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Who Pays for and Who Benefits from Minimum Wage Increases? Evidence from Israeli Tax Data on Business Owners and Workers

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ABSTRACT

A key goal of a higher minimum wage is income redistribution towards low-income families. Existing research on the minimum wage focuses on the impact on affected workers, but is silent on the incomes of the owners of businesses who pay for a higher minimum wage. Higher minimum wages will do more to redistribute income if the owners of businesses who pay the higher minimum are at the top of the income distribution. Conversely, if minimum wage employers have relatively low incomes, the redistributional effects are weakened. We study evidence on this question using a unique administrative dataset on the universe of tax records for Israel, in the period surrounding a large minimum wage increase. We find that the minimum wage hike reduced profits of companies, with minimum-wage intensive companies bearing the bulk of the cost and adjusting their workforces more aggressively, and profits declining more for lower-income business owners. Moreover, owners of businesses with higher shares of minimum-wage workers ranked at the bottom of the income distribution of business owners, and their incomes were comparable to those of mid-to-high level workers. In most cases, spouses of business owners earn less than the owners while spouses of minimum wage workers earn more, further reducing the redistributive effect of the minimum wage increase.

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1. Introduction

At its core, the minimum wage is a redistributive policy, meant to increase incomes of low-income families. In the U.S. context, Senator Edward Kennedy, a perennial sponsor of legislation to raise the minimum wage, argued that "The minimum wage was one of the first – and is still one of the best – anti-poverty programs we have" (Clymer, 1999, p. 449).

Existing research on the minimum wage focuses on the impact on affected workers. Many of the research findings on the minimum wage are contested. There is little doubt that higher minimum wages raise wages of affected workers. There is a good deal of recent evidence that higher minimum wages reduce employment of the least-skilled (e.g., Belman and Wolfson, 2019; Clemens and Wither, 2019; Kabátek, 2015; Gopalan et al., forthcoming; Meer and West, 2016; Monras, 2019), but this conclusion is contested, and there is recent evidence to the contrary (e.g., Cengiz et al., 2019), and also recent evidence that far more workers may experience wage gains than job losses, in part because estimated job losses are small (Harasztosi and Lindner, 2019).[1]

In terms of redistribution, researchers have focused on whether minimum wages reduce poverty or "near-poverty" (being below one-half of the poverty line). Most research tends to find no statistically significant evidence of poverty reductions (e.g., Sabia and Nielsen, 2015), although the point estimates tend to point in this direction (see, e.g., Neumark, 2016; Dube, 2018), and one recent study finds evidence of substantial poverty reductions (Dube, 2019).

Another potentially important dimension of the relationship between the distributional effects of minimum wages and the impact of minimum wages is not who *benefits* from the minimum wage, but who *pays* for it. However, the research literature is silent on the incomes of the owners of businesses who pay for a higher minimum wage. Higher minimum wages will do more to redistribute income if the owners of businesses who pay the higher minimum are at the top of the income distribution. Conversely, if minimum wage employers have relatively low incomes, the redistributional effects are weakened, and – on this

[1] For a comprehensive review of recent evidence, see Neumark (2019a).

dimension at least – minimum wages would be less effective at redistributing from high-income individuals or families to low-income individuals or families.[2]

Casual evidence on the distributional effects of the incidence of the minimum wage on businesses appears to point in a number of possible directions. There are likely many relatively small, lower-income business owners ("mom and pop" shops) who use low-skill workers and hence will have to pay for higher minimum wages. But there are also some large corporations (e.g., Wal-Mart) that also pay relatively low wages. On the other hand, there are clearly many higher-income business owners, investors, and salaried workers who will not pay directly for a higher minimum wage, and it seems likely that this is true of many of those who have had the highest income growth in recent years.[3]

The likely reason for the absence of evidence on the distributional effects of the incidence of the minimum wage on businesses is the lack of data on the incomes of business owners. In this paper, we begin to fill this void, using a unique administrative dataset on the universe of tax records for both workers and firms in Israel. We study a period surrounding a large minimum wage increase that was an exogenous event driven by political bargaining, to provide evidence on the incidence of the costs of higher minimum wages with respect to the family incomes of business owners, and the family income distribution more generally. To the best of our knowledge, this is the first evidence of its kind on the incomes of business owners who pay for higher minimum wages and their position in the income distribution.

We find that the minimum wage hike reduced profits of companies, with minimum-wage intensive companies bearing the bulk of the cost and adjusting their workforces more aggressively, and profits declining more for lower-income business owners. Moreover, owners of businesses with higher shares of minimum-wage workers ranked at the bottom of the income distribution of business owners, and their incomes were comparable to those of mid-to-high level workers. In most cases, spouses of business owners

[2] In this sense, the minimum wage could be quite different from other redistributional policies financed by taxes – such as the U.S. Earned Income Tax Credit. Redistributional policies financed by taxes by construction distribute income *from* those who pay the most taxes, although how progressive this financing side of the redistribution is depends, of course, on the progressivity of the tax system.

[3] For example, Piketty et al. (2018) note that in the United States, the surge in top incomes since 2000 has been mostly associated with capital income.

earn less than the owners while spouses of minimum wage workers earn more, further reducing the redistributive effect of the minimum wage increase.

2. Minimum Wages in Israel

The first collective labor agreement regarding minimum wages in Israel was signed in 1972, setting the minimum wage as a percentage of the average wage in the economy.[4] Since 1987, instead, the minimum wage level is set by legislation, with the initial statutory constraint that the minimum wage cannot fall below 39% of the average wage, raised to 45% in April 1988 and 47.5 in April 1997.[5] However, indexation to the average wage was not done consistently; rather, the ratio was used as guidance when there was a change in nominal value of the minimum wage.

The minimum wage "event" we study is the set of increases that occurred from 2006 through 2008. There were no increases in the nominal minimum wage in the few years preceding 2006. In the subsequent three years the nominal minimum wage was increased in three increments, leading to a sizable increase in the minimum wage relative to the statutory floor from 2006 to 2008. There were then no changes to the nominal minimum wage from 2008 until 2011. In addition to the minimum wage history providing stable pre- and post-periods for the 2006 to 2008 increases, these increases were large and plausibly exogenous (as discussed more below).

The variation in the nominal wage in Israel over the longer term, and during our sample period – 2003-2010 – is depicted in Figure 1. For the three-year period 2006-2008, the total nominal increase was 15.4%.[6] This figure shows the relative stability of the statutory minimum wage in windows before and after the 2006-2008 increases. There were frequent increases beginning in 2011, covering the period until our

[4] The minimum wage is set in hourly and monthly terms, in a compatible manner based on full-time work.
[5] The average wage is computed by the Central Bureau of Statistics (CBS) based on administrative records provided by the National Insurance Institute, covering the entire economy. It includes both full-time and part-time jobs.
[6] This increase is small relative to increases in the U.S. minimum wage. For example, three increases from 2007-2009 raised the federal minimum wage by a cumulative 41% (nominal). However, keep in mind that U.S. minimum wage increases are much less frequent, with increases, in recent decades, only in 1990-91, 1996-97, and the last increases in 2007-2009 (over 10 years ago). Most of the U.S. evidence focuses on state minimum wage increases, which are often much smaller, with increases in the range of 25 or 50 cents (a few percent) very common. For example, see the state minimum wage database at:
http://www.economics.uci.edu/~dneumark/MW_LW%20dataset%20updated%20through%202019%20-%201-01-20%20Update.csv.

data set ends in 2016.[7] Our data only extend through 2016; but as the figure shows, even a couple more years of data would not give us a post-period with a stable nominal minimum wage which to study the latter increases in the minimum wage.

The 2006-2008 minimum wage increases led to a large relative increase in the minimum wage relative to the average wage in this period, as there was only moderate growth in average wages or prices from 2006-2009. Figure 2 depicts the real increases (relative to the CPI published by the Israeli Central Bureau of Statistics).

The minimum wage increases that occurred in 2006-2008 were the result of a lengthy campaign led by the Labor Party (HaAvoda), which won 19 seats (16%) in the elections for the 17th Knesset (Israel's parliament). After the 2006 elections, the Labor Party became one of the key government coalition parties, led by Amir Peretz, who previously served as the head of largest labor union. Increasing the minimum wage and supporting "fair" earnings was among Labor's pre-election commitments (see Appendix A). However, there were no substantive changes in labor market developments in the period leading up to the election; Figure 3 shows the time-series on the unemployment and participation rates. Moreover, the minimum wage did not get much attention prior to the election or implementation of the increases; the Google trends data graphed in Figure 4 show no clear increase prior to the minimum wage hikes beginning. Alternatively, one could read the absence of any uptick in searches on the minimum wage as an indicator that the minimum wage increase was not predicted (Choi and Varian, 2012). Hence, the increases in the minimum wage in this period did not result from labor market developments, but rather were an exogenous event driven by political bargaining.

Figure 3 also shows that there were no significant sharp cyclical changes around the time of the minimum wage increases we study, as measured by the output gap. Moreover, our pre- and post-periods

[7] The next minimum wage increases following those in 2006-2008 occurred in July 2011 and October 2012, when the minimum wage was raised to NIS (New Israeli Shekels) 4,100 and then NIS 4,300. In November 2014, the "Histadrut" (the national labor union) and the Coordinating Bureau of Economic Organizations agreed to raise the minimum wage in the business sector, which later also applied to public sector employees (with certain limitations). As a part of the agreement, the minimum wage increased to 5,000 NIS in three stages, in April 2015, July 2016, and January 2017. On March 30, 2015, an additional collective agreement was signed between the Histadrut and Coordinating Bureau of Economic Organizations, raising the minimum wage to NIS 5,300 in December 2017.

