing tax wedges that are about twice the average. From an aggregate point of view, the employer penalties by themselves are historically significant but nonetheless the wedges that they create are matched, if not exceeded, by the ACA’s implicit tax provisions. My results account for the facts that a variety of longstanding tax and subsidy rules also affect work incentives (in both directions) and that many people will not participate in programs for which they are eligible.\(^1\)

This paper also uses a model from the literature to offer predictions for the magnitude, direction, and incidence of the long run effects of the ACA’s various taxes on weekly work schedules. According to the model, the likely labor market adjustments to the new costs will primarily be reduced weekly employment rates: about three percent on average. The employer penalty is responsible for only a quarter of the employment and aggregate hours reductions, in part because it helps keep employees away from the exchanges and their high marginal income tax rates. Work schedules are costly for both the model’s employers and employees to adjust, but nonetheless the tax wedges push some workers to work more hours per week (for the weeks

\(^1\)The income and payroll tax exclusions of premiums paid for employer-sponsored health insurance are among the many longstanding policies affecting the incentives to work.
that they are on a payroll), and others to work less, with an effect on average hours per employee that tends to be small and can be in either direction.

Section I explains how the ACA contains hidden taxes on work schedules, and quantifies the amount of the new incentives. Section II presents the model of labor market reactions. Section III points to the key behavioral magnitudes that are needed to project the market consequences of the new incentives, and relates the magnitudes to historical studies of the labor market and work schedules. Section IV displays the labor market projections, and Section V concludes.

I. Distorting the Workweek

A. Relevant ACA Provisions

Three major provisions of the ACA introduce incentives to change the workweek. The most acknowledged is the penalty on large employers that do not offer health insurance to their full-time employees. Because the amount of the penalty is proportional to the number of full-time employees (over thirty) on the payroll, the penalty creates an incentive to substitute part-time positions for full-time positions.²

Less acknowledged is the ACA provision that full-time employees and their families cannot receive subsidized health coverage on the ACA’s health insurance exchanges unless their employer fails to offer affordable coverage. Except in the increasingly rare cases where part-time positions are eligible for employer health coverage too, an employee (and family) at a firm offering affordable coverage would be eligible for exchange subsidies only if he worked part-time, which amounts to an implicit tax on full-time employment.³ The amount of the implicit tax on full-time employment is equal to the employee’s valuation of the exchange subsidy he forgoes as a consequence of working full-time. The foregone subsidies include cost-sharing assistance – federal dollars that reduce a family’s health insurance deductibles and co-payments – as well as

² The marginal penalty is either $2,000, zero, or (approximately) $20,000 per full-time-employee year, plus health cost inflation after 2014, depending on whether the employer is above, below, or at the employment-based threshold for penalties in the subsequent calendar year, respectively. For simplicity, this paper models the employer penalty as if it had a constant marginal rate of $2,000 (plus health cost inflation after 2014). Gallen (2013) looks at the non-linearity of the penalty in employer size and how it relates to the allocation of labor between part- and full-time positions.
³ See also Gamage (2012) and Mulligan (2013a). The incentives can be more complicated for dual-earner couples; see below my discussion of the ACA’s “family glitch.”
premium assistance administered through the federal personal income tax, and can easily be worth more than $10,000 per year.

As a result of the third ACA provision, any household head or spouse that has a family member (or himself) receiving exchange subsidies some time during the calendar year, the ACA also increases the marginal tax rate on their earnings because the exchange subsidies are phased out as a function of family income. In other words, a household participating in the exchanges will find that earning additional income will not only add to its federal and state income tax liabilities, but will also decrease the subsidy it receives for its health insurance. Like any additional marginal earnings tax, this tax can reduce hours worked.

The subsidy phase out is separate from, and has little to do with, the aforementioned implicit tax on full-time work. To see this, suppose, hypothetically, than any person not offered health insurance by his employer would be eligible for a $5,000 subsidy, regardless of his household income. By assumption, this hypothetical subsidy has no phase out and creates no marginal earnings tax because income is irrelevant for determining the subsidy amount. Nevertheless, the $5,000 is an implicit tax on full-time work for someone working for an employer that offers health insurance only to its full-time employees, because a decision to move to part-time work would make him eligible for the $5,000.

The longstanding exclusion of ESI premiums from payroll and personal income taxes is itself an instance of a full-time employment tax, with a negative sign. That is, full-time workers can use the exclusion to avoid taxes but non-workers and uncovered part-time employees cannot. The exclusion is relevant for understanding coverage decisions under the ACA, for measuring the combined total of ACA and non-ACA incentives, or for comparing actual full-time work incentives with the incentives that would be present in a hypothetical world without taxes. But the hypothetical no-tax world is not of interest in this paper. My purpose is to compare the labor market with the ACA to how the labor market would have evolved without the ACA and to calculate the impact of the ACA as the difference between the two. In both of those cases, ESI premiums are excluded from payroll and personal income taxation and thereby are hardly relevant for understanding the impact of the ACA on the incentives to work full-time. Because

See Rennane and Steuerle (2011) and Gallen and Mulligan (2013).
the ACA is not creating or eliminating the ESI tax exclusion, the tax exclusion is not a significant part of the ACA’s contribution to overall incentives to work full-time.⁵

B. Tradeoffs between hours and employment

As a first step to modeling the economy’s reactions to the ACA’s taxes, it helps to build a household budget constraint that includes part-time work, full-time work, the employer penalty, exchange subsidies, as well as other factors that affect work schedules. Consider a large family that, in any given week, supplies \( n \) workers each working \( h \) hours. For the moment, assume that all family members are identical in terms of the pecuniary costs and benefits of their work. Each worker’s labor income subject to tax is \( wh-q-p(h) \), where \( q > 0 \) is a quasi-fixed cost of employment and \( p(h) \) is the employer penalty. \( q \) is a cost that employers pay, aside from a penalty, for each worker it has. It includes scheduling costs, payroll costs, hiring costs, and perhaps management and coordination costs. I assume for the moment, and later prove, that the employer simply passes those costs on to the employee, which is why a worker’s income is the product of his marginal hourly wage \( w \) and his work hours \( h \) minus these two costs.

The penalty is a function of the length \( h \) of the work schedule: namely, a step function:

\[
p(h) = I(h > h)pZ
\]

where \( I() \) is the indicator function that is one when the condition in parentheses is satisfied, and zero otherwise. \( h \) is the hours limit for “part-time” employment, which refers to the positions exempt from the penalty at assessable employers on the basis of their work schedules. The ACA

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⁵ This is a basic implication of marginal analysis that has been confirmed with empirical research. In theory, there were employees before the ACA who were on the margin between ESI and other types of coverage (including no coverage), despite the fact that ESI has tax advantages. Even a small subsidy to the other types of coverage would move a few employees off of ESI, despite the fact that the small subsidy is less than the dollar value of ESI’s tax advantage, because even without the subsidy the value of the tax advantage was offset (from the point of view of the employees on the margin) by other costs of ESI or benefits of other coverage. The empirical studies reviewed in Congressional Budget Office (2007) confirm that marginal changes in the relative price of ESI affect behavior even though ESI remains a net tax advantage.
sets the limit at 29 hours per week (i.e., 30-hour workers are considered full time and thereby subject to penalty), with some caveats noted below, so the bulk of my analysis sets $h = 29$. The constant $p$ is the amount of the employer penalty measured in hours per week and $Z$ is a parameter converting hours per week into units of the consumption good (more on $p$ and $Z$ below).

The household pays a tax at constant rate $t + \tau$ on its taxable labor income, where $\tau$ is the ACA component of the overall tax rate, if any, and $t$ is the non-ACA component, especially employee payroll taxes and employee personal income taxes. The household also incurs a per-employee quasi-fixed cost $a$ that by itself makes households prefer to work more hours per week and fewer weeks per year (or employees per household) because the quasi-fixed cost is $a/h$ per hour worked, which is less for long work schedules, and $na$ in total. Commuting costs and foregone after-tax unemployment benefits are important examples. Employee tax and administrative savings from fringe benefits are also captured in $a$ — they reduce $a$ — to the extent that employees cannot receive these benefits during times that they are not employed.

The two quasi-fixed costs $q$ and $a$ serve the same basic economic purposes — to lengthen work schedules and reduce employment — but different accounting purposes. In practice, $q$ is subtracted from employee pay but $a$ is not, which means that empirical measures of taxable earnings should be compared with $wh - q - p(h)$, and not $wh - q - a - p(h)$. Because taxes are levied on the former and not the latter, $a$ is effectively more expensive to the employee than $q$ is because $q$ helps reduce payroll and income taxes.

Finally, each of the employed family members pays a convex cost $f(h)$ of supplying hours and the household receives a lump sum transfer $g$ from the government. The household budget constraint is:

$$c = g + \{(1 - t - \tau)[wh - q - I(h > h) pZ] - a - f(h)\} n$$

(2)

where $c$ is household consumption. With a caveat mentioned below, the term in square brackets is income subject to tax (technically, adjusted gross income).

Holding constant total work hours $nh$, households face a tradeoff between hours and employment. High employment allows for fewer hours worked per employee and thereby less cost $f(h)$ of supplying hours per employee, but high employment creates more of the quasi-fixed
costs. A reduction in the after-tax quasi-fixed costs, such as that achieved by a higher marginal earnings tax rate $\tau$, thereby encourages households to substitute employment for hours per employee.

If the household desired to be working full-time even under the ACA, then the employer penalty would just be another quasi-fixed cost and thereby encourage households to substitute hours for employment. If the household desired to be working part-time even without the ACA, then the relevant part of the budget set is not affected by the penalty and the household would have no incentive to adjust its behavior. Finally, households working full-time without the ACA but near the margin are induced to work part-time, but at a higher employment rate, in order to avoid the penalty.

In this way, the budget constraint alone suggests that an employer penalty might either reduce or increase average hours worked per employee. As $h$ approaches zero – and is thereby well below desired hours – the employer penalty is essentially a tax on employees regardless of how many hours they work, and thereby shifts production in the direction of fewer employees each working longer hours. For $h$ closer to desired hours, the penalty can also be avoided by reducing hours and not just employment, which by itself is a force in the direction of fewer hours per employee. As I show below, the net effect can be in either direction.

The $pZ$ term can be interpreted narrowly as the employer penalty, or as the salary equivalent value of an exchange subsidy potentially foregone by people working for ESI employers. In the subsidy-foregone case, $pZ$ is the value of the subsidy divided by the tax factor $(1-t-\tau)$ because, unlike $wh-q$, the exchange subsidy is not taxable. However, the budget constraint (2) does not recognize that an ESI employee’s marginal income tax rate from the ACA depends (slightly, see the Appendix) on the number of weeks that he works.