(2004-2005 and 2009-2010) were at quite similar points in the business cycle, in terms of both level and trends. Nonetheless, in all of our analyses we are careful to compare developments in businesses more affected vs. businesses less affected by the minimum wage increase, even within industry, to net out any aggregate or sector-specific influences.

3. Research on the Effects of Minimum Wages on Firms

The literature on the effects of minimum wages on labor markets is voluminous. For example, Neumark and Wascher (2007) review over 100 studies of the employment effects of minimum wages, focusing only on papers since the early 1990s. Belman and Wolfson (2019) review many recent studies of employment effects. Broader reviews of the minimum wage literature are provided in the books by Neumark and Wascher (2008), Belman and Wolfson (2014), and, earlier, Card and Krueger (1995). These broader reviews focus mostly on employment effects, but also cover many other outcomes, including effects on poverty, the distribution of wages and income, skill accumulation, and prices.

As noted in the Introduction, we know of no work that studies the incidence of minimum wages on business owners who pay for higher minimum wages, and their position in the income distribution. However, the very limited literature on the effects of minimum wages on firms might provide some clues as to how minimum wages affect business income or profits, and for which businesses.

Card and Krueger (1995) do an event study of the effects of the 1990-1991 federal minimum wage increases – and news stories related to them – on the daily excess returns of stock prices for two subsamples of firms: one of 110 firms in industries with the highest proportions of minimum wage workers; and the second of 28 firms (mostly in the restaurant industry) that referred to the 1990-1991 increases in their annual reports. They also do a similar analysis of events related to a proposal to increase the minimum wage to $4.75 (it went to $4.25 in 1991). The results of these analyses are rather weak, without a clear indication that profits fall, although as Card and Krueger noted, this could be because the news events studied did not provide much relevant information to market participants.[8] This research

[8] Similar ambiguous findings are reported for an event analysis of stock prices in New Zealand (Pacheco and Naiker, 2006).

applies to publicly-held firms, and hence cannot provide direct evidence on the incomes of those affected by paying for higher minimum wages. Stocks are on average held by high-income people, but they are also held by pension funds.[9] (Our analysis also faces the challenge of not being able to interpret data on the effects of minimum wages on the profits of publicly-held firms in terms of the income of owners, but we have data on both publicly-held and non-publicly-held firms.)

More compelling evidence on the effects on firms comes from an analysis of the 1999 introduction of the minimum wage in the United Kingdom (Draca et al., 2011), because data used capture firm-level profits. Draca et al. use pre-1999 information on the distribution of wages (triangulating different sources of information on average wages and the distribution of wages) to measure differences in how firms are impacted, and find significant reductions in profitability (but no impact on employment). One virtue of one of the data sets used – the FAME (Financial Analysis Made Easy) data – is that it covers a wide range of firms, including smaller and medium-sized firms (and of course many firms not listed on the stock market), although some small firms are excluded from having to report data. A related analysis of data on U.K. residential care homes – a very low-wage sector – finds corroborating evidence. Based on the FAME data, the negative effect of the minimum wage on profits is more evident for firms with more market power (as measured by the Lerner Index, based on the price-cost margin), which the authors argue is consistent with more competitive firms being more likely to pass on minimum wage increases to prices. However, this evidence does not map into how effects are distributed across the income distribution of business owners.[10]

A slice of the research literature focuses on small businesses. This research is potentially informative about how minimum wage impacts are distributed across the income distribution of business owners, because the incomes of small business owners are likely considerably lower than those of other

[9] For the United States, Wolff (2017, Table 10) shows that direct stock ownership is heavily concentrated in the top 1% of the wealth distribution (53.4% for 2016, vs. 40% in the next 9% and 6.8% in the bottom 90%), while pension accounts are more equitably distributed, but still skewed to higher-wealth households (13.7% in the top 1%, 51.2% in the next 9%, and 35.2% in the bottom 90%).

[10] Belman and Wolfson (2014) review five additional studies of effects of minimum wages on profitability or what might be considered related measures – exits or failures. Machin and Wilson (2004) also study the effects of the introduction of the U.K. minimum wage on closures of residential care homes, based on their own survey. They find some evidence of employment declines, but do not detect a closure effect on homes more impacted by the minimum wage. Two other papers report conflicting evidence on firms exits or failures (Waltman et al., 1998; and Orazem and Mattila, 2002).

business owners or other potentially high-income professional workers.

Despite the presumption that small businesses may be hit hardest by minimum wage increases, the empirical evidence is not so clear. Some of the studies discussed above focus on smaller firms, such as the Draca et al. (2011) analysis of residential care homes (which tend to be small), survey evidence from the United Kingdom in Mason et al. (2006), and a study by Orazem and Mattila (2002) that focused on firms in services and retail newly covered by Iowa's minimum wage law. However, these studies were not explicitly focused on the question of whether minimum wage effects fell more heavily on small businesses, comparing minimum wage responses in a uniform way, with comparable data, between smaller and larger firms. Luca and Luca (2019) study the effects of minimum wages on the restaurant industry, using data from Yelp to study restaurant closure. They find that more marginal restaurants (as indicated by lower ratings) are disproportionately led to exit because of minimum wage increases, and find no impact for the top-rated restaurants.

The only study of which we are aware that provides an analysis of effects by firm size is a recent paper by Chava et al. (2019). They use the National Establishment Time Series (NETS),[11] and estimate the effects of minimum wage increases on establishment credit (*Paydex*) scores. They find that federal minimum wage increases in states where the federal minimum wage binds reduced credit scores, more so for small establishments (defined as below median sales in the 4-digit NAICS code); differences in effects associated with sales were likely related to differences in effects associated with incomes of business owners. They also report that minimum wage hikes increased firm exit, and again find evidence of more adverse effects for small establishments. The Chava et al. study is the best evidence of which we are aware that minimum wages (in the United States) have more adverse impacts for small businesses. But again, one can only draw an indirect inference from this evidence that lower-*income* business owners are more adversely affected.

In U.S. policy debate, minimum wage opponents often appeal to the difficulties small firms will face as a result of minimum wage increases. For example, the U.S. Chamber of Commerce, in criticizing a

[11] For details, see Neumark et al. (2007).

proposed New Orleans living wage law in 2002, argued that "the mandated wage increases … will hit small businesses the hardest."[12] More recently, the Virginia Chamber of Commerce argued that a proposed minimum wage increase in Virginia "would primarily impact small business who rely on affordable labor to compete."[13] And a website published by the Employment Policies Institute includes videos of small business owners claiming difficulties in adjusting to high minimum wages.[14] The reasons are not always made clear, reference is often made to small profit margins,[15] or a high share of wages in total costs (e.g., Chava et al., 2019). Minimum wage laws sometimes reflect the presumption that small businesses (and hence their owners) will be harder hit, perhaps because of lower incomes. U.S. minimum wage laws have long had a minimum sales or revenue threshold (currently $500,000).[16] Similarly, in Korea a large minimum wage hike in 2018 was accompanied by compensation to firms employing less than 30 workers.[17] In Israel, in contrast, the minimum wage is applied to all workers regardless of firm size.[18]

4. Data

Sources and key variables

Our empirical analysis relies on administrative records of the Israeli Tax Authority. Our data set is constructed from three sources – matching company records, employee data, and business owners. In addition, family income variables for business owners and workers are constructed using these data.[19] The key variables we construct and use, and some others used in the analysis or in auxiliary calculations, are listed and defined in Table 1.

The first data source is annual files of company tax records covering 2003-2010, which provide

[12] See https://www.uschamber.com/press-release/us-chamber-challenges-living-wage-law.
[13] See https://www.marketwatch.com/press-release/virginia-chamber-of-commerce-releases-fact-sheet-on-proposed-minimum-wage-increase-2019-01-16.
[14] See https://www.facesof15.com/.
[15] See, e.g., https://www.pbs.org/wnet/chasing-the-dream/stories/minimum-wage-increase-means-small-businesses/ and https://nsba.biz/dems-pushing-minimum-wage-hike/.
[16] See https://www.dol.gov/whd/minwage/q-a.htm.
[17] The compensation covered the difference between the minimum wage increase and trend wage growth rate in the past five years, and subsidized social insurance premiums (OECD, 2018).
[18] The only possible exemption is that the Ministry of Labor can set a lower minimum wage for mentally or physically disabled workers employed in pre-defined organizations that receive budgets from the government. (See https://www.nevo.co.il/law_html/Law01/P222K11_001.htm#Seif11, item 17, in Hebrew.)
[19] According to Tax Authority records, family income consists of spouses' incomes only, as discussed more below.

data on each company's characteristics and indicators of business activity, such as sales and industry classification. The company files are used to construct annual measures of profits, or corporate income from all sources, including reimbursement of the owner's salary. In our models, we use the inverse hyperbolic sine (IHS) of profits. The IHS can be interpreted similarly to natural logs, but can accommodate zeroes and negative numbers (Ravallion, 2017); in particular, the interpretation of estimated coefficients of right-hand side variables when the dependent variable is expressed in terms of the IHS are nearly identical to the interpretation when the dependent variable is expressed in terms of natural logs.[20] We also construct a profitability measure defined as corporate income divided by sales. Finally, we use the Central Bureau of Statistics (CBS) classification of economic sectors to define 23 sector dummy variables.

The second data source we use is tax records of all employees for 2003-2010, which were matched to the employers. The employee files provide data on each worker, including employment type, earnings, and number of months the employee worked at the same job. Our tax records include employees for whom pay is reported to tax authorities in Israel, i.e., if a company is situated in Israel. The data files also cover temporary employment abroad that is included in the payroll of an Israeli company. However, people who work abroad and their "center of life" is not in Israel are not included in the tax files.[21] For each company, we match all employees based on unique personal and company identifiers. We created the database at the employee level, with workers matched to firms over time, and then calculated employee-related aggregates for each firm, including total employment.

Our research does not cover self-employed workers or employees related to these individuals (in

[20] As an example, the table below shows some calculations for hypothetical changes in log profits and IHS profits.

Initial profits	Change in profits	Change in log profits	Change in IHS profits
-10000	1000	Undefined	0.105360515
-100	10	Undefined	0.105354652
100	10	0.09531018	0.095305841
1100	100	0.09531018	0.095310136
1100000	100000	0.09531018	0.09531018

[21] According to the tax law, citizens with "center of life" abroad (based on a given set of criteria such as presence in Israel, family location, etc.) are not liable for taxes in Israel.

unincorporated businesses). In 2005, there were approximately 287,000 self-employed workers, representing 11.5% of employment.[22] There were 61,460 unincorporated businesses that employed 126,688 workers.[23] The majority of these unincorporated businesses were very small, averaging around 2 employees per establishment.[24] Regardless, the self-employed are not relevant for studying the impact of minimum wages, as the self-employed decide on their own wage given tax and business considerations. Moreover, adding profits of unincorporated business is problematic since such businesses report income to the tax authority in a different manner than companies do. However, we compared monthly earnings of employees in the unincorporated businesses to earnings in companies; excluding extreme values, earnings appear to be similarly distributed, suggesting that our results could be applicable to unincorporated business employment and income.[25] Thus, we study only incorporated companies.

We use the data on employees to construct a critical variable for our analysis: the fraction affected (*FMW*), which is the proportion of workers at a company earning below or equal to the minimum wage. The data do not distinguish part-time vs. full-time workers, and earnings are reported monthly, not hourly. We therefore define *FMW* as the fraction of full-year employees working at their main job, in 2005 (the last year of the pre-treatment period), who were paid less or equal to the monthly minimum wage that prevailed in the post-hike period (2009-2010).[26] We base *FMW* on full-year employees working at their main job because when we compared the Tax Authority earnings reports with those of the Central Bureau of Statistics (CBS), by industry, we found that the earnings of employees that worked full-year at the main job were closest to the wages that CBS reports. Moreover, we compared average wages and *FMW* derived from the tax data we use to those reported in the income survey (the equivalent of the Current Population Survey), by economic sector. Monthly wages and *FMW* rates are very similar by sector.[27]

[22] This is based on CBS data (https://old.cbs.gov.il/publications18/1673/pdf/t02_01.pdf).
[23] These figures relate to 2010, as prior data regarding self-employed are less reliable.
[24] There is a small number of larger establishments of this kind, with tax records tying workers directly to company owners (i.e., to the individuals who own the companies, rather than company identifiers).
[25] These results are available upon request.
[26] The main job is the one that the worker chooses for the application of tax credits and benefits. In general, if an individual works in more than one job, defining the higher-paying job as the main job minimizes tax payments.
[27] These results are available upon request.

The third data source is a registry of company owners for 2003-2010, which includes ownership structure for each company and allows the identification of individual business owners.[28] We identify owners (and their spouses, when present) of the companies in the sample for the year 2005. This is the most recent year before the minimum wage hike, and the year for which *FMW* was computed. Of the 57,520 companies in that year, we could identify data on 47,275 sole owners (out of a total of 63,674 owners, because of foreign ownership, firms that are owned by other local companies, and co-ownership).[29]

For both business owners and workers, we construct measures of family incomes. We assembled data on owners' salary from the company, salary from other sources, age, marital status, and earnings of the spouse. We also define where business owners' and workers' salaries are in the distribution of labor incomes, assigning percentiles in the distribution (between 1 and 100).[30]

Two age-related issues are relevant to the measurement of family income. First, teens could not be matched to the parents, as tax records do not provide information beyond number of children in the household, and hence teenagers' labor incomes are not included in family income. However, teen employment is relatively low in Israel; the participation rate of youths (aged 15-17) is 9.6%, of whom only 1.5% do not study at the same time. Correspondingly, according to the income survey published by the CBS,[31] only 7.2% of households had more than two providers in year 2005; and according to tax records, only 3.7% of employees (including the self-employed) were younger than 19 in 2005.[32] Among business owners, the tax records show that there was a single owner (i.e., one person) aged 18 in the year 2005, with owners below the age of 25 constituting fewer than 1% of owners.

Second, military service in Israel is obligatory for men aged (18-21) and women aged (18-20,

[28] Some of the companies are owned by other companies or foreign residents.
[29] There were 2,010 companies (out of 57,520 in 2005) that were fully owned by foreigners. 2,414 companies (out of 57,520 in 2005) were fully owned by other companies. According to tax records, 60.5% of companies have a single owner, 29.1% have two owners, and the remainder have three or more owners.
[30] We study labor income rather than asset income. One problem with asset income is that wealthy individuals can hold large companies, which could post significant losses in given year (in the form of undistributed profits), resulting in low income ranks that would be misleading.
[31] See the 2005 Income Survey (https://old.cbs.gov.il/webpub/pub/text_page_eng.html?publ=11&CYear=2005&CMonth=1).
[32] See the 2005 state revenue administration report (https://mof.gov.il/ChiefEcon/StateRevenues/StateRevenuesReport/DocLib/2005/Report2005_05.pdf).

with some exceptions).[33] Soldiers are reported in the official statistics as part of the labor force, but the army was excluded because it is in the government sector. However, there is no restriction on ownership of companies by soldiers in the family income calculation.

Sample

To define our sample, we begin with data on all companies that were active in Israel from 2003 through 2010.[34] The pre-period for our analysis of minimum wage effects begins in 2004; our data start in 2003, however, because the calculation of profits requires lagged data for carryover losses. The treatment period (2006-2008) was excluded from the estimation sample for most of our analyses, so we evaluate the evidence on changes from the 2004-2005 pre-period to the 2009-2010 post-period. We impose several restrictions to arrive at our analysis sample, as documented in Table 2. (The table also reports some descriptive statistics on key measures, to show how these change with the sample restrictions.)

We exclude the government sector and non-profit organizations, as we would expect such organizations to respond differently to minimum wages than do private-sector firms. Moreover, our interest is in the incidence of minimum wages in relation to the owners of firms, and the incomes of firm owners are most simply conceptualized and defined for private-sector firms. We exclude companies that were in the liquidation process at any point during our sample period. In principle, these events could be related to the minimum wage, in which case we could potentially understate adverse employment effects of the minimum wage. However, we exclude these companies because they are likely to experience large employment declines and liquidation could be caused by quite different factors.[35] We do not exclude publicly held companies. Our sample includes 144 publicly held companies in 2005, with 135 surviving through 2010.[36]

[33] These were the age ranges during the sample period. The conscription rate for men is above 75% for the majority of cities in Israel (https://www.idf.il/2018-גיוס-נתוני-האדם-כוח-אגף/אתרים/).

[34] Firms that exit in 2010 are still included in the sample since the post-treatment period covers 2009-2010. Firms that exited in 2009 or earlier were excluded from the sample.

[35] If we instead exclude those that are in liquidation only in the pre-treatment period, to allow for the possibility that post-treatment liquidation is caused by the minimum wage, 433 observations are added. In this case, the estimated effects are little changed, but generally more negative.

[36] We thank Kosta Kosenko for sharing his data on publicly-traded companies in Israel.

Companies that are likely to be holding financial companies, based on extreme values of the profitability measure, are also excluded. These companies can show extraordinarily high profits relative to sales (or employment), because of the nature of such companies, and also because of ambiguities regarding where profits are assigned relative to where they are generated.[37] We cannot directly identify holding companies. However, when we explored extreme profitability values for specific companies, we found that they were frequently of this type.[38] Thus, we restricted the range of the profitability variable to be between −100% and +100%.

For companies established after 2005, we cannot generate a measure of *FMW* that is independent of employment or wage adjustments after minimum wage increases begin in 2006. Hence, we exclude these companies. Similarly, we had to exclude companies with no earnings data in 2005, because the *FMW* calculation requires workers employed full-year at a specific company in 2005. This excludes a fairly large number of companies, for two reasons. First, there are some very small companies in terms on number of employees, with high labor turnover during the year. Second, until 2017 there were many companies that were set up for tax purposes, which had earned profits but had not distributed them (effectively used as a tax shelter for various professionals due to higher personal income tax rates).

The combined set of restrictions reduces the size of the estimation sample. But we believe our restrictions provide a sample that is informative about the effects of the minimum wage on private-sector firms that employ at least some minimum wage workers. Table 3 shows that our sample period begins with about 55,000 companies and ends with about 44,000. The number declines because companies had to have been established by 2005 to be included in our sample, so we lose companies through deaths before 2010, but do not gain them through births.

Descriptive statistics

[37] For example, in the data there is a company with three employees that reports revenues of a large construction company fully owned by it.

[38] We examined extreme values of profitability to try to understand if these represent real activity or some recording technique, and found that the majority of companies with these extremes were holding companies. These companies were fully owned by business group owners and did not have economic activity beyond holding a portfolio of companies.

Table 4 provides descriptive statistics on the key variables for our analysis sample. On average, in 2005, the average share of minimum wage workers across companies was 18%. However, as shown in Table 2, these workers were concentrated in fewer than half of all companies (the median value of *FMW* is 0); 56% of companies had no minimum wage workers.[39]

As reported in Table 4, average profits of the firms in the estimation sample were around 1.3 million NIS, but the median value was much smaller at NIS 0.2 million. It is important to note that profits can be negative (or zero). On average, throughout the estimation sample period, profitability of companies, calculated as profits divided by sales, was 15%.