C. The Magnitudes of the Tax Wedges: Four Scenarios

The ACA has a number of transitional features that complicates assessment of its economic effects. The original 2010 legislation arranged for delayed implementation of its main features, including the health insurance exchanges and the employer penalty. Some of the language in the law was vague and thereby required a back-and-forth between regulators and the public before it was finally determined how the law would be enforced (Burkhauser, Lyons and
Simon 2011). In some instances, as with the employer penalty and the open enrollment period for exchange coverage, the administration responded to political pressures by delaying implementation beyond what was specified in the original law. It will also take time for the private sector to fully comprehend and adapt to the new economic environment created by the law. In this paper, I only attempt to examine the consequences of the ACA as it will stand when it is essentially fully implemented, perhaps in the year 2016 or beyond. I therefore measure the size of the tax incentives from the perspective of employers and employees situated in the year 2016, and show how the results might be different if the employer penalty were delayed beyond that year, or indefinitely. All of these measures are made relative to a (presumably) hypothetical world in 2016 in which (a) the ACA did not exist and (b) the hypothetical non-ACA policies coincide with actual non-ACA policies.6

Table 1 presents estimates of the number and composition of non-elderly household heads and spouses in 2016 who would work for an employer offering coverage, assuming for the moment that neither employers nor employees adjust the overall level of employment or its distribution between full- and part-time work, based on the Current Population Survey (hereafter, CPS).7 The total number is 87 million, of which 47 million would be ineligible for exchange subsidies regardless of their employment situation because they are from a family with income outside the interval in which subsidies are available: 100-400 percent of the federal poverty line (hereafter, FPL). Take, for example, heads and spouses from families of four who are working for ESI employers and living in the contiguous United States. Those with family incomes between $23,850 and $95,400 measured in 2014 dollars would not be among the 47 million subtracted on the table’s 3rd row, whereas those with family incomes outside the interval would be among those subtracted.8

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6 One exception, noted further below, is that, regardless of the existence of the ACA, the Emergency Unemployment Compensation program was terminated between 2013 and 2016.
7 I use the March 2012 Current Population Survey, and project 2016 population totals by multiplying by a factor of 1.01^4. Unmarried partners of household heads are treated as heads of their own one-person household. Foster children are analyzed as children. Any other person not related to a household or spouse is excluded from my sample.
8 Separate poverty lines apply to families in Alaska and Hawaii, but otherwise they are treated the same way in Table 1. The federal poverty lines vary by family size and are adjusted for inflation from year to year.
Exchange subsidies are not available to persons who can obtain employer coverage through a spouse. The ACA’s exchange subsidies are not an implicit tax on such a person’s employment status because, due to this so-called “family glitch,” his entire family is ineligible for the subsidies even if he gives up his ESI by leaving the job or moving to part-time. Table 1 therefore subtracts all 4.5 million married persons who (i) work for ESI employers, (ii) live in a family between 100 and 400 percent of FPL, and (iii) have a spouse working full time for an ESI employer.

24 million full-time workers and 9 million part-time workers remain. For these 33 million workers, their entire family’s eligibility for exchange subsidies hinges on their employment status. In any month that they are off the payroll, or working part-time, they can get coverage on the ACA’s exchanges and the subsidies that go with it. In any month that they are working full-time for their employer, they are ineligible for exchange subsidies, regardless of how low their family incomes may be. Thus, the population of potential workers facing the ACA’s new implicit full-time employment tax in 2013 is 33 million, or 21 percent of the potential workforce.

The Congressional Budget Office (2014b) estimates that by 2016 about 25 million people will be enrolled in exchange plans during the average month of the year. Based on CPS data, I assume that about half of these – 13 million, or about 9 percent of the workforce in that year – are household heads and spouses who work sometime during the calendar year and the rest of the 25 million are either dependents or people who do not work. Of the 9 million non-elderly household heads and spouses employed part-time by employers offering coverage and not having opportunities for coverage through a family member, I assume that 70 percent will get exchange coverage, which means that about half of the 13 million working heads and spouses on the

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9 The family coverage offered by a spouse’s employer does not even have to be affordable, as long as the spouse’s employer offers affordable (by ACA definitions) self-only coverage to its employees. See also Burkhauser, Lyons and Simon (2011).
10 This ignores the full-time workers for ESI employers for whom coverage is not affordable in the sense that worker-only coverage is less than 9.5 percent of their family income. The number of these workers is likely small, unless employers significantly adjust the financing of ESI premiums (Burkhauser, Lyons and Simon 2011), but in any case they are still subject to a FTET in the form of an employer penalty that is 50 percent larger than the penalty on employers not offering affordable coverage.
11 A “potential worker” is someone who would be working sometime during 2016 if the ACA had not become law.
12 According to the March 2012 CPS, just over half of all non-elderly persons covered by private insurance were employed during 2011 and either head of household or spouse.
exchanges are already represented as part-time workers in Table 1’s bottom line. The remaining of the 13 million, or about 4 percent of the potential workforce, are working for employers that do not offer coverage.

The workforce-share results are recorded in Table 2’s first column. Each row of the table is a tax scenario created by the ACA. 21 percent of the potential workforce will be in the implicit full-time employment tax scenario. Four percent face a new implicit income tax by working for an employer not offering coverage (to any employees) and getting coverage on the ACA’s exchanges. Because about 26 percent of workers are expected to be working for employers that do not offer coverage,13 that leaves 22 percent who work for an employer that does not offer coverage but do not face the ACA’s implicit income tax because they are not a head or spouse or because they are not covered on the exchanges. 22 percent is therefore shown on the third row of Table 2. The residual frequency is 53 percent, which represents workers who do not face any of the ACA’s new disincentives to work or earn.

The remaining columns of Table 2 show the amounts of the earnings and employment taxes. By definition, “no new incentives” (the table’s fourth row) means just non-ACA taxes, with zero’s entered for the two kinds of ACA taxes. I take the non-ACA earnings tax rate to be \( t = 25\% \) for all four tax scenarios.\(^{14}\)

The third column of Table 2 shows the ACA’s contribution to the marginal tax rate on earnings from work, which I denote as \( \tau \) and comes from the fact that families receiving exchange subsidies have those subsidies phased out with income. This is most relevant for families that are subsidized throughout the calendar year, in which case \( \tau = 21\% \).\(^{15}\) \( \tau \) is only 5 percent in Table 2’s top row because many of those workers are covered through an employer

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\(^{13}\) By all estimates, a minority of employers work for an employer that does not offer coverage to any of its employees. The CBO estimates that, in 2008, such were 27 percent of all workers (Congressional Budget Office 2007). Using Census Bureau data, Janicki (2013) estimates 29 percent for 2010. Using the Medical Expenditure Panel Survey (MEPS), Carroll and Miller (2011) estimate 13 percent for 2011. It take 26 percent for the year 2016, assuming that the actual percentage in that year is closer to the former two estimates than to the MEPS estimate, especially to the degree that at least a few employers drop their coverage due to the ACA.

\(^{14}\) Non-ACA earnings taxes include personal income taxes (state and federal) and employee payroll taxes.

\(^{15}\) The exchange subsidies are phased out with family income at an average rate of 23 percent (this average smooths out a number of “notches” and “cliffs”). However, in some cases insurance on the exchanges is substituting for means-tested uncompensated care (Mulligan 2013a) – a means test that would be present even without the ACA – so the net addition of the exchange subsidies to marginal income tax rates is about 21 percent.
during most, if not all, of the calendar year. \( \tau \) is zero in the bottom two rows because none of those workers are heads or spouses of families that receive exchange subsidies.

The final column shows the amount \( p \) of the penalty – implicit or explicit – for working 30 or more hours per week. The penalty is expressed in terms of the number of hours it takes for the typical worker to earn the amount of salary net of taxes that is equal to the dollar amount of the penalty. The penalty is largest in the first row because in that case full-time employment renders the employee ineligible for a subsidy that, on average, is worth about $6,000 per year, accounting for spousal earnings, asset income, taxes on income and payroll, and the fact that exchange plans are not perfect substitutes for employer-sponsored plans. The median hourly earnings (including fringes) among full-time employees represented in Table 2’s first row scenario is $22, which means that it typically takes about 5.5 hours per week to earn an amount equivalent to the value of the exchange subsidy foregone by working full-time for an employer offering affordable coverage. \( p = 5.5 \) hours per week is therefore entered in Table 2’s first row.

Because the employer penalties are not deductible from business income taxes, the salary equivalent of a $2,000 employer penalty (adjusted for health cost inflation) is $3,163 per year on the full-time payroll.\(^{16}\) Although all workers in my model of weekly hours and employment have the same basic productivity, in reality the economic significance of a $3,163 annual penalty (about $60 per week) varies across workers subject to the penalty because they differ widely in terms of their productivity. The dollar amount of the penalty probably reveals less about its typical significance than does the hours that a person would need to work just to raise the funds to pay the penalty. Using the March 2012 CPS, I found that the median hourly wage among workers with usual work schedules of at least 30 hours per week and who are not likely to work for an employer offering coverage is about $15. At that wage, it takes 4.1 hours of work per week, 52 weeks per year, in order to obtain the income that would be equivalent to the $3,163 employer penalty in 2016. To put it another way, half of the full-time workers at penalized

\[^{16}\] \(3,163 = 2,000 \times 1.0384 / [(1 - 0.39) \times (1 + 0.0765)] \) where 39% and 7.65% are the employer business (federal and state; the rate is approximately the same for both C-corp and S-corp businesses) and payroll tax rates, respectively. The factor of 1.0384 adjusts the employer penalty from 2014 to 2016 based on health cost inflation (per the ACA) in excess of wages because I compare the 2016 penalty to estimates of wages in 2014 (in other words, wage inflation between 2014 and 2016 does not affect my results because it is in both the numerator and the denominator of my tax measures). The health inflation adjustment from 2014 to 2015 has already been set by the Secretary of Health and Human Services (United States Department of Health and Human Services 2014c). I assume that health cost inflation between 2015 and 2016 will be the same as it was historically: 1.6 percent per year in excess of wage inflation.
employers earn less than $15 per hour and would each have to work at least four hours per week for free in order to compensate their employer for the penalty owed because of his employment. The point here is not that the employer penalty is the employee’s “fault” or “obligation” – it’s just to gauge the magnitude of the employer penalty from the perspective of the parts of the labor market where the penalties will accrue. The middle two scenarios in Table 2 therefore have a full-time employment tax of $p$ equal to the amount earned in 4.1 hours per week of work.

Among the scenarios with new incentives, the two most common scenarios primarily elevate quasi-fixed costs on full-time work, and a third scenario elevates that cost as well as significantly raising marginal earnings tax rates. All three scenarios involve economically significant changes in work incentives, and almost half of the workforce experiences one of them. All three scenarios encourage work schedules of exactly 29 hours per week, especially among those whose weekly work hours would have been above but near that amount. Those who work full-time under the ACA are encouraged to work more hours per week and fewer weeks per year.

II. A Model of the Distribution of Weekly Work Hours

The purpose of this paper is to make predictions for the distribution of work hours under the ACA, with special attention to the fraction of employees working part-time and the propensity of workers to have schedules pushing the ACA-defined hours limit for part-time workers. I therefore extend the homogeneous-worker model (2) to acknowledge the fact that hours worked can vary across workers even when those workers face a common set of tax parameters. The extended model also considers the demand for labor and looks closer at labor supply. Hours and employment distributions are simulated from the extended model, once for each of the four scenarios in Table 2.

A. Equilibrium Defined

A representative family consists of various types of persons who are heterogeneous in terms of their willingness to supply labor. Person types are indexed by $i \in [0,1]$. Without loss of generality, each type supplies the same aggregate work hours absent the ACA. The representative family’s utility function is (3):
where, as before, \( c \) is household consumption or disposable income. Holding constant disposable income, the household typically (although not always: see below) prefers not to supply labor: the primary reason it supplies labor is to obtain income. The constant preference parameter \( \eta > 0 \) is the Frisch wage elasticity of the supply of aggregate hours \( N \) and indicates the size of the incentives required to induce households to supply additional labor. \( \gamma_i \) is a type-specific parameter reflecting preferences and the number of family members of each type.

Although the right-hand side of equation (2) shows how each type of person in the extended model ultimately contributes to his household income, it assumes without proof that the employer penalty and other quasi-fixed costs come out of — a.k.a., are “passed through to” — employee pay. The extended model uses the logic of supply and demand, rather than a pass-through assumption, to estimate the degree to which quasi-fixed costs are reflected in employee salaries. In order to do so, I let \( q_{PTi} \) or \( q_{FTi} \) denote the amounts, if any, that employers subtract quasi-fixed costs \( q \) and \( pZ \) from part-time and full-time employee salaries, respectively. My conclusions about pass through are based on the model’s predictions for the effect of the latter cost variables on the former equilibrium wage structure. With these additional wage structure variables and heterogeneous family members, the household budget constraint (2) becomes (4):

\[
\ln c - \frac{\eta}{\eta + 1} \int_0^1 \gamma_i N_i^{(\eta+1)/\eta} di
\]  

Note that the model is consistent with a discrete number of types merely by discretely partitioning the unit interval and assuming that \( \gamma_i \) and \( \bar{h}_i \) are constant within each partition.

The weekly pay of each type of person in the family is shown in equation (4)’s square brackets. Specifically, a type \( i \) employee working part time \( h_i \leq \bar{h} \) hours per week is paid \( wh_i - q_{PTi} \) per week. \( q_{PTi} \) is in effect the weekly employment fee that employers charge type \( i \) workers when they work part time, although in practice I doubt the fee would be labeled so explicitly and instead the position would be described as one in which the employee is required to work \( h_i \)
hours and gets paid \( w_i \cdot q_{PTi}/h_i \) per hour of work.\(^\text{17}\) A type \( i \) employee working full time \( h_i > h \) hours per week is paid \( wh_i - q_{FTi} \) per week, because the \( I(h_i > h) \) term in equation (4) is one and the \( q_{PTi} \) terms disappear.

In order to reflect the fact that work schedules vary across persons, in large part due to preferences and occupational considerations, the extended model (4) has an hours supply cost function \( f \) varies across types in a one-dimensional way related to the cost parameter \( h_i \). The hours cost function satisfies:

\[
f(h_i; h_i) = 0, \quad f'(h_i; h_i) = 0, \quad f''(h_i; h_i) > 0\]

(5)

In effect, the cost parameter \( h_i \) is an index of how preferences, occupations, and other person-specific variables influence the work schedule. I sometimes refer to \( h_i \) as “desired work hours” because, as I show below, a person of type \( i \) would optimally work exactly \( h_i \) per week if there were no quasi-fixed costs of employment.

Each type of worker does a somewhat different task, and the composite gross output of the economy is a constant elasticity of substitution (hereafter, CES) function of the worker inputs:

\[
Z \left[ \int_0^1 N_i^\sigma q_i \sigma^{-1} di \right]^{\sigma/(\sigma-1)} - \int_0^1 n_i q_i di
\]

(6)

where the first term is gross output, \( q \geq 0 \) is the quasi-fixed cost of employing each worker of type \( i \), and the constant \( \sigma > 0 \) is the elasticity of substitution in production. Note that each type of worker symmetrically enters the production function (6), which means that no type of model worker is intrinsically more productive than another. In practice, worker productivity varies widely across workers based on training, knowledge, schooling, health, etc., but this paper focuses on how work schedules, rather than pay, vary across people. Because a low wage

\(^{17}\) If the employee wanted to work a different number of hours, he could do so in a different position and would have to accept the schedule and hourly pay that goes with it.
worker takes more hours to earn a given dollar amount than a high wage worker does, this paper indirectly captures some of the differences in pay across workers by building its model on the hours equivalent of the FTETs.

The representative employer’s profits are:

\[
Z \left[ \int_{0}^{1} \frac{N_i^{\sigma-1}}{\sigma} \, di \right]^{\sigma/(\sigma-1)} - \int_{0}^{1} \{w_i n_i + [q - q_{PTi} + I(h_i > h)(pZ + q_{FTi} - q_{PTi})]n_i \} \, di
\] (7)

where the term in braces is the sum of salaries, quasi-fixed costs \( q \), and employer penalties \( pZ \).

Following the presentation in Table 2, the full-time employment tax parameter \( p \) is measured in work hours rather than units of the consumption good; the technology parameter \( Z \) converts hours to units of the consumption good.\(^\text{18}\)

Given taste and technology parameters \( \eta, \sigma, Z, a, q \), and \( \{ \gamma_i \} \), and tax parameters \( t, \tau, h \) and \( p \), a competitive equilibrium is a value \( g \) for the lump sum transfer, mappings from type to marginal wages \( w \), part-time employment fees \( q_{PT} \), full-time employment fees \( q_{FT} \), employment \( n \), weekly hours \( h \), and aggregate hours \( N \), such that (i) each type’s aggregate hours are the product of its employment and weekly hours; (ii) each type’s employment and aggregate hours maximize profits (7) taking wages, lump sum transfers, penalties, and employment fees as given; (iii) each type’s employment, weekly hours, and aggregate hours maximize (3) subject to \( N_i = n_i h_i \) and (4), taking wages and employment fees as given; and (iv) the government budget constraint (8) balances:

\[
g = (t + \tau) \int_{0}^{1} \{w_i h_i - q_{PTi} - I(h_i > h)(q_{FTi} - q_{PTi})\}n_i \, di + \int_{0}^{1} I(h_i > h)pZn_i \, di
\] (8)

Without loss of generality, types \( i \) are ordered so that equilibrium weekly hours without the ACA \((\tau = p = 0)\) are weakly increasing with \( i \).

My model (3) through (8) is similar to models by Rosen (1978), Calmfors and Hoel (1988), and Hart (1987), which have been used to examine the employment and hours

\(^{18}\) Equivalently, the dollar penalty of the penalty \( pZ \) could be measured directly and then \( p \) inferred from that measure by dividing by \( Z \).
consequences of a range of workweek policies, except that I put the cost of supplying weekly
hours in the household budget constraint rather than the employer profit function and, most
important for examining the ACA, allow for an equilibrium discontinuity in the household
budget set.\textsuperscript{19}

**B. Qualitative Results**

Equilibrium hours per type \(i\) employee minimize costs per hour (9):

\[
x_i \equiv \min_h \frac{a + (1 - t - \tau)[q_{PTi} + I(h > \bar{h})(q_{FTi} - q_{PTi})]}{h} + \frac{f(h; \bar{h}_i)}{h}
\]

(9)

where \(x_i\) denotes type \(i\)'s minimum hourly cost.

Holding constant a type’s aggregate work hours \(N_i\), the profit function is linear in type \(i\)
employment, which means that the employer penalty and quasi-fixed costs must be passed to
employees one-for-one:

\[
q_{PTi} = q
\]

\[
q_{FTi} = q + pZ
\]

(10)

In other words, all types of part-time workers pay the same implicit employment fee and its
amount is equal to the non-ACA quasi-fixed cost \(q\) paid by employers. Full-time workers pay an
implicit employment fee that is equal to \(q\) plus the amount \(pZ\) of the employer penalty, if any.
As a matter of economics the employer penalty is really an employee penalty, even though
employers are legally liable for it, because it comes out of employee salaries.\textsuperscript{20}

If an employee’s cost (9) is not minimized at the part-time threshold \(h\), then the optimum
hours is an increasing function of \(a + (1 - t - \tau)q + I(h > \bar{h})pZ\), with the sensitivity of
optimal hours determined by the degree of convexity of the cost function \(f\). Without the ACA, \(p\)
would be zero and this term would just be \(a + (1 - t)q\). Recall from the scenarios listed in
Table 2 that the ACA either introduces \(\tau > 0\) or \(p > 0\), or both. The marginal tax rate hike by

\textsuperscript{19} See also Oi (1962).

\textsuperscript{20} Regardless of whether employer penalties are fully subtracted from employee salaries, a dollar of
implicit FTET – that is, tax-adjusted exchange subsidies forgone – is equivalent to a dollar of employer
penalty.
itself tends to reduce employment and weekly hours, whereas the penalty \( p \) tends to reduce employment and increase hours among workers with hours above the penalty threshold. Of course, the penalty also induces workers whose optimal hours would be near but above the threshold to work below the threshold in order to avoid the (sometimes implicit) penalty.

A household’s first order condition for type \( i \) employment is:
\[
(1 - t - \tau)w_i - x_i = cy_i N_i^{1/\eta} \tag{11}
\]

Combining the condition (11) with an employer’s first order condition requires the distribution of aggregate hours across types satisfy (12):
\[
(1 - t - \tau)ZN_i^{-1/\sigma} \left[ \int_0^1 N_i^{-\sigma+1} \frac{d}{di} \right]^{1/\sigma-1} = cy_i N_i^{1/\eta} + x_i \tag{12}
\]

Under any one of the four scenarios, the ACA affects weekly employment rates differently at different points in the hours distribution. Persons with high desired weekly hours (including those who would work 40 hours without the ACA) work fewer weeks and more hours per week as a result of a penalty on full-time work, while most persons induced to set hours at the threshold are working more weeks and fewer hours. The hike in marginal earnings tax rates reduces employment more among those with low desired hours because they have less surplus earnings beyond their quasi-fixed costs. As a result, the ACA has a composition effect on average hours per employee that can go in either direction.