Average employment per firm was 36 workers. Figure 5 shows the distribution of company-year observations in the estimation sample by *FMW* bins. As shown in Figure 6, large shares of companies with *FMW* equal to 0 or 100% were firms with only one worker (the only values *FMW* can take on for these firms). Companies with *FMW* in the range 80-90% were on average largest in terms of employment, with average employment around 250 workers per firm (see Figure 7). The largest company in this range, with 7,304 workers, is a nursing home company; the remainder of the companies in this group were, naturally, in economic sectors with large shares of minimum-wage workers (e.g., cleaning, security, and health services and social work).

5. Effects on Employment and Profits

In this section we first report some standard types of evidence on the effect of minimum wages on employment and earnings, and then move on to evidence on how the minimum wage affects company profits. The following section turns to the evidence on how cost of minimum wage increases is distributed across the income distribution.

Minimum wage effects on earnings and employment

We want to be clear, at the outset, that countries with a national minimum wage – like Israel and many others – pose more of a challenge for estimating minimum wage effects than countries with regional

[39] Note that *FMW* would likely be higher (and higher at more firms) if we could directly measure wages. There is no way to verify this directly, because if we expand the sample to workers other than full-year workers in their main job, we cannot map as reliably from earnings to wages (and hence *FMW*).

variation (or some other variation, like sectoral). We are not using the Israeli data to get a better estimate of the employment effect of the minimum wage. Rather, we are using the Israeli data because the tax data provide the other critical information (incomes of business owners and data on the companies they own). That said, we try to obtain as compelling evidence as we can on effects on employment (and earnings), and our ability to do so is important, because much of our evidence on effects on business owners uses the same identification strategy. At its core, our identification hinges on variation in effects for firms with different fractions of workers paid at or below the new, higher minimum in the period just before the minimum wage increases being, denoted *FMW*. Among other things we do to make it more likely that we are estimating a causal effect, we study the effects of this variation *within* sectors, to allow for differential shocks to sectors that could otherwise generate spurious evidence on minimum wage effects.

Figure 8 shows trends in average annual earnings,[40] covering the pre-treatment, treatment, and post-treatment years, for workers in firms with very few minimum wage workers ($FMW \leq 10\%$), firms in the midrange ($40\% < FMW \leq 75\%$), and firms with a high fraction of affected workers ($FMW > 75\%$). We normalize to 2005 values. In the pre-treatment period, there is not much difference in the trends in average earnings at the three groups of firms; if anything earnings are growing faster at the firms with lower *FMW*. After the minimum wage increase, earnings in lower-wage (higher *FMW*) firms grew faster, consistent with a direct effect of minimum wages on earnings. Note also that the initial relative increases are largest for the highest *FMW* firms, as we would expect. There is no evidence of a change in the trend for the low *FMW* firms.

Figure 9 presents more detailed evidence, with a more granular disaggregation by *FMW*, showing that the minimum wage increase raised earnings more in high *FMW* firms. The estimates in this figure are based on regressions on the *FMW* bins and firm fixed effects, with estimates measured relative to the *FMW* = 0 group. The figure shows that the average real earning rose more from 2003-2005 to 2009-2010 in firms where the percentage of workers below the minimum wage (*FMW*) was higher, and the relationship is

[40] Technically, these are earnings associated with the main job position, but since we cover full-year employees on their main jobs, it is not unreasonable to think of these as wages. Still, to be as clear as possible we refer to earnings instead of wages.

approximately monotonic. Figure 9 also presents evidence on employment changes. The figure indicates that employment fell among firms with a higher *FMW* (above around 20%), but not at very low *FMW* firms (relative to *FMW* = 0). Moreover, among the higher *FMW* firms, the employment decline was generally sharper the higher *FMW*. The exception is at the very highest *FMW* firms; we discuss this below, in relation to the regression estimates. The line labeled "combined" effect is the average earnings-weighted employment change. Given that earnings rose at the more-affected (higher *FMW*) firms, this series declined by less than employment. This evidence is consistent with rather sharp disemployment effects of minimum wages, given the magnitude of the minimum wage increase (see Figure 2). With regard to expected effects on firm income, the employment declines suggested by Figure 9 will mitigate some of the costs of the higher minimum wage for more-affected firms; but of course this will also impact firm revenue and income.

It is possible, of course, that the employment changes depicted in Figure 9 reflect different sectoral trends over the sample period, and the correlation between *FMW* and sector, rather than actual employment effects. Hence, in our regression analysis that follows we estimate difference-in-differences regression models with and without sector dummy variables and their interaction with *POST*.

To estimate the effects of minimum wages on employment in a regression framework, we begin with a simple difference-in-differences specification. Indexing firms by *i*, years by *t*, and denoting firm-level controls (such as the sector dummy variables) by *X*, we first estimate

$$Log(Employment)_{it} = \alpha + \beta FMW_i + \gamma POST_t + \delta FMW_i \times POST_t + X_i\lambda + \varepsilon_{it} \ . \qquad (1)$$

Note that *FMW* has only an *i* subscript, since it is defined at the firm level, but only for the pre-treatment period. *POST* has only a period subscript, since it is a dummy variable for the post-treatment period. The estimate of δ from equation (1) is a difference-in-differences estimate of the effect of *FMW* – the fraction affected by the minimum wage – on employment. We then add sector dummy variables and their interaction with *POST*, to allow for differential changes in profits by sector, as well as firm fixed effects.

The results in Table 5 shows a negative impact of the minimum wage increase on employment. The estimated coefficient of δ is negative and significant, and robust across the three columns. The estimated elasticity from column (3) of Table 5 implies that for a company with *FMW* larger by 10 percentage points, the employment decline is 1.1% larger.[41] We explored whether we see changes in the pre-treatment period that look the same as the changes in the treatment period, which would be evidence of spurious trends. We found employment was growing faster at high *FMW* firms (slope not significantly different from zero), which rules out the treatment effects on employment reflecting declining employment at high *FMW* firms in the pre-treatment period.[42]

A potential concern is that sectors with relatively high *FMW* were more adversely impacted by the global financial crisis, potentially leading to spurious evidence of adverse effects of minimum wages. This is not a concern. First, the financial crisis had a relatively modest effect in Israel, with the unemployment rate going up only 1.5 percentage points in 2009, and declining the next year (as Figure 3 shows). Second, the companies most affected were in the financial sector, and those that are export oriented. These are sectors where firms are generally not in the high *FMW* range, so if there was a bias it would be against finding adverse minimum wage effects. Moreover, the financial sector was already partially omitted based on our profitability criterion. In addition, our model includes sector × *POST* interactions, to account for differential impacts by sector that could otherwise be confounded with minimum wage increases. Finally, however, we have run the models in Table 5 (and the tables that follow) excluding the financial and export-oriented sectors, and the results/estimates barely change.[43]

In Table 6, we report estimates from a less constrained model, where instead of using a linear measure of *FMW*, we break *FMW* into a number of categories. We show the estimates with and without the

[41] Given that the mean of *FMW* is 0.18, the implied elasticity is around −0.02 (approximately 1.1/[(10/18) ×100].) This is smaller than the central tendency of employment estimates (with respect to changes in the minimum wage) in the literature, which is around −0.1 (Belman and Wolfson, 2019). However, that literature is nearly exclusively based on elasticities computed for workers, typically with a focus on workers likely to be strongly affected (like teens). Moreover, we do not weight in our analysis, since our goal is to study effects on business owners. For both of these reasons, we do not think there is a clear comparison to the more conventional estimates in the literature (which are estimated at the individual level).

[42] These results are available upon request.

[43] These results are available from the authors upon request.

sector × *POST* interactions, but all columns include firm fixed effects. In columns (1) and (2) – column (2) includes the sector-*POST* interactions – the negative minimum wage effect on employment is increasing with *FMW*, except in the top range of *FMW* > 80%.

Further exploration revealed that companies in the upper range of *FMW* are quite heterogeneous in terms of size and activity, with companies with very high *FMW* concentrated in different industries and much smaller; the latter point was already noted with respect to Figures 6 and 7. In column (3) of Table 6 we therefore split the *FMW* > 80% range into two groups – 80% < *FMW* ≤ 94% and *FMW* > 94%. The group of companies with 80% < *FMW* ≤ 94% is characterized by large employment, with 196.4 workers on average, while the group of companies with *FMW* > 94% is much smaller, with average employment of 16.8. Moreover, among companies with *FMW* > 94%, 32.9% have only one worker; this percentage is 0.4% among companies with 80% < *FMW* ≤ 94%. In addition, the sectors are quite different, with companies in the lower range (80% < *FMW* ≤ 94%) concentrated in wholesale and retail trade (16%), cleaning and security (16%), and health services and social work (12%), while companies in the upper range (*FMW* > 94%) are highly concentrated in the latter industry (46%), and also manpower (8%) and business services (7%).

When, in column (3) of Table 6, we break the *FMW* > 80% range up in this way, we find more negative effects than in column (2). Most notably, it is only the effect in the very top range (*FMW* > 94%) that is not negative (and near zero). We believe this is because companies with such a high *FMW* share have less scope for adjusting employment.[44] This conjecture about the inability to adjust employment for the firms with very high *FMW* is consistent with the results for the impact of the minimum wage hike on profits; below, we report that the profits of companies with very high *FMW* are reduced more strongly by the minimum wage increase.[45]

[44] For companies with only one worker, which is common in this top *FMW* range, the inability to adjust employment is clear. For larger companies, the lack of employment response may reflect Marshall's Third Law of Labor Demand, in which under some conditions the elasticity of labor demand is smaller when labor's share is larger (see, e.g., Hoffman, 2009).