Equation (12) also shows how the shape of the hours cost function \( f \) affects the equilibrium type profile for aggregate hours \( N \) only through the profile for the hourly cost variable \( x \). Combining (9) and (10), that profile is described by
\[
x_i = \min_h a + (1 - t - \tau)(q + I(h > \bar{h})pZ) + \frac{f(\bar{h}; \bar{h}_i)}{h} \tag{13}
\]

By the envelope theorem, the response of \( x_i \) to a marginal change in the penalty amount \( p \) depends only on \( h_i \) and not the sensitivity of \( h_i \) to the tax parameters (that is, the shape of the function \( f \)). Beginning from a given profile for weekly hours, a marginal change in \( p \) will therefore have the same effect on the profile for aggregate hours regardless of whether
equilibrium weekly hours are sensitive or insensitive to the penalty. Aggregate hours effects of infra-marginal changes in \( p \) do depend on the shape of the cost function \( f \), but only indirectly through the effect of \( p \) on the distribution of weekly hours. For this reason, I expect the model results for aggregate hours to be fairly insensitive to quantitative assumptions about the shape of \( f \).

### III. Model Calibration and Solution

A number of the model parameters are related to the distribution of weekly work hours without the ACA, which I measure as the usual weekly work hours variable from the March 2012 CPS. My CPS sample is any respondent working at least one week and at least eight hours per week during calendar year 2011, and observations are weighted by the product of weeks worked and the CPS March Supplement weight.\(^{21}\)

The CPS reports a perhaps extraordinary fraction – about half – of workers who work exactly forty hours per week. If that fraction is exaggerated, it presents two possible problems for making and interpreting predictions about the weekly hours distribution. First, the historical CPS data may understate the number of persons working 30-39 hours per week and thereby understate the number of persons who will be induced by the ACA to cut hours to 29 or less. Second, the ACA’s measurement of work hours may, in the future, make CPS respondents more aware of the exact number of hours that they are working and thereby change reporting patterns in the CPS even if the ACA did not change behavior. The CPS is arguably the best data I have for this purpose,\(^ {22}\) so I continue with that data and remind the reader about its weaknesses.

#### A. Scalar Non-tax Parameters

The model non-tax parameters consist of two distributions \( h_i \) and \( y_i \) for all \( i \in [0,1] \), a function \( f \) describing the costs of deviating from desired hours, and four scalars \( \eta, \sigma \) and \( a, q \) and

---

\(^{21}\) Weighted by weeks worked, less than one percent of the CPS sample has usual weekly work hours less than 8. Among the remaining sample, 25 percent report usual weekly work hours less than 40 and 52 percent report exactly 40.

\(^{22}\) Time diary studies offer an alternative technique for measuring hours worked, but the diaries usually measure minutes worked per day rather than hours per week. The ACA rules are based on hours per week, not hours per day.
two normalizations that pin down the productivity parameter $Z$ and the mean of the taste parameter distribution. Table 3 lists the model’s scalar non-tax parameters.

For the normalizations I set both employment and gross output without the ACA equal to one. Because model gross output without the ACA is the product of the productivity parameter $Z$ and work hours per capita and the latter is normalized to be work hours per employee, I take $Z$ to be the inverse of average weekly work hours per employee in the CPS, which is 39.8.

My benchmark value for $\eta$ is 0.5, which makes the wage elasticity of aggregate hours supply equal to about 0.6, and also show results for alternative values $\eta = 0$ and $\eta = 0.88$. The $\eta = 0$ case is not of much interest for obtaining final results, because incentives do matter, but it helps as an intellectual exercise to see how much of the ACA impact has to do with changing aggregate hours worked versus changing the composition of those hours among various groups and margins. My benchmark value of the elasticity of substitution between worker types is $\sigma = 2$, based on Montgomery and Cosgrove’s (1993) study of the degree of substitution between full-time and part-time positions, and also show results for an alternative values of 4.

The parameter $a$, which denotes the common quasi-fixed costs paid by households, is set equal to $4.14^*A$ because 4.14 is the average weekly commuting hours among employed persons sampled by 2000 Census PUMS with positive weeks worked in 1999. This is not to say that such costs are limited to commuting time or that commuting time is entirely a cost (part of it may be leisure time), but merely to establish the order of magnitude. I also show results for values of $a$ that are half and double the benchmark value.

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23 Specifically, with $\eta = 0.5$ and the other parameters set at their benchmark values, a consumption-constant increase in the productivity parameter $A$ of the right amount to increase log average hourly earnings by 0.01 would increase log aggregate hours supplied by the median worker type (in terms of desired worker hours, i.e., the large group of people working exactly 40 hours but for the ACA) by 0.0057.

24 Montgomery and Cosgrove estimate a range of 1.7 to 2.6. They treat fringe benefits as a quasi-fixed cost for employers. In my opinion, only the administration of fringe benefits, and not the fringe benefits themselves, are a quasi-fixed cost; the fringe benefits themselves are just a way that employees choose to spend their wages. Because the substitution elasticity is log quantity change per unit log cost change, I suspect that with lesser estimates of the quasi-fixed costs associated with fringe benefits, Montgomery and Cosgrove would have had greater estimates of the substitution elasticity. Also note that Owen’s (1979) estimate (with macro data) of the substitution elasticity is 4.3.

25 The Census asks about the number of minutes to travel to work, which I multiply by ten to get weekly commuting time for a 5-day-week schedule (a factor of two is to include the travel time from work to home). Sample observations are weighted by the Census person weight.
The magnitude of the parameter $q$, which denotes the (non-ACA) quasi-fixed costs paid by employers, can be inferred from the earnings-hours relationship at a point in time. Formally, absent a tax that is specific to full-time work, pre-tax hourly employee compensation for a type $i$ working $h$ hours without the ACA is $(Z - q/h)$, which means that, in theory, a given person moving from full-time to part-time would not only experience a cut in total pay, but also a cut in hourly pay. At least as a qualitative matter, this prediction seems to fit common experience. Moreover, economists have previously interpreted the relationship between hourly pay and hours worked in terms of quasi-fixed costs (Hirsch 2005), and have tried to estimate the causal effect of work hours on hourly pay. If the amount $\delta$ of the log hourly wage cut could be measured as a share of full-time hourly pay, then the measurement would permit us to estimate the magnitude of the quasi-fixed cost $b$:

$$
\frac{q}{Z h_{FT}} = \frac{1 - e^{-\delta}}{h_{FT}/h_{PT} - e^{-\delta}}
$$

(14)

where $h_{FT}$ and $h_{PT}$ are the hours worked on the full- and part-time positions being compared, respectively. Based on the literature cited in the previous footnote, I take $\delta = 0.10$ as my benchmark value, and also show results for $\delta = 0.05$ and $\delta = 0.15$. I calibrate $h_{FT}$ and $h_{PT}$ as the CPS sample average weekly hours worked conditional on full- and part-time status, respectively, based on the definition of full-time used by the Bureau of Labor Statistics (at least 35 hours per week; hereafter, “BLS definition”). As a result, the benchmark value of $q$ is $0.09*(Z_{h_{FT}}) = 4.11*Z$ and the overall non-ACA quasi-fixed costs are split almost exactly between employers and employees.27

26 Hirsch (2005) finds that workers switching from a full-time position to a part-time position lose a full-time log hourly wage premium of about 0.09, but he also reports specifications with a premium that is statistically indistinguishable from zero. Cross-sectional hourly wage comparisons, controlling for various demographic measures, sometimes find a premium greater than 0.09, other times find less. Most of these studies measure wages without including fringe benefits, and the little available evidence suggests that the log compensation premium for full-time work would be about 0.06 greater if fringe benefits were included because part-time employees are typically ineligible for the more valuable fringes like health insurance (Hirsch 2005, p. 546).

27 This is not a statement about the ultimate economic incidence of quasi-fixed costs. The split between employer and employee, as defined above, matters because only the employer quasi-fixed costs are effectively deductible from income for the purposes of payroll and personal income taxation.
B. Costs of Deviating from Desired Weekly Hours

An important part of the cost function $f$ is its convexity, because that determines the sensitivity of weekly hours to quasi-fixed costs and the propensity to reduce hours to 29 in order to avoid implicit and explicit penalties. It is also important that $f$ varies across worker types so that people in the same tax situation may nonetheless work different weekly hours. I therefore assume a two-parameter cost function of the form (15):

$$f(h; \bar{h}) = Z \frac{\bar{h} - h + h \ln \frac{h}{\bar{h}}}{\phi}$$  \hspace{1cm} (15)

where the ratio of constants $Z/\phi > 0$ indicates the slope and convexity of the relationship between hours and cost.28 $\bar{h}$ varies across worker types; $Z/\phi$ does not.

To a second order approximation, equation (15) is proportional to the squared deviation $(h - \bar{h})^2$. I use (15) instead of the squared deviation because it results in a simple closed form solution for equilibrium hours per type $i$ employee in the absence of taxes specific to full-time employment ($s = 0$):

$$h_i = \bar{h}_i + [(1 - t - \tau)q + a] \phi/Z$$  \hspace{1cm} (16)

In other words, equation (16) is the solution to the minimization problem (9) when $q_{FTi} = q_{FTi} = q$, $\rho = 0$, and $f$ takes the form (15). $\phi/Z$ is the sensitivity of optimal weekly hours (per type $i$ employee) to the after-tax quasi-fixed cost when the cost is measured in consumption units.

$\phi$ is the sensitivity of optimal weekly hours to the after-tax quasi-fixed cost when the cost is measured in hours per week. As noted above, the employer penalty is equivalent to the wages generated by 4.1 work hours per week, or about 3.1 hours after earnings taxes. Thus, my model assumes that the employment and work hours effects of the employer penalty for full-time work are essentially the same as they would be if full-time workers (by the ACA definition) were required to travel an extra 3.1 hours per week to and from work (i.e., about 18 minutes per one-way trip); both effects depend on the magnitude of $\phi$.

---

28 In order to normalize units, I show the same parameter $A$ in the production and cost functions.
My model treats the “commuting cost” variable \( a \) as a constant across workers, but equation (16) suggests that \( \phi \) could be estimated by comparing weekly work hours to weekly commuting time across workers. I used the same 2000 Census PUMS sample as above, but limited to respondents with unallocated travel times, and regressed weekly work hours on weekly commuting hours. The coefficient on commuting hours was 0.258, so I use \( \phi = 0.25 \) as the benchmark value and also show results for alternative values \( \phi = 0.15 \) and \( \phi = 0.35 \).

C. The Taste Distributions

Having calibrated \( q/Z, a/Z, \) and \( \phi \), inverting equation (16) with no-ACA tax parameters permits me to infer the cross-sectional distribution of the cost parameters \( \{\tilde{h}_i\} \) from the cross-sectional CPS distribution of weekly hours in 2011:

\[
\tilde{h}_i = \hat{h}_i - \left[ (1 - t) \frac{q}{Z} + \frac{a}{Z} \right] \phi
\]

(17)

where I put a hat over variables in order to indicate a no-ACA value. I measure no-ACA values for weekly hours from the March 2012 CPS.

As noted above, I define the type index \( i \) such that each type supplies the same aggregate hours absent the ACA, \( \tilde{N} \). Equation (12) therefore implicitly defines the profile of disutility parameters \( \{\gamma_i\} \):

\[
\gamma_i = \frac{(1 - t)Z - \hat{x}_i}{\left( 1 - \tilde{N} \int_0^1 f(\tilde{h}_i; \tilde{h}) + a + q \, dl \right) \tilde{N}}
\]

(18)

Note from equation (18) that, in principle, \( \gamma_i \) could be negative, which means that type \( i \) persons would be willing to pay to be employed in a job with schedule \( \tilde{h}_i \), and in equilibrium would pay in the form of commuting costs and employment fees. However, this case rarely occurs in my quantitative results, and when it does it occurs in the far left tail (1/1000\(^{th}\) or so) of the distribution of hours taste parameters \( \{\tilde{h}_i\} \).
D. Solution Technique and the Prevalence of “29ers”

Weekly hours $h$ under the ACA can be calculated separately for each type and scenario from the minimization problem (9). One of the scenarios (plus the no-new-tax scenario) has no penalty specific to full-time workers, so the first order condition (16) is sufficient to calculate equilibrium hours. For the other two scenarios, potential workers can be partitioned into two groups on the basis of weekly hours worked (conditional on employment) without the ACA. A critical hours value $\hat{h}_k$ determines the margin between the two groups and is implicitly defined by (19):

$$1 - \frac{\hat{h}_k - \tau q \phi / Z}{h} + \ln \left( \frac{\hat{h}_k + [(1 - t - \tau)p - \tau q / Z] \phi}{h} \right) = 0$$  \hspace{1cm} (19)

A person of type $k$ would work $\hat{h}_k$ hours without the ACA and thereby has the preferences that make him indifferent between working $h$ hours penalty free under the ACA and working his optimal full-time job subject to the penalty $s$. Persons with non-ACA hours $\hat{h} < \hat{h}_k$ have ACA work hours equal to the minimum of $h$ and the hours determined by the first order condition (16). Persons with $\hat{h} > \hat{h}_k$ have ACA work hours determined by the first order condition (16) with the quasi-fixed cost $q$ augmented to include the penalty $pZ$.

Figure 1 graphs the solutions to equation (19) as a function of $\tau$ and $p$. It also shows the three scenarios from Table 2 that have penalties as a square, circle, and triangle. Figure 1’s horizontal axis measures the penalty in hours per week. Its vertical axis measures the critical value for weekly hours but for the ACA. For example, the triangle located at (4.1,34.7) indicates that persons working more than 34.7 hours but for the ACA would prefer to pay the 4.1-hour penalty and work full-time (by the ACA definition). Persons working less but for the ACA would work part time under the ACA, and in many cases do so by working exactly at the threshold $\hat{h}$. Those working exactly at the threshold are sometimes known as “29ers.”

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29 Persons exactly at the margin work $\hat{h}$ under the ACA, but this never occurs in my data because non-ACA hours are measured as exact integers and the critical value $\hat{h}_k$ is never an integer.

30 A schedule for $\tau = 0.8\%$ is not shown because it is difficult to distinguish from the $\tau = 0$ schedule.
The larger the hours shown in Figure 1, the greater the percentage of workers who will work exactly at the threshold \( h \) under the ACA. For the workers at ESI employers who satisfy the other income and family criteria for exchange subsidies, the critical value is shown as a square. The height of the square is 36.3, which means that some of the “29ers” would be working 36 hours per week (when they are working) but for the ACA.

In order to solve for the distribution of employment rates under the ACA, I begin with a guess for ACA-equilibrium consumption \( c \) and gross output \( y \), conditional on one of the scenarios from Table 2. Equation (20) is solved type-by-type for the distribution of aggregate work hours \( \{N_i\} \):

\[
(1 - t - \tau)ZN_i^{\frac{1}{\sigma}}\left(\frac{y}{Z}\right)^{1/\sigma} = \frac{(1 - t)Z - \hat{x}_i}{1 - \hat{N} \int_0^1 \frac{f(h_i; \hat{h}_i)}{\hat{h}_i} dl} c \left( \frac{N_i}{\hat{N}_i} \right)^{1/\eta} + x_i
\]

Taking \( n_i = N_i/h_i \), I then check whether the guesses for gross output and consumption are consistent with the solutions. If not, I revise the guesses and repeat until convergence. This iterative process is done once for each of the scenarios shown in Table 2. The result of the simulation is a competitive equilibrium as defined above because it satisfies the conditions stated in the equilibrium definition.

**E. Predictions for demographic groups**

The model allows for various possible impacts of the ACA on hours and employment because different tax scenarios are possible (see Table 2) and because the model is populated with a distribution of types that differ in terms of their desired weekly work hours. I use the model to make predictions for demographic groups by measuring the propensity of each group to supply hours without the ACA (as measured in the March 2012 CPS) and to experience each of

---

31 I use 92 types (one for each of the integer weekly hours amounts reported in the CPS, excluding 1-7) and revise the guesses by setting them to the consumption and gross output implied by the solutions to (20) in the previous step. Convergence occurs in less than ten steps and all five scenarios combined can be calculated in less than one second on a PC.
the five tax scenarios. An appendix (available upon request) shows the weights, but the primary features are (i) women are about 2/3 of those working less than 40 hours per week (in 2011), and about 1/3 of those working more than 40, (ii) working household heads are especially likely to work more than 40 hours, regardless of marital status, but unmarried working household heads are also disproportionately represented in the 30-40 hour range, (iii) the working elderly are especially likely to work less than 30 hours, and (iv) that unmarried working household heads are almost three times as likely to forego the exchange subsidies as a consequence of working full-time at an employer offering ESI.

IV. Predictions for Work Schedules and Employment under the ACA

A. The Hours Distribution and Employment

The law’s impact on weekly hours worked per type \( i \) employee is:

\[
\Delta h_i = \begin{cases} 
  \left( (1 - t - \tau) p - \frac{q}{Z} \right) \phi & \text{if } \hat{h}_i > \hat{h}_k \\
  \min \left( \underline{h} - \hat{h}_i, -\tau \phi \frac{q}{Z} \right) & \text{if } \hat{h}_i \leq \hat{h}_k 
\end{cases}
\]  

(21)

where I use \( \Delta \) to denote the “ACA impact” operation: the difference between an ACA outcome and its corresponding no-ACA outcome (indicated with hats). The top line is the impact among longer-hours employees: they work full-time even under the ACA. The first term in the min operator is the impact among workers with exactly \( \underline{h} \) hours under the ACA, and would be working full-time absent the ACA. The second min term is for the remaining workers, who work part-time regardless of the ACA.

For each of the four tax scenarios, I calculate equilibrium distributions of employment and work hours, and then average the distributions using the weights shown in Table 2. Figure 2 shows the overall hours distribution with and without the ACA, excluding people who are not

---

32 For the population as a whole, employment and aggregate hours under a tax scenario are unweighted cross-type integrals of the corresponding type-level variable. For a specific demographic group, the integrals are reweighted to reflect the group’s representation among each type.
working during the week.\footnote{Appendix II shows the results separately by scenario.} Below 29 hours per week, there is little change in the hours distribution. Not surprisingly, the hours distribution under the ACA has less density between 30 and 35 hours than without the ACA because those are the worker types who can reduce hours below the ACA-defined threshold for full-time work, which is relevant for workers subject to employer penalties or workers who are ineligible for exchange subsidies solely because they have been offered ESI on a full-time job.

The right half of the hours distribution is shifted slightly to the right because the employer penalties and the exchange subsidies foregone by ESI workers are quasi-fixed costs of employment. People who prefer to work full-time can avoid penalties and/or enhance subsidies by working slightly more hours per week and fewer weeks per year.

Table 4 shows summary ACA-impact estimates. The top panel has a breakdown by tax scenario, and the bottom panel a breakdown by demographic group. The bottom row of each panel shows the total for all scenarios or groups combined. According to the benchmark model, the ACA reduces both employment and aggregate hours by about three percent. The effects on employment rates and aggregate hours are economically significant under the two most common scenarios – “penalty only” and “subsidy foregone due to ESI” – but nonetheless far less than under the (less common) middle scenarios.

The final two columns quantify the bump in the hours distribution shown in Figure 2: 5.0 percentage points more of the workforce will work 26-29 hours per week – “the 29ers” – than would without the ACA.\footnote{I use a slightly broader definition of “29er” to include those working 26, 27, or 28 hours per week because the threshold for salaried workers may be 4 days, rather than 30 hours, per week. The final rule issued by the U.S. Treasury states “For employees paid on a non-hourly basis (such as salaried employees), an employer may calculate the actual hours of service using the same method as for hourly employees, or use a days-worked equivalency crediting the employee with eight hours of service for each day for which the employee would be required to be credited with at least one hour of service…. The proposed regulations prohibit use of these equivalencies, however, in circumstances in which their use would result in a substantial understatement of an employee’s hours of service...” (United States Department of Treasury 2014, pp. 22-23).} The final column shows that the percentage of workers under the ACA that are part-time by the BLS definition (that is, 34 hours per week or less) is within 2.9 points of the percentage without the ACA. This is another indicator that the frequency of 29ers can increase without increasing as much the fraction of workers working part time by the BLS definition.
The employment impacts of the ACA’s quasi-fixed costs reflect two forces: (i) a tendency to substitute weekly hours for weekly employment, holding aggregate hours fixed, in order to economize on the ACA’s quasi-fixed costs, and (ii) reductions in aggregate work hours due to a lost surplus from working. Figure 3 illustrates by showing the cross-sectional relationship between impacts on weekly work hours and weeks worked (both in logs) among persons experiencing the “subsidies foregone by ESI workers” tax scenario. If aggregate hours were held fixed, then the schedule in Figure 3 would be a straight line with slope equal to minus one. The fact that the schedule tends to be concave, with slopes closer to zero in the second quadrant and slopes further from zero in the fourth quadrant, means that aggregate hours impacts are more negative for worker types further from the origin in Figure 3.\textsuperscript{35} A negative effect of the ACA’s penalties on aggregate work hours is to be expected given that workers either pay the ACA’s taxes (implicit or explicit) or make costly behavioral adjustments to avoid those taxes.