[45] Table 6 does not provide an indication of relative employment growth at low *FMW* firms stemming from the minimum wage increase, which suggests there is not a large reallocation of labor from lower-wage to higher-wage

We did one other potentially important robustness check. We re-estimated the models for employment retaining the firms that exited before the post-period, setting their employment to zero, and using the IHS function instead of logs to accommodate the zero values. For both Tables 5 and 6, we found stronger evidence of negative employment effects for higher values of *FMW*, consistent with the higher minimum wage doing more to increase firm exit. The estimates were a good deal more negative, which is not surprising given that the employment declines to zero can be very influential. In addition, in these specification we found a strong and significant negative effect for the highest *FMW* firms (*FMW* > 94%), with an estimated coefficient of −0.212 (significant at the 1% level) – consistent with an inability to adjust employment, as discussed above, but with adverse effects on these firms.[46]

Minimum wage effects on profits

We next turn to estimation of the effects of minimum wages on owners. We begin with the effects of minimum wages on profits. We begin with a similar specification to equation (1), but for profits:

$$IHS(\pi)_{it} = \alpha + \beta FMW_i + \gamma POST_t + \delta FMW_i \times POST_t + X_i\lambda + \varepsilon_{it} \ . \qquad (2)$$

As shown in Table 7, we begin, in column (1), with a simple specification. In columns (2) and (3) we then add sector dummy variables and their interaction with *POST*, to allow for differential changes in profits by sector, and firm fixed effects. The estimate of δ from equation (2) is a difference-in-differences estimate of the effect of *FMW* – the fraction affected by the minimum wage – on profits.

As shown in column (1) of Table 7, profits decline in relative terms for firms with a higher value of *FMW* in the pre-treatment period. The negative estimate implies that a higher minimum wage reduces profits at firms with a high share of minimum wage workers, relative to firms with a low share.[47] Since our

firms. Longitudinally linked employee-employer data, which we do have at this time, could provide more decisive evidence on whether some reallocation occurs, and where (by sector or by *FMW*).

[46] We do not feature these estimates because, as discussed below, it is not clear how to define profits for firms that fail, and we wanted to focus on similar samples for the employment and profit results. These results are available upon request.

[47] Like for the analysis of employment, we explored whether we see changes in the pre-treatment period that look the same as the changes in the treatment period, which would be evidence of spurious trends. We actually find that profits were growing faster at high *FMW* firms (slope not significantly different from zero), which rules out the treatment effects on profits reflecting declining profits at high *FMW* firms in the pre-treatment period; these results are available upon request.

sample does not include failed firms, the adverse effect of the minimum wage on higher *FMW* firms could be stronger than this estimate implies.[48]

To interpret the magnitude, in the regression *FMW* is defined on a scale of zero to one. Thus, the estimated coefficient of −0.749 on *FMW* × *POST* in column (1) implies that profits declined by about 7.5% for firms where the fraction affected by the minimum wage, based on the pre-treatment period data, was about 10 percentage points higher. With the sector dummies and "trends" added, in column (2), this estimate becomes −0.795, and with firm fixed effects the estimate is similar (−0.720). These estimates appear to us to be sizable. For example, the latter estimate implies that profits of firms at the 90th percentile of FMW decline by 21% more than profits of firms at the 75th percentile of FMW.[49] (We return to the other columns of Table 7 later.)

To provide a different way to convey the magnitude of the effect, we estimate a specification that measures the effect on profits of an estimate of the mechanical increase in labor costs from the minimum wage increase, based on the number of minimum wage workers in 2005 (the end of the pre-period) and the increase in the minimum wage. We modify equation (2) to be, instead

$$IHS(\pi)_{it} = \alpha + \beta log(WBMW_i) + \gamma log(RMW_t) + \delta log(WBMW_i) \times log(RMW_t) + X_i\lambda + \varepsilon_{it} \quad . \quad (3)$$

In this specification, *log(WBMI)* is the log of the wage bill for minimum wage workers, computed as the number of minimum wage workers in 2005 multiplied by the statutory 2005 minimum wage, where minimum wage workers are defined as those below the deflated minimum wage in the post-period. *Log(RMW)* is the log of the relative minimum wage in the pre- and post-periods, defined as zero (log(1))

[48] The data allow identification of failed companies in the post-treatment period, but lacks information regarding profits for those firms. Assigning zero values for profits can be misleading since profits could have negative values. A related point is that, especially if there is some exit of the most-affected firms, surviving firms could do better. Indeed, in a recent study of Germany's new minimum wage, Dustmann et al. (2019) find that affected workers have some tendency to move to higher-wage firms, consistent with reallocation towards more-productive firms, and also find evidence that there is some firm exit (among small businesses) and that surviving firms became more productive. We estimated models for firm survival to the post-treatment period, and found that the most-affected firms were significantly less likely to survive (results available upon request). This implies that our evidence of declines in profits for affected firms understate the negative impact of the minimum wage on firms. These results are available upon request.

[49] The 75th percentile of FMW is 0.308, and the 90th percentile is 0.600. Multiplying this difference by the estimated effect of −0.720 predicts a decline in profits of 21%.

for the pre-period and log(1.154) for the post-period, given the 15.4% increase in the minimum wage. The interaction therefore measures the percent change in profits for a one-percent higher effect of the minimum wage increase on the wage bill (based on minimum wage workers in 2005).[50] Note that the increase in the wage bill we consider is a "mechanical" one, assuming no other adjustments in behavior.[51] We expect the estimate to be negative but less than one in absolute value, as firms can adjust to the wage increase by varying employment, prices, and other variables.

The specification is otherwise the same as in Table 7 (and we report the estimates for column (3), including the sector dummies and their interactions with *POST*, and firm fixed effects). The results are reported in Table 8. The estimated coefficient of the interaction is a statistically significant −0.269, indicating that, for example, if the minimum wage increase implied a 10% larger mechanical increase in the wage bill for minimum wage workers for a firm, its profits fell by 2.7%. The implied effect is far less than one-for-one, consistent with the average *FMW* of 0.18 and with firms making other adjustments to offset the effects of the higher minimum wage (including, but not limited to, the reductions in employment among the lowest-earning workers that we have already estimated).

A richer breakdown of firms into six bins based on *FMW*, paralleling our employment specifications, provides results that reinforce the conclusion that profits fell more at firm with larger share of minimum wage workers (see Table 9). Compared with the zero *FMW* firms in the sample, the estimates show that the minimum wage hike had no statistically significant effect on profits for the second and third bins ($0 < FMW \leq 40\%$). For companies with *FMW* above 40%, profits decline – for the fourth bin (40-60%) by 20%, for the fifth bin (60-80%) by 44-45%, and for the highest *FMW* firms (80-100%) by 87-92%. Hence, the relationship is monotonic. The results are robust to allowing for different changes over time by economic sector (column 2). As noted in the previous discussion of the employment results in Table 6, low

[50] Note that this is not quite the same as the implied cost of topping off below-minimum wage workers to the minimum wage, and hence allows for some increases in wages to a bit above the minimum wage; on the other hand, it does not include potential spillovers to those above the new minimum wage, and hence should provide a good back-of-the envelope estimate of the cost of the minimum wage increase.

[51] There is, in fact, evidence of adjustment along other margins, including price (e.g., Aaronson, 2001), substitution towards higher-skilled labor (e.g., Clemens et al., 2018), and the provision of benefits (e.g., Marks, 2011).

labor adjustment in the top *FMW* firms can explain the larger negative impact on profits.

Returning to Table 7, the remaining columns (4)-(7) report estimates for the effect of minimum wages on profits for the four quartiles of the profit distribution (based on the data from the period prior to the minimum wage increase) – from lowest to highest. We find the strongest negative impact of minimum wage on profits in the 1st quartile of profits (including companies with losses or near-zero profits). The effect weakens significantly for firms in the 2nd to 4th quartiles. This evidence suggests that it is the low-profit firms that bear most of the cost associated with higher minimum wages.

Effects by year

Our empirical results thus far compare the post- and pre-periods. To provide more information on the evolution of the dependent variables by year, Figure 10 graphs estimates of effects for earnings, employment, and IHS profits. The specifications (except for variation in the dependent variable) are the same as those in Table 9, column (1), with fixed effects added, although interacting the minimum wage variables with dummy variables for each year. We graph the interactions of the minimum wage variables with the dummy variable for each year from 2006-2010. For earnings, we see that the increases for the more-affected firms began early and reached their maximum in the post-period (2009-2010). Employment at more-affected firms began to fall with the minimum wage increases, also reaching the lowest levels in the post-period for all groups except the highest *FMW* group (as discussed earlier with respect to the regressions). In the profits graph, the decline is persistent and profits reach their lowest in the post-period only for the three most-affected groups of firms (*FMW* between 40% and 60%, between 60% and 80%, and between 80% and 100%).[52]

6. Evidence on the Distribution of the Costs of Minimum Wage Increases

We now turn to the evidence that is unique to this paper, exploring how the incidence of the cost of

[52] It would be too messy to include confidence intervals in these figures. In the earnings graph, the standard errors for the estimates shown reach a maximum of about 0.013, so nearly all of the estimates are significant (using, for this footnote, the 5% level). For the employment regressions, the standard errors for the estimates shown reach a maximum of about 0.022, so again most of the estimates are significant. For the profit regressions, the standard errors are larger, reaching a maximum of about 0.123. All of the estimates for the groups with *FMW* between 60% and 80%, and between 80% and 100%, are statistically significant, as are the estimates for firms with *FMW* between 40% and 60% beginning in 2007.

minimum wage increases varies across the income distribution, as well as comparing the incomes of affected business owners with the incomes of workers.