B. Average Hours per Employee: Offsetting Effects

The middle columns of Table 4 show the ACA’s impact on work hours per employee, by two measures. The first “VW” (“variable-weight”) measure may be the most familiar because it just divides aggregate hours by the number of employees. However, this measure could be affected by the ACA even if zero employees had the length of their workweek affected because employment rate impacts could be correlated with the length of the workweek. The “IW” (initial-weight) measure averages type-specific weekly hours changes, using non-ACA employment rates as weights. By construction, this measure shows an impact only if the impact is nonzero for at least one type of worker. The IW measure is different from the VW measure to the extent that the ACA affects the composition of worker types among those employed during any given week.

Overall, both measures show essentially zero impact on weekly hours per employee because some worker types reduce their hours (conditional on employment), and other worker types increase it. However, the two measures are somewhat different at a scenario level because

\textsuperscript{35} The jump in the schedule reflects results for worker types in the far left tail of the desired hours distribution, among which the surplus for working (and thereby the sensitivity of their supply of aggregate hours) varies widely.
two scenarios have employment rates fall more for high-hours workers and the other ("phaseout and penalty") has employment rates fall more for low-hours workers. The latter case is especially interesting because the model predicts that low-hours workers had little surplus from working before the ACA, and the ACA’s increase in the marginal tax rate eliminates them from the labor market.\textsuperscript{36}

**C. Results by Demographic Group**

The bottom panel of Table 4 shows results for demographic groups, which are formed by changing the scenario and worker-type weights to match the group of interest, rather than for the population as a whole. Women (without regard to marital status) and unmarried household heads are especially likely to cut their hours to the ACA’s hours threshold, both because they are disproportionately likely to otherwise work 30-35 hours and can therefore move to 29 hours with comparatively little cost.\textsuperscript{37} Unmarried heads are also more likely to have their exchange subsidy eligibility hinge on their ESI status, because by definition they do not have a spouse who could get them ESI coverage.

Unmarried heads also have the most negative impact on their employment rates and weekly work hours. The elderly, defined to be persons in households in which the youngest person is at least 65 years old, have the impacts closest to zero because they cannot receive exchange subsidies regardless of how much they earn or work. The elderly may work at employers that are assessed the employer penalty, in which case they experience the “penalty only” tax scenario.

**D. Sensitivity Analysis**

\textsuperscript{36} To put it another way, to the extent that the model is wrong that the employment rates are especially sensitive among low-hours workers, then the IW measures are more informative than the VW measures.\textsuperscript{37} The 2011 distribution of weekly work hours by demographic group is shown in Appendix II. Throughout the paper, I assume that all groups have the same utility parameter $\eta$ that quantifies the wage elasticity of labor supply. If women’s labor supply were significantly more elastic than men’s, then Table 4 may understimate the magnitude of the ACA’s impact on women’s employment and aggregate hours worked.
In a way, the ACA full-time threshold of 30 hours per week strikes a balance between groups of workers reducing weekly hours and groups increasing them, resulting in entries for Table 4’s middle two columns that are essentially zero. For this reason, the willingness of employers and employees to adjust work schedules does not matter much for determining the employment and hours effects. If adjustments are more costly than I assume, then the size of the downward hours adjustments would be smaller than I assume – there would be fewer 29ers – but the size of the upward adjustments would be less too, so the net weekly hours results would not be much different than shown in Table 4. Nonzero adjustments would occur in both directions, though, and by assumption the work schedule adjustments are costly, so that the ACA still significantly reduces the reward to employment even when employers or employees find work schedule adjustments to be costly. By the same reasoning, the results should not be much different if work schedule adjustments were less costly than I have assumed, except that the number of 29ers would be greater.

Table 5 confirms the intuition above. The top row of the table displays the results under my benchmark assumptions – namely the results shown in the bottom row of Table 4. The next two rows show the results under two alternative assumptions about the employee costs of schedule adjustments. The following “high employer substitution” row shows results under the assumption that employers are easily (that is, with minimal loss of productivity) able to substitute part-time positions for full-time positions. Notice that the employment rate, aggregate hours, and average weekly hours columns are hardly different in rows (2)-(4) than they are under the benchmark. What varies more is the number of workers who become 29ers under the ACA, and the number of workers who work part-time under the BLS definition.

The next two rows of the table look at 34- and 35-hour thresholds for full-time work, rather than the 30-hour threshold that is in the law. Nobody becomes a 29er under the 34- and 35-hour thresholds, because a 29-hour schedule has no special advantage. However, with a 34-hour threshold 15.9 percent of the workforce changes their work schedule from 34-plus hours to less than 34 hours (typically, they change to exactly 33 hours). Moreover, the middle columns of the table show that the 34-hour threshold no longer attains the balance between groups of workers reducing weekly hours and groups increasing them. The former groups dominate, and average weekly hours fall more than one percent. Employment rates fall less than one percent.

38 The elasticity of substitution in production is $\sigma = 2$ in the benchmark and $\sigma = 4$ in Table 5’s fourth row.
With the 35-hour threshold, even workers who would otherwise be working 40 hours may find it worthwhile to cut their schedule by six hours in order to avoid the 5.5-hour quasi-fixed cost. It is even possible that aggregate employment rates increase. Thresholds greater than 30 hours result in less net government revenue (not shown in the table) than the actual 30-hour threshold, because the higher threshold encourages more workers to avoid the penalty or obtain the exchange subsidies.

The exchange plans through which households receive subsidies are not identical to employer plans, so it is possible that people value the exchange subsidies less than they cost the government. My benchmark assumption is that households discount exchange plans at 25 percent of their full cost due to their unique plan features. Table 5’s row (7) shows the result if instead the remaining net subsidy were discounted an additional 25 percent: that is, using a 4.2-hour equivalent of the implicit full-time employment tax rather than 5.5 hours. Row (7) also gives a good indication of what the impact estimates would be if I have over-estimated exchange plan premiums for 2016.

For the purposes of setting the frequencies of Figure 2’s tax scenarios, I may have underestimated the degree to which the employer penalty will prevent ESI employers from dropping their coverage. Row (8) therefore shows the results of changing the scenario weights to reflect ten million more people (including dependents) on the exchanges and correspondingly fewer workers in the implicit FTET scenario. This adjustment decreases the prevalence of 29ers because the implicit FTET is typically greater than the employer penalty, but reduces aggregate hours because the workers on the exchanges face a greater marginal earnings tax rate than ESI workers do.

It is also possible that the employer penalty is weakly enforced, cleverly avoided, or never implemented. Row (9) therefore takes the setup from row (8) – with more workers on

---

39 As noted above, the CPS data show about half of workers working exactly forty hours per week in 2011, and gives little information as to how work schedule preferences might vary within that group. My model’s quantitative predictions are therefore inaccurate when the gap between the full-time threshold and 40 is near to, or less than, the hourly amount of the full-time employment tax, as it is with the 35-hour threshold.

40 In other words, I assume that, on average, ESI workers leaving their job need a premium discount of at least 25 percent in order to be willing to purchase an exchange plan rather than going uninsured or paying full price to stay on their former employer’s plan.

41 For example, the ACA does not require employers to offer coverage to new employees and gives employers up to a year to measure a new employee’s work schedule to determine whether it is full time.
exchanges and fewer workers at ESI employers – and eliminates the employer penalty. By comparison with row (1), row (9) suggests that the employer penalty is responsible for only a quarter of the employment and hours reductions, in part because it helps keep employees away from the exchanges and their high marginal income tax rates.\footnote{By just moving workers to the “subsidy phase out and penalty” scenario from the implicit FTET scenario, I may have exaggerated the differences between rows (1) and (9), because some workers would be moving into the implicit FTET scenario from “no new incentives” as a consequence of employers’ dropping coverage. An example of the latter shift would be ESI workers who would have access to coverage through a spouse if the spouse’s employer had retained coverage.} The same comparison from Table 5 also suggests that the employer penalty is responsible for more than half of the 29ers, but part of the reason why the employer penalty creates 29ers is that it makes it difficult for full-time workers at ESI employers to obtain the exchange subsidies without reducing their hours.

The next four rows show alternative values for the quasi-fixed costs both on the employer and employee side. Increasing either quasi-fixed cost matters more for the ACA employment and aggregate hours impact estimates than decreasing the quasi-fixed costs because quasi-fixed costs cut heavily into the surplus of workers with low weekly hours. In effect, increasing quasi-fixed costs while holding constant the utility parameter $\eta$ makes the employment rates of low-hours workers especially sensitive to income and employment taxes. The ACA’s impact on the prevalence of 29ers is insensitive to non-ACA quasi-fixed costs.\footnote{In other words, the sensitivity analysis with respect to the quasi-fixed costs is another way of demonstrating that the ACA’s impact on aggregate hours, but not its impact on weekly hours, varies with the responsiveness of labor supply to incentives because higher quasi-fixed costs create additional responsiveness, holding $\eta$ constant.}

While quasi-fixed costs determine the responsiveness of aggregate hours to incentives, the value $t$ of the non-ACA marginal earnings tax rate determines the effect of ACA tax parameters on incentives. The greater is $t$, the greater is the proportional effect of ACA tax parameters on after-tax earnings share, and it is proportional changes in the after-tax share that drive aggregate hours. Rows (14) and (15) confirm this idea, showing that the ACA’s aggregate hours impact is greater when $t$ is set higher than 25 percent and less when $t$ is set lower than 25 percent.

The final row shows that the negative employment and aggregate hours impacts exceed four percent when the model parameter $\eta$ is adjusted so that the Frisch elasticity with respect to the measured wage (net of employer-paid quasi-fixed costs) is assumed to be one for the median

\begin{itemize}
\item During this period, the new employee can receive exchange subsidies even though his employer is not being penalized.
\end{itemize}
worker rather than the value of 0.57 it has with the benchmark parameters.\textsuperscript{44} However, the Frisch elasticity has little to do with the model’s predictions for the prevalence of 29ers.

V. Conclusions

The Affordable Care Act has several economically distinct types of taxes that will affect work schedules. One is an explicit tax on full-time employment in an amount proportional to the number of full-time employees on the payroll, levied on employers that do not offer affordable health coverage to their full-time employees. The second, but not necessarily less important, is the full-time employment tax that is implicit in the fact that full-time employees at employers that do offer affordable coverage are ineligible to receive subsidies on the law’s new health insurance exchanges, whereas part-time employees (and persons not on any payroll) may get them. The third new tax is a combination of income taxes including the income tax implicit in the determination of the amount of the exchange subsidies. This paper emphasizes that income taxes are not the same as full-time employment taxes.

One contribution of this paper is to quantify the magnitude of the three types of new taxes, both in terms of fractions of the workforce that face them and the magnitudes experienced by those who do face the new taxes. In doing so, I account for the tendency of the ACA to move people off of means-tested uncompensated care, and the facts that (i) many people will not participate in programs for which they are eligible, (ii) the ACA implicitly taxes unemployment benefits, and (iii) the ACA has a “family glitch” that prevents a number of married non-workers from getting subsidies. The ACA elevates income tax rates by more than 20 percentage points for part of the population, but that part of the population is small enough that the aggregate effects of either of the two new full-time employment taxes are probably more significant. On average, the ACA provisions considered in this paper will create a combined quasi-fixed cost of full-time employment of about 2.1 hours per week and, in addition, increase the average marginal earnings tax rate by 1.8 percentage points.

\textsuperscript{44} In this case $\eta = 0.88$. If $\eta = 0.88$ and the non-ACA earnings tax rate were 35\% rather than 25\%, then the ACA’s impact on log employment and log aggregate hours would be -0.053 and -0.051, respectively (and not shown in Table 5), rather than the -0.044 and -0.043 shown in the last row of the table.
Another contribution of this paper is to estimate the long run impact of the new taxes on employment and the distribution of weekly work hours separately by demographic group by adapting and calibrating a model familiar from the labor economics literature. Not surprisingly, the model predicts that a large majority of the workforce works full time despite the new full-time employment tax. For them, the full-time employment tax is just an employment tax and thereby induces them to work fewer weeks and slightly longer weekly schedules than they would without the ACA. A smaller part of the workforce makes a larger absolute change in their weekly work hours – in the direction of a shorter workweek – in order to avoid the full-time employment taxes.

One of the economic results that is perhaps contrary to conventional wisdom is that a tax on long-hours work schedules can increase work schedules more often than it decreases them. As a result, the ACA’s overall impact on average hours per employee may be essentially zero. But the near-zero average effect does not mean that the ACA fails to distort work schedules and their efficiency, just that the work schedule effects may not be detectable with aggregate data, even if that data were disaggregated according to the 35-hour definition of full-time work that has been used by the Bureau of Labor Statistics over the years.

Another result contrary to the conventional wisdom is that equilibrium average employment rates do not increase to “compensate” for work hours lost due to taxes on full-time schedules. Both the ACA’s full-time employment tax and its income tax significantly reduce the fraction of the population that is on a payroll in any given week because, as parameterized, the ACA’s full-time employment tax is typically avoided by reducing the number of jobs rather than reducing the propensity of jobs to be classified as full time. My conservative estimates suggest that the ACA will reduce the nationwide employment rate by three percent below what it would have been without the ACA. These results are consistent with empirical studies of public policies that raise the relative employer cost of weekly work hours without creating a

---

45 The three percent estimate is an impact and not an estimate of the employment rate change between, say, 2012 (before the exchanges and penalties took effect) and 2016. Non-ACA factors, such as the aging of the workforce and the expiration of the Emergency Unemployment Compensation program, have also been changing between 2012 and 2016.
commensurate increase in employment because the average hour worked by employees is more expensive and/or less productive.\textsuperscript{46}

The ACA reduces employment because it reduces the incentive for out-of-work people to accept jobs and because it subsidizes layoffs, quits, and retirements. Before the ACA, people found health insurance to be less expensive when employed than it was when not working, and health insurance expenses were one reason why unemployed people have been eager to get back to working in a position with coverage (Gruber and Madrian 2004). But the ACA permanently reverses the calculus by giving people who do not work more opportunities for subsidized coverage than employed people will have. Employers and employees used to find layoffs, quits, and (before age 65) retirements to be financially costly because, among other things, many people want to have health insurance coverage even after their job ends. For example, a survey of employers shows how layoffs traditionally created a liability for them because “they provided some amount of free or reduced cost [continuing] coverage for laid-off workers,” but that federal assistance can free employers from this expense by allowing them to reduce or drop their benefits for laid-off workers.\textsuperscript{47} Employers have already realized that the ACA’s exchange subsidies make early retirements less expensive (Dardick 2013).

The ACA’s labor market effects vary by demographic group. Unmarried household heads may reduce their employment rates by five or six percent. They will also be especially likely to work a schedule that keeps their hours just below the ACA threshold, but nevertheless their average weekly hours may noticeably increase as a consequence of the law.

The elderly are hardly affected by the law because their longstanding Medicare program renders them ineligible for the new exchange subsidies and the implicit income and full-time employment taxes that go with the subsidies. Women are about twice as likely as men to have their weekly work hours pushed below 30 as a consequence of the law.

At first glance, my predictions may seem at odds with Massachusetts’ experience with the “Romneycare” health reform law signed by Governor Romney in 2006 because the evolution of the Massachusetts labor market after that date does not appear to be significantly different than in other states without health reforms (Dubay, Long and Lawton 2012). However, the labor

\textsuperscript{46} Some studies even find that raising the employer cost of weekly work hours reduces employment. See the literature surveyed by Hamermesh (1996a, Chapter 3) and Hamermesh (1996b, pp. 106-7).

\textsuperscript{47} Bovbjerg, et al. (2010). Topel and Welch (1980) also explain how benefits for the unemployed are, in effect, layoff subsidies.
taxes created by Romneycare and the ACA are qualitatively and quantitatively different from each other. The Romneycare employer penalty was proportional to total work hours at an employer, rather than the number of full-time employees as with the ACA’s employer penalty, and was an order of magnitude less than the penalty in the federal law (Mulligan 2013b). Although both Romneycare and the ACA created subsidized health plans for persons who could not obtain coverage from their employer, Romneycare hardly introduced any new implicit employment tax because its subsidized coverage had a number of limitations and had been preceded by longstanding health assistance programs for the unemployed.

This paper focuses on the ACA’s consequences for work schedules, but some of the same disincentives have other effects as well. People and businesses may misreport incomes (or work entirely off the books) in order to maintain eligibility for income-tested benefits. They may also misreport hours worked so that the employer avoids a penalty or the employee remains eligible for exchange subsidies.

VI. Appendix: Derivation of the household budget constraint

Heads and spouses not offered ESI coverage during any part of the calendar year

Worker i’s family disposable income $c_i$ is, net of taxes, subsidies, and health expenses:

$$c_i = y_i - a n_i + (s_0 - \beta y_i) - ty_i \quad (22)$$

$$y_i = n_i h_i w_i + (1 - n_i) UB_i + o_i - n_i I(h_i > h)pZ \quad (23)$$

where, as in the main text, $y_i$ denotes income reported on the personal income tax return, including spousal income (if any) and $a$ denotes quasi-fixed costs paid by the household. The term in equation (22)’s parentheses is the exchange subsidy, which is approximated as a linear function of income $y$, or zero if the household is not eligible. The $ty$ term is the non-ACA income and payroll taxes. $n_i$ is the fraction of the year person $i$ was on a payroll, $h_i$ is weekly work hours, and $w_i$ is the hourly wage rate. $UB$ denotes a taxable unemployment insurance
benefit. \(o_i\) denotes other sources of reported income such as spousal earnings and asset income. \(pZ\) is the salary equivalent of the employer penalty, and \(p\) is its hours equivalent. The \(nI\) term reflects the fact that the penalty only applies when worker \(i\) is on a payroll as a full-time worker.

Substituting (23) into (22); defining \(q = UB\), \(\tau = \beta\), and \(g \equiv s_0 + (1-t-\tau)(UB+o)\); and inserting the work-schedule term \(f(h)n\) yields equation (2) from the main text.

**Heads or spouses offered ESI coverage when working full time**

In this case, the exchange subsidy is received only when worker \(i\) is not at work full time (and has a family member enrolled in exchange coverage). The budget constraint is:

\[
c_i = y_i - an_i - f(h_i)n + (s_0 - \beta y_i)[1 - I(h_i > h)n_i] - ty_i
\]  

(24)

With three definitions, the budget constraint becomes

\[
c = g_i(y_i, I(h_i > h)n_i) + (1 - t - \tau_i)y_i - \{(1 - t - \tau_i)I(h_i > h)p_Z + a + f(h_i)\}n_i
\]

\[
\tau_i \equiv [1 - I(h_i > h)n_i]\beta, \quad p_Z \equiv \frac{s_0 - \beta \hat{y}_i}{1 - t - \tau_i},
\]

(25)

\[
g_i(y_i, I(h_i > h)n) \equiv s_0 + \tau y_i - \beta y_i - (\hat{y}_i - y_i)\beta I(h_i > h)n_i
\]

where hats indicate values before the ACA. The budget constraint (25) is different from (2) in only that the \(g\) term in (25) is not a constant. It is constant to a first order approximation, though, because the two first partial derivatives of the \(g\) function are zero in the neighborhood of the values of income, hours, and weeks that occurred before the ACA. In other words, equation (25) is a more complicated version of the budget constraint in which the marginal income tax rate varies with the number of weeks worked and with full-time status whereas the equation (2) that I use in the model treats the marginal income tax rate as a constant.
Table 1. ESI employees: reasons for ineligibility

*Millions of non-elderly household heads and spouses only, projected to 2016*
Holds full- and part-time employment rates constant at 2011 values

worker counts are in millions

<table>
<thead>
<tr>
<th></th>
<th>Full-time schedule</th>
<th>Part-time schedule</th>
<th>All schedules</th>
</tr>
</thead>
<tbody>
<tr>
<td>All working non-elderly household heads and spouses</td>
<td>80.9</td>
<td>33.2</td>
<td>114.1</td>
</tr>
<tr>
<td>Working for an ESI employer</td>
<td>63.8</td>
<td>22.9</td>
<td>86.7</td>
</tr>
<tr>
<td>(-) family is outside 1-4 FPL</td>
<td>35.2</td>
<td>11.8</td>
<td>47.0</td>
</tr>
<tr>
<td>(-) spouse works full-time for an ESI employer</td>
<td>4.5</td>
<td>2.3</td>
<td>6.8</td>
</tr>
<tr>
<td><strong>Full-time employment by itself renders the worker (and family) ineligible for exchange subsidies</strong></td>
<td><strong>24.1</strong></td>
<td><strong>8.8</strong></td>
<td><strong>32.9</strong></td>
</tr>
</tbody>
</table>

Notes: An ESI employer is one offering coverage to its full-time employees. An ESI employee is anyone working for an ESI employer. National populations are based on the March 2012 CPS, excluding persons not working or without wage income in 2011. The CPS health insurance weights were multiplied by 1.01^4 in order to project to 2016. If part-time workers with ESI continue to be offered it under the ACA, then their eligibility for exchange subsidies does not depend on full-time status. A full-time schedule is 35+ hours per week. FPL refers to the Federal Poverty Line.
### Table 2. Four Tax Scenarios Created by the ACA
Includes both implicit and explicit taxes for calendar year 2016. Categories are mutually exclusive.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Frequency</th>
<th>Marginal earnings tax rates non-ACA, $t$</th>
<th>ACA, $\tau$</th>
<th>Weekly penalty on full-time work (hours per wk), $p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implicit full-time employment tax</td>
<td>21%</td>
<td>25%</td>
<td>5%</td>
<td>5.5</td>
</tr>
<tr>
<td>Employee receiving exchange subsidies, and employer penalized</td>
<td>4%</td>
<td>25%</td>
<td>21%</td>
<td>4.1</td>
</tr>
<tr>
<td>Employer penalized, but employee not receiving exchange subsidies</td>
<td>22%</td>
<td>25%</td>
<td>0%</td>
<td>4.1</td>
</tr>
<tr>
<td>No new incentives</td>
<td>53%</td>
<td>25%</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Frequency-weighted average</td>
<td></td>
<td>25%</td>
<td>2%</td>
<td>2.2</td>
</tr>
</tbody>
</table>