Minimum wage effects across the income distribution

We noted earlier that a more adverse effect of minimum wages on profits at relatively low-profit firms would likely also predict that a higher minimum wage has more adverse effects on business owners with relatively low incomes ("mom and pop" shops, among businesses). To explore this question directly, we alter our regression model to estimate the effects of minimum wages on profit not by *FMW*, but by the owners' income percentile in the income distribution of owners and workers together (see Table 1 for variable definitions). Denoting income percentile by *IP*,[53] our regression model now becomes

$$IHS(\pi)_{it} = \alpha + \beta IP_i + \gamma POST_t + \delta IP_i \times POST_t + X_i\lambda + \varepsilon_{it} \ . \quad (4)$$

We have substituted *IP* for *FMW*, to detect post-treatment changes in profits across the distribution of incomes of business owners. Note that *IP* has only an *i* subscript, since it is defined at the owner level, but only for the pre-treatment period.

The results are reported in Table 10. Recall that a higher income percentile implies higher income of business owners. Thus, the positive estimated coefficients on the *IP* × *POST* interaction imply that profits of lower-income business owners declined more in relative terms in the post-treatment period. For example, the estimated coefficient of 2.351 in column (2) implies that firms with owners earning median income suffered a 7.6% larger decline in profits than those at the 75th percentile.[54] The estimated direct effect is smaller than the decline in profits estimated in Table 7. This could be explained by the fact that we estimate the effect on company profits and not on the owner's business income.[55]

Minimum wage impacts relative to the income distribution

The implication of the preceding estimates is that profits of lower-income business owners were

[53] The income percentiles are calculated based on universe of business owners and workers in 2005. Owners' income includes wages from owned business and other labor income.
[54] The median of *IP* is 0.9516, and the 75th percentile is 0.9842. Multiplying this difference by the estimated effect of 2.351 predicts a decline in profits of 7.6%.
[55] Owners' income percentile is calculated based on all labor-related incomes including wages of owners in their companies and labor income from other sources. Moreover, a substantial share of companies are owned by more than one owner.

more adversely affected by the 2006-08 minimum wage increases. We already saw that profits (and employment) of higher *FMW* firms were also more adversely affected. Column (1) of Table 11 shows why these results coincide. Based on pre-treatment data – as is all the analysis in this subsection – the owners of businesses with higher *FMW* are lower in the income distribution. The relationship between *FMW* and the income percentile of business owners is nearly monotonically negative.[56]

Note, though, that even among the high *FMW* firms, business owners are relatively high in the income distribution – for individuals, for example (column (1)), ranging from the 74th to the 94th percentile across different *FMW* bins. Thus, this evidence suggests that the impact of minimum wage increases is regressive in terms of the income distribution of business owners, but still relatively progressive with regard to the overall distribution of income.[57]

To provide a richer perspective on distributional effects, column (2) shows the average income percentiles of workers, based on *FMW* at the firms at which they were employed prior to the minimum wage increase. As we would expect, workers in higher *FMW* firms have lower incomes on average; the income percentile declines nearly monotonically with *FMW*.

The comparison across columns (1) and (2) is also of interest. This comparison shows that in the lowest *FMW* firms, workers' average income percentiles (77) are about the same as those of owners in the higher *FMW* firms (the percentiles range from 74 to 78 for firms with *FMW* above 60%). In this sense, too, the redistributional impacts of the minimum wage seem, if not strictly regressive, than at least sharing the burden of the minimum wage very unequally between economic agents at similar points in the income distribution, with owners paying directly for the higher minimum wage, while workers with similar incomes do not. On the other hand, incomes of workers in the high *FMW* firms are clearly lower than incomes of the owners of these firms, and in that sense the minimum wage does redistribute income downward.

[56] We use pre-treatment ownership data is to abstract from ownership and income changes that could result from the minimum wage hike.
[57] And this would be more the case if, as seems likely, business owners have more assets because of the businesses they own.

In columns (3) and (4) of Table 11 we extend the analysis to family income – the usual lens through which we view redistribution, poverty, etc. Doing so amplifies the regressivity of the incidence of the minimum wage with respect to the distribution of incomes of business owners. Families with ownership of the highest *FMW* firms earn slightly less than the median family income in 2005 (column (3)), and the income percentiles for firms with *FMW* > 60% are not much above the median. Moreover, the income percentile declines significantly more, as *FMW* increases, in column (3) compared to column (1). In addition, workers in the lowest *FMW* firms are at higher income percentiles than business owners at the highest *FMW* firms. On the other hand, it is still very much the case that workers at high *FMW* firms are considerably lower in the family income distribution than workers at low *FMW* firms (column (4)). Thus, we might conclude that, overall, the effect of the minimum wage hike is fairly regressive for business owners (and even more so for families of business owners), but is progressive for workers (and even more so for families including minimum wage workers).

Table 12 provides more details on the income distribution by *FMW* that includes family incomes (adding owners'/workers' spouses). Panel A shows the details for married business owners.[58] Owners of high *FMW* businesses are younger, slightly more likely to be female, and have more children. The first two, at least, are almost certainly associated with lower income. As shown in column (5), average incomes of owners drops dramatically with *FMW* – and the contrast between lower *FMW* firms (e.g., *FMW* below 20%) and higher *FMW* firms (e.g., *FMW* above 30%) is quite striking. Columns (9) and (10) show that incomes of spouses exacerbate the relationship between *FMW* and income, as incomes of spouses are higher for owners of low *FMW* firms, and hence the gaps in family income across the distribution of *FMW* are generally larger than for owner income alone (column (5) vs. (10)). The numbers in column (11) provide a summary measure showing this conclusion, indicating that family income declines quite sharply as *FMW* increases. These data reinforce the conclusion that, among business owners, the burden of the minimum wage falls on lower-income families.

[58]The division between married and single provides income comparisons that do not depend on marital status. Among business owners, 85% are married, while the share of married workers is lower at 61%. The comparison of single business owners/workers is shown in Table 13.

But how do the incomes of the business owners who bear the burden of the minimum wage compare to the incomes of the potential beneficiaries of higher minimum wages – families with workers earning the minimum wage? Panel B of Table 12 shows that, as expected, average worker earnings decline with *FMW* (column (5)) – reflecting the fact that at high *FMW* firms most workers earn the minimum wage. This is reinforced by spouse's earnings, which also decline with *FMW*, indicating that incomes of spouses are positively correlated. However, spouses' earnings do not decline nearly as steeply with *FMW*. Moreover, earnings of spouses of workers in high *FMW* firms are generally much higher, as reflected in the fact that average earnings of spouses of those in high *FMW* firms are much higher than those of the workers in these firms (column (8) vs. column (5)). This indicates that a large share of minimum wage workers are the secondary earners in families, which reduces the redistributional effects of minimum wages towards families with the lowest incomes.[59]

At the same time, a comparison of the family incomes of owners and workers in higher *FMW* firms – in column (10) of Panels A and B – indicates that the family incomes of minimum wage workers are much lower than those of the owners of high *FMW* firms. For example, in firms where *FMW* exceeds 90%, average family income of owners is 198,334 NIS, vs. average family income of workers in those firms of 74,137 NIS. And the average family incomes of workers in low *FMW* firms are similarly to the average family incomes of the owners of high *FMW* firms, implying that a large share of the cost of the minimum wage – for high *FMW* firms – falls heavily on one among two different types of agents (owners vs. workers), despite them having relative similar incomes. This kind of evidence is inconsistent with horizontal equity.

Analysis for singles, who constitute a much smaller share of the sample, provide similar results (see Table 13). As before, incomes of business owners and average earnings of workers decline with *FMW*. The main and obvious difference is that single owners and workers do not enjoy additional income of spouses.

[59] This parallels evidence for the United States, for example, that the high share of teens and young adults among minimum wages implies that a large share of the benefits of higher minimum wages do not go to poor families (Lundstrom, 2017).

Thus, the conclusions from Table 12 (and 13) are similar to those from Table 11. The higher minimum wage does redistribute income towards lower-income families. But the redistribution is not from the top of the income distribution, but rather from owners whose incomes are higher than those of minimum wage workers, but whose incomes are lower than those of many other owners who do not bear the burden of the minimum wage, and similar to those of many higher-earning workers.[60] Moreover, note that this distributional analysis does not account for profits of publicly-held companies paid out as dividends (or reflected in appreciation of stocks). Since these companies are large and likely least affected by minimum wage increases,[61] and stocks are held by higher-income individuals and families, our distributional analysis almost certainly understates the degree to which the burden of the minimum wage falls on lower-income business owners – making our evidence of the regressive nature of the burden of minimum wages, with respect to the income distribution among business owners, more striking.

7. Conclusions

In this paper, we study an unexplored dimension of the distributional effects of the minimum wage, turning attention from the question of the effects on workers, who are potentially helped by a higher minimum wage, to the question of who *pays* for it. A key goal of a higher minimum wage is income redistribution towards low-income families. Existing research on the minimum wage focuses on the impact on affected workers, but is largely silent on the incomes of the owners of businesses who pay for a higher minimum wage, and especially silent on the incidence of the costs of a higher minimum wage across the income distribution.

We study evidence on this dimension of the distributional effects of minimum wages using a unique administrative dataset on the universe of tax records for Israel, in the period surrounding a large and plausibly exogenous minimum wage increase. The evidence indicates that the minimum wage hike reduced

[60] A related issue, which we do not address here, is how minimum wages affect prices, since price changes affect the purchasing power of income changes. Indeed recent U.S. evidence in Renkin et al. points to significant (actually, *full*) price pass-throughs of minimum wage increases, with the negative effects larger for poor families. Effects like these work against any progressive redistribution from the minimum wage.

[61] In results available upon request, we compute the equivalent of Figure 5, but for publicly-traded companies. There are much lower shares of companies in bins with high values of *FMW*.

profits of companies, with minimum-wage intensive companies bearing the bulk of the cost and adjusting their workforces more aggressively, and profits declining more for lower-income business owners. Moreover, owners of businesses with higher shares of minimum wage workers ranked at the bottom of the income distribution of business owners, and their incomes were comparable to those of mid-to-high level workers. In most cases, spouses of business owners earn less than the owners while spouses of minimum wage workers earn more, reducing the redistributive effect of the minimum wage.

Overall, then, the evidence indicates that the higher minimum wage does redistribute income towards lower-income families. However, the redistribution is not from the top of the income distribution. Rather, it is from owners whose incomes are higher than those of minimum wage workers, but whose incomes are lower compared to other owners who do not bear the burden of the minimum wage, and similar to those of many higher-earning workers. The latter result implies that a large share of the cost of the minimum wage – for high *FMW* firms – falls heavily on one among two different types of agents (owners vs. workers), despite them having relative similar incomes – inconsistent with horizontal equity.

Thus, minimum wages, while somewhat redistributive, are not effectively redistributing from the highest-income individuals or families (aside from the issue, addressed in prior research, that minimum wages do not do a very good job of targeting benefits to low-income individuals or families). In that sense, the minimum wage is quite different from other redistributional policies financed by taxes – such as the U.S. Earned Income Tax Credit.[62] We have no way of doing a direct comparison of the minimum wage with other redistributive tax policies, including simply more progressive taxation, in the absence of a structural model, so we do not, in this paper, quantify the differences in the distributional effects of the minimum wage and alternative policies. But our results clearly suggest that such an inquiry could be very useful (for Israel as well as other countries). Another policy that could be considered to improve the targeting of who *pays* for a higher minimum wage is to create a tax credit that offsets part of the cost of higher minimum wages borne disproportionately by the businesses that employ a relatively higher share of minimum wage workers (Neumark, 2019b) – businesses that, as we have shown, have lower profits and are

[62] There is also an EITC in Israel (see Brender and Strawczynski, 2019).

owned by those with lower incomes than the owners of other businesses and incomes comparable to those of higher-income workers.

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Appendix A

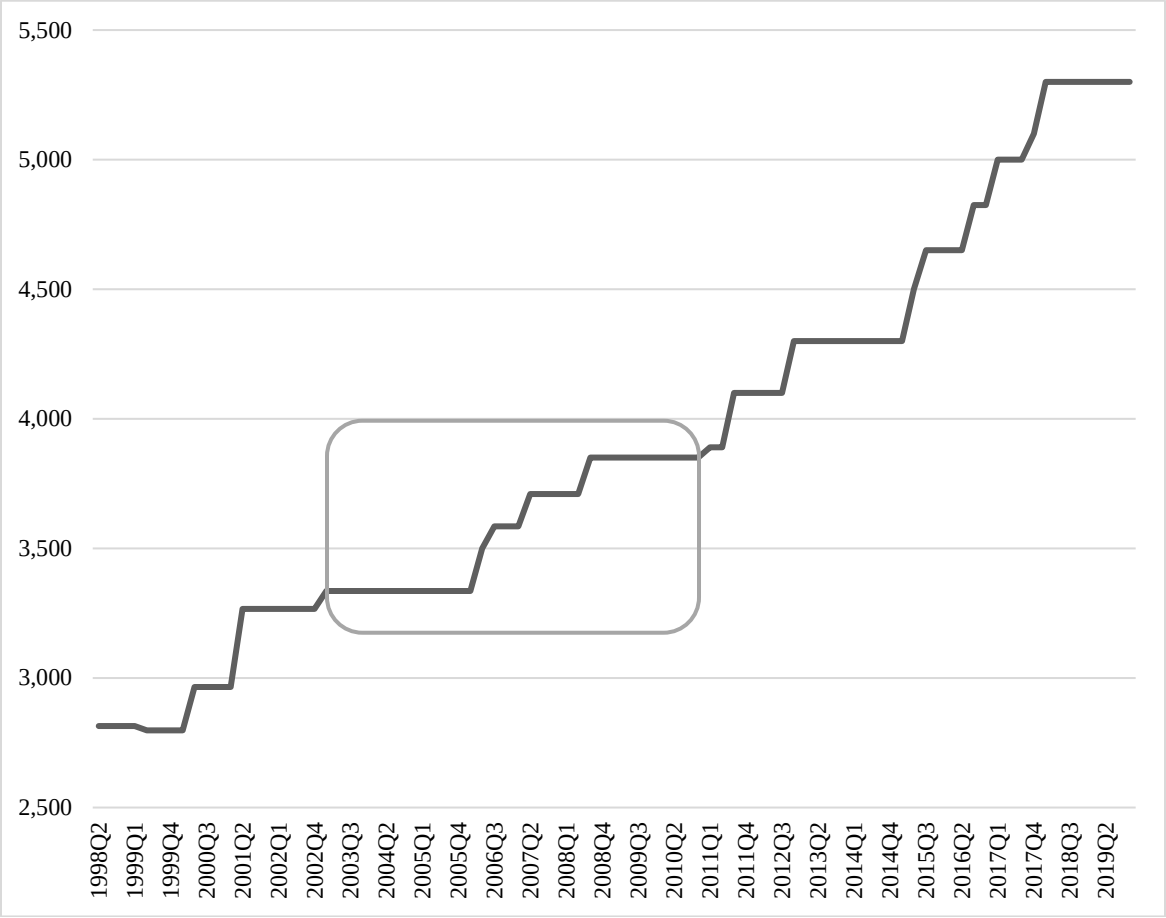
Minimum wages in the 2006 elections

This Appendix documents the importance of the minimum wage during the pre-election period prior to the 2006 general elections. Amir Peretz, who served in a previous role as a head of the national labor union (Histadrut), promised to increase the minimum wage, and later during coalition negotiations insisted on a minimum wage hike. Below are excerpts from official statements by the Labor Party:

> "The challenge facing the Israeli society is to accelerate the processes of economic development and growth, and to ensure fair distribution to the public… The government, led by the Labor Party, will set a goal of reducing unemployment, raising minimum wage, effectively enforcing labor laws, reducing social gaps in income, education and housing quality."
>
> – Labor party pre-election platform

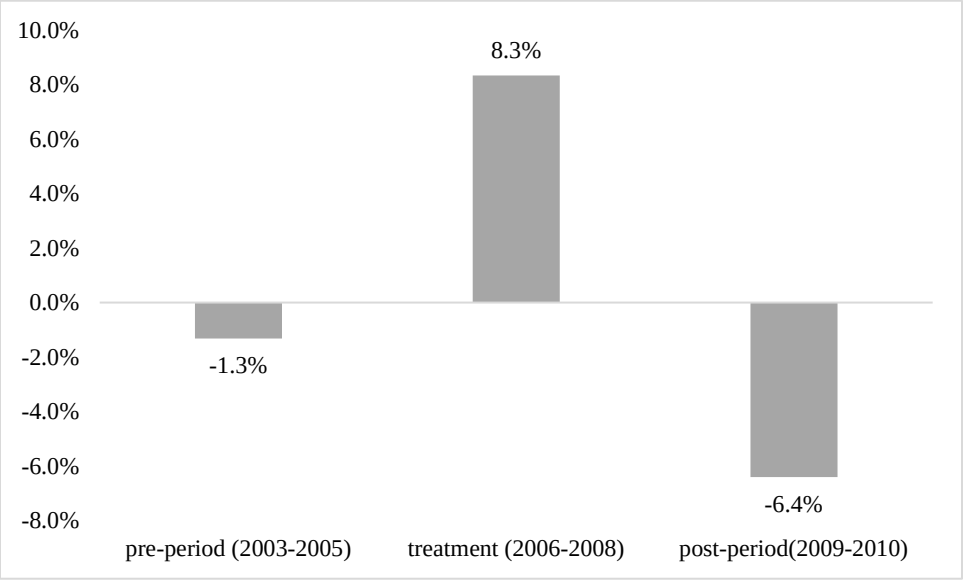
> "Mr. Speaker of the Knesset, Ministers, Members of the Knesset…First of all, I am glad to tell to all of those who said that the last increase of the minimum wage will cause a severe crisis to the unemployment rate, that if the minimum wage will be raised the crisis for the economy will be unmanageable- we see nowadays that the economy continues to grow, the consumption of all those million people who enjoy the new minimum wage helps to improve the economy and doesn't harm it.… But the most important thing is that there are no budget consequences. Why? The Ministry of finance claims it will cost 230 million shekels. But those million people who will get the extra 140 shekels, most of them work in the business sector and not for the government. They won't buy diamonds in Paris or a house in Manhattan with this money, they will use it to purchase inside the Israeli market, which means the Ministry of finance gets taxes…"
>
> –Amir Peretz , in the 75th Session of the 17th Knesset, November, 2007

Figure 1: Evolution of the Statutory Minimum Wage in Israel in Analysis Period



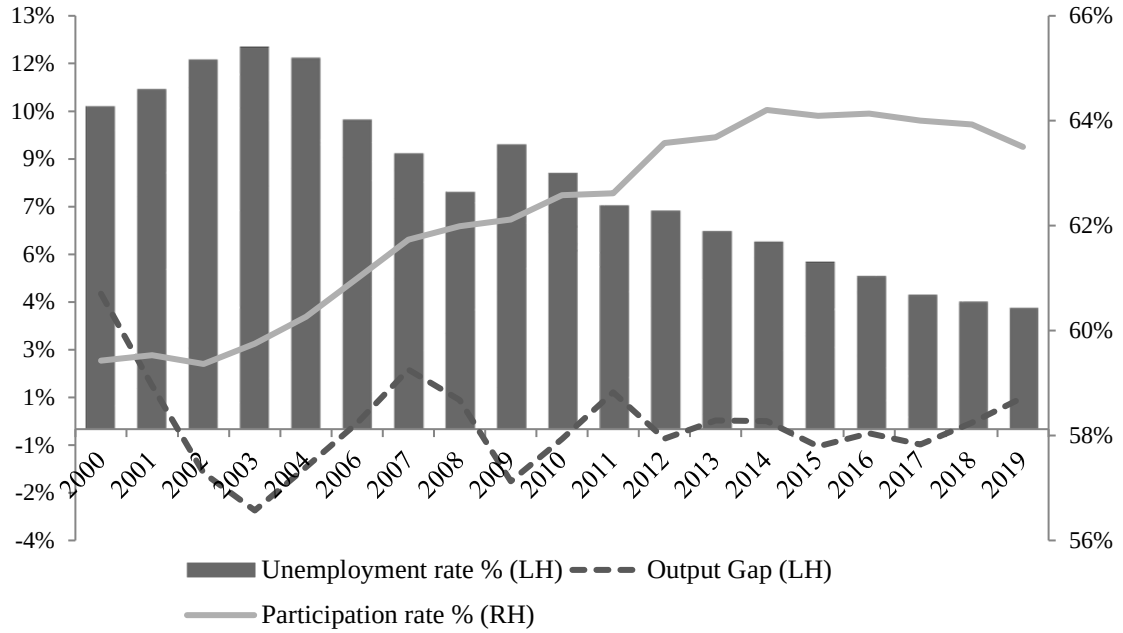
The minimum wage is in NIS per month, at current prices, based on full-time work. The box shows the period covered by our analysis.