**Notes:** The marginal earnings tax rate includes pre-ACA payroll and personal income taxes at a 25% rate. "Receiving exchange subsidies" refers to heads or spouses of households receiving subsidies; dependents in such households are considered "not receiving" for the purpose of determining incentives. "Employer penalized" includes all employers not offering affordable coverage. $p$ is measured in hours per week.
### Table 3. Scalar non-tax parameter values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Benchmark Value</th>
<th>Alternate Values</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-ACA gross output</td>
<td>1</td>
<td></td>
<td>a normalization</td>
</tr>
<tr>
<td>non-ACA employment per capita</td>
<td>1</td>
<td></td>
<td>a normalization</td>
</tr>
<tr>
<td>productivity, ( Z )</td>
<td>0.03</td>
<td></td>
<td>inverse of 2011 weekly work hours per employee</td>
</tr>
<tr>
<td>work disutility parameter, ( \eta )</td>
<td>0.5</td>
<td>0, 0.88</td>
<td>approximately equal to the Frisch wage elasticity of aggregate hours supply</td>
</tr>
<tr>
<td>substitution elasticity in production, ( \sigma )</td>
<td>2</td>
<td>4</td>
<td>between worker types</td>
</tr>
<tr>
<td>household-paid quasi-fixed cost, ( a )</td>
<td>4.14*( Z )</td>
<td>half and double</td>
<td>lesser and greater values correspond to half and double the full-time hourly wage premium, respectively</td>
</tr>
<tr>
<td>employer-paid quasi-fixed cost, ( q )</td>
<td>4.11*( Z )</td>
<td>less and greater</td>
<td>larger values of ( \phi ) mean less convex costs/more weekly hours sensitivity</td>
</tr>
<tr>
<td>parameter of cost of desired hours deviations, ( \phi )</td>
<td>0.25</td>
<td>0.15, 0.35</td>
<td></td>
</tr>
</tbody>
</table>

**Sources:**
- 2012 CPS Annual Demographic file
- 2000 Census PUMS
- Montgomery and Cosgrove (1993)
- Owen (1979)
- Hirsch (2005)
### Table 4. The ACA's Impact on Various Summary Labor Statistics

#### Impacts by Tax Scenario (1)

<table>
<thead>
<tr>
<th>Tax scenario</th>
<th>Weekly emp. rate</th>
<th>Aggregate hours</th>
<th>VW Weekly hrs per employee</th>
<th>IW Weekly hrs per employee</th>
<th>Percentage of employees working:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26-29 hrs/wk</td>
</tr>
<tr>
<td>Penalty only</td>
<td>-0.037</td>
<td>-0.038</td>
<td>0.000</td>
<td>0.006</td>
<td>10.9</td>
</tr>
<tr>
<td>Subsidy phaseout and penalty</td>
<td>-0.190</td>
<td>-0.180</td>
<td>0.011</td>
<td>0.004</td>
<td>5.7</td>
</tr>
<tr>
<td>Subsidy foregone due to ESI</td>
<td>-0.077</td>
<td>-0.078</td>
<td>-0.001</td>
<td>0.007</td>
<td>12.5</td>
</tr>
<tr>
<td>All (including no tax change)</td>
<td>-0.031</td>
<td>-0.031</td>
<td>0.000</td>
<td>0.003</td>
<td>5.0</td>
</tr>
</tbody>
</table>

#### Impacts by Demographic Group (1)

<table>
<thead>
<tr>
<th>Demographic Group</th>
<th>Weekly emp. rate</th>
<th>Aggregate hours</th>
<th>VW Weekly hrs per employee</th>
<th>IW Weekly hrs per employee</th>
<th>Percentage of employees working:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26-29 hrs/wk</td>
</tr>
<tr>
<td>Female</td>
<td>-0.028</td>
<td>-0.031</td>
<td>-0.003</td>
<td>0.003</td>
<td>6.6</td>
</tr>
<tr>
<td>Male</td>
<td>-0.033</td>
<td>-0.031</td>
<td>0.003</td>
<td>0.009</td>
<td>3.7</td>
</tr>
<tr>
<td>Elderly</td>
<td>-0.006</td>
<td>-0.008</td>
<td>-0.003</td>
<td>-0.001</td>
<td>3.6</td>
</tr>
<tr>
<td>Unmarried head (2)</td>
<td>-0.055</td>
<td>-0.054</td>
<td>0.002</td>
<td>0.007</td>
<td>7.8</td>
</tr>
<tr>
<td>Married head or spouse (2)</td>
<td>-0.035</td>
<td>-0.033</td>
<td>0.002</td>
<td>0.009</td>
<td>3.9</td>
</tr>
<tr>
<td>All (including dependents and elderly)</td>
<td>-0.031</td>
<td>-0.031</td>
<td>0.000</td>
<td>0.003</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Notes: (1) Every table entry is a difference between the ACA outcome and the no-ACA outcome, and expressed in percentage points in the final two columns. VW impact (in logs) is the difference between the impacts for log aggregate hours and log employment rate. IW impact is the log change in weekly hours averaged across worker types (before logging) using non-ACA employment shares as weights.  
(2) Excludes poor and elderly workers.
Table 5. Sensitivity Analysis

ACA Impacts under alternative assumptions\(^{(a)}\)

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Weekly employment rate</th>
<th>Aggregate weekly hours</th>
<th>Weekly hours per employee</th>
<th>VW Impact</th>
<th>IW Impact</th>
<th>Percentage of employees working:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Benchmark</td>
<td>-0.031</td>
<td>-0.031</td>
<td>0.000</td>
<td>0.003</td>
<td>0.003</td>
<td>5.0</td>
</tr>
<tr>
<td>(2) Schedule adjustments are more costly</td>
<td>-0.035</td>
<td>-0.032</td>
<td>0.003</td>
<td>0.004</td>
<td>2.6</td>
<td>0.4</td>
</tr>
<tr>
<td>(3) Schedule adjustments are less costly</td>
<td>-0.032</td>
<td>-0.031</td>
<td>0.001</td>
<td>0.005</td>
<td>5.7</td>
<td>3.6</td>
</tr>
<tr>
<td>(4) High employer subst. between FT &amp; PT</td>
<td>-0.031</td>
<td>-0.031</td>
<td>0.000</td>
<td>0.003</td>
<td>5.0</td>
<td>2.9</td>
</tr>
<tr>
<td>(5) 34-hour threshold rather than 30</td>
<td>-0.003</td>
<td>-0.025</td>
<td>-0.022</td>
<td>-0.017</td>
<td>0.0</td>
<td>15.9</td>
</tr>
<tr>
<td>(6) 35-hour threshold rather than 30</td>
<td>0.023</td>
<td>-0.019</td>
<td>-0.042</td>
<td>-0.037</td>
<td>0.0</td>
<td>29.7</td>
</tr>
<tr>
<td>(7) Lower subsidy valuation rate</td>
<td>-0.029</td>
<td>-0.028</td>
<td>0.000</td>
<td>0.002</td>
<td>4.7</td>
<td>2.5</td>
</tr>
<tr>
<td>(8) &quot;ESI dump&quot; affects 10 million more workers</td>
<td>-0.033</td>
<td>-0.034</td>
<td>0.000</td>
<td>0.003</td>
<td>4.8</td>
<td>2.6</td>
</tr>
<tr>
<td>(9) ACA lacks employer penalty</td>
<td>-0.023</td>
<td>-0.023</td>
<td>0.000</td>
<td>0.001</td>
<td>2.0</td>
<td>1.2</td>
</tr>
<tr>
<td>(10) Lower employer quasi-fixed cost</td>
<td>-0.030</td>
<td>-0.030</td>
<td>0.000</td>
<td>0.003</td>
<td>5.0</td>
<td>2.9</td>
</tr>
<tr>
<td>(11) Half employee quasi-fixed cost</td>
<td>-0.028</td>
<td>-0.028</td>
<td>0.000</td>
<td>0.003</td>
<td>5.0</td>
<td>2.9</td>
</tr>
<tr>
<td>(12) Higher employee quasi-fixed cost</td>
<td>-0.033</td>
<td>-0.034</td>
<td>-0.001</td>
<td>0.003</td>
<td>5.0</td>
<td>2.9</td>
</tr>
<tr>
<td>(13) Double employee quasi-fixed cost</td>
<td>-0.040</td>
<td>-0.040</td>
<td>0.000</td>
<td>0.003</td>
<td>5.0</td>
<td>2.8</td>
</tr>
<tr>
<td>(14) Add ten points to non-ACA tax rate</td>
<td>-0.038</td>
<td>-0.036</td>
<td>0.002</td>
<td>0.004</td>
<td>3.9</td>
<td>1.7</td>
</tr>
<tr>
<td>(15) Subtract ten points from non-ACA tax rate</td>
<td>-0.028</td>
<td>-0.027</td>
<td>0.000</td>
<td>0.003</td>
<td>5.2</td>
<td>3.0</td>
</tr>
<tr>
<td>(16) Frisch aggregate hours elasticity = 1</td>
<td>-0.044</td>
<td>-0.043</td>
<td>0.001</td>
<td>0.003</td>
<td>5.0</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Notes: \(^{(a)}\) Every table entry is a difference between the ACA outcome and the no-ACA outcome, and expressed in percentage points in the final two columns. VW impact (in logs) is the difference between the impacts for log aggregate hours and log employment rate. IW impact is the log change in weekly hours averaged across worker types (before logging) using non-ACA employment shares as weights.
Figure 1. Weekly hours of the marginal "29er" but for the ACA as a function of the tax parameters

- $\tau = 0\%$
- ESI worker with foregone subsidy (100% valuation)
- Penalty, but no subsidy
- Penalty and subsidy
- $\tau = 21\%$
Figure 2. The ACA's Impact on the Weekly Hours CDF among the Employed

Note: ACA is the weighted average of all tax scenarios
Figure 3. Employment and Hours Impacts in the Cross-Section

Note: only one ACA tax scenario is shown (subsidies foregone by FT ESI workers)
Bibliography


Mulligan, Casey B. "Average Marginal Tax Rates under the Affordable Care Act." *NBER working paper,* no. 19365 (November 2013a).