Figure 2: Percent Change in Real Monthly Minimum Wage



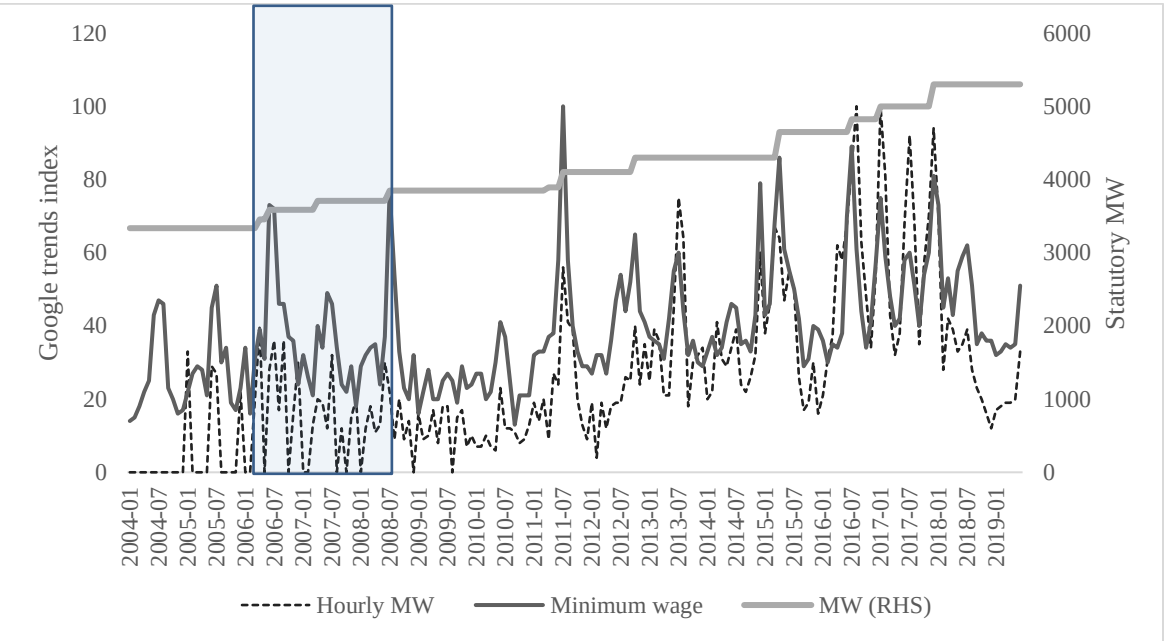
Notes: The real minimum wage is in NIS per month (deflated by the CPI), based on full-time work. The values shown measure changes within periods; for example the pre-period value is the change of CPI deflated minimum wage between 2006Q1 and 2003Q1.

Figure 3: Participation and Unemployment Rates (Population aged 15+), and Output Gap



Source: For unemployment rate and participation rate: CBS, LFS. We calculated the output gap by applying Hodrick-Prescott filter to quarterly national accounts series for GDP. Output Gap is calculated as part of the macroeconomic forecasting process in the Israeli Ministry of Finance and serves as a measure of slack in the economy. OECD publishes similar figures for the Israeli economy as part of the OECD Economic Outlook.

Figure 4: Google Trends Data on Minimum Wages



Notes: Leading search terms related to minimum wage in Hebrew as follows: minimum wage – שכר מינימום, hourly minimum wage – שכר מינימום לשעה. Google trends index is available since 2004. Zero values in Google trends commonly represent search query sample that is not large enough to be reported. The box shows the period of the increases.

Figure 5: Distribution of Company-Year Observations in the Analysis Sample, by *FMW* Bins

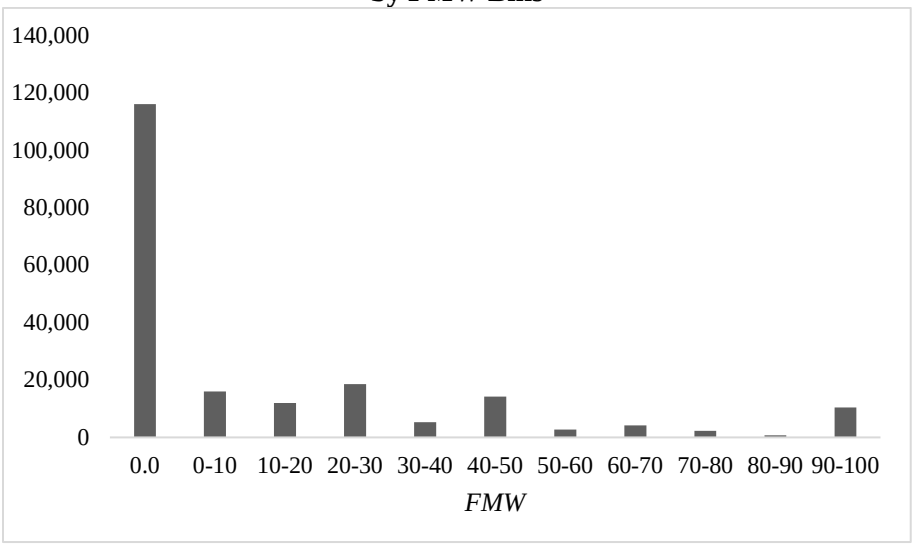
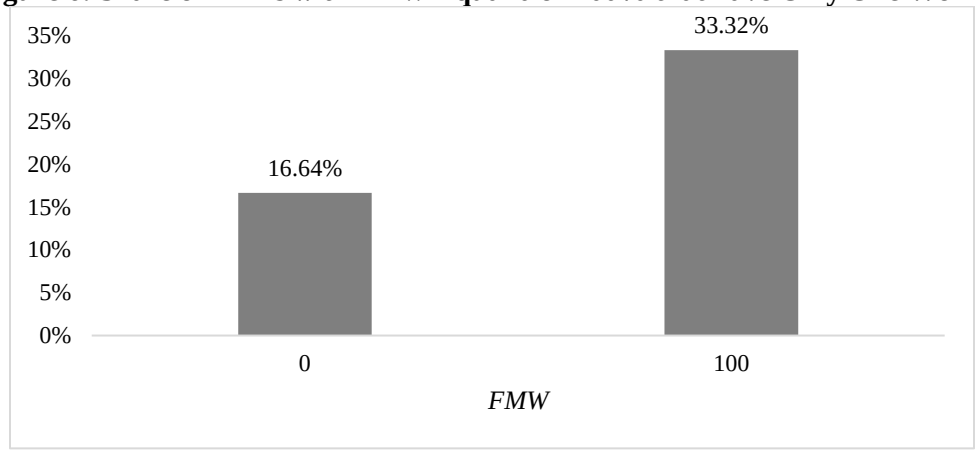


Figure 6: Share of Firms with *FMW* Equal 0 or 100% that have Only One Worker



Notes: The percentages shown are for the shares of one-worker firms out of all firms in given an *FMW* category.

Figure 7: Employment per Firm, According to *FMW* Bins

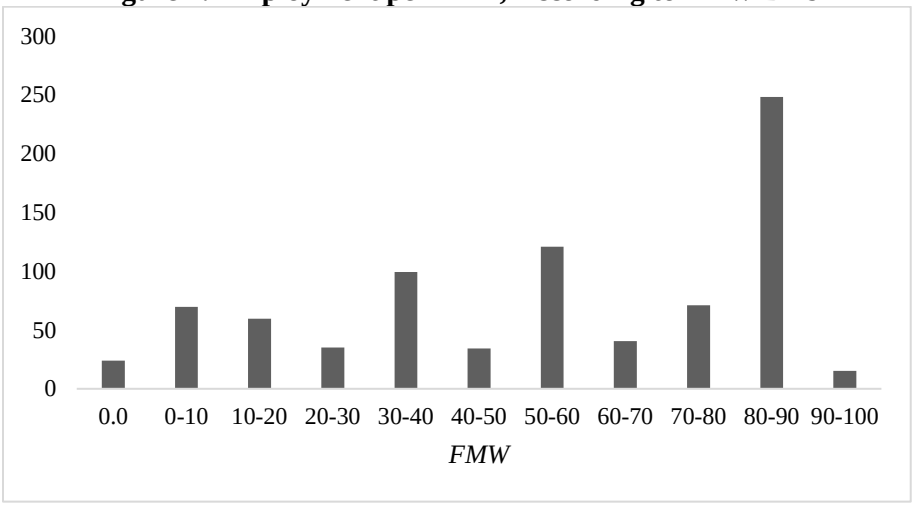
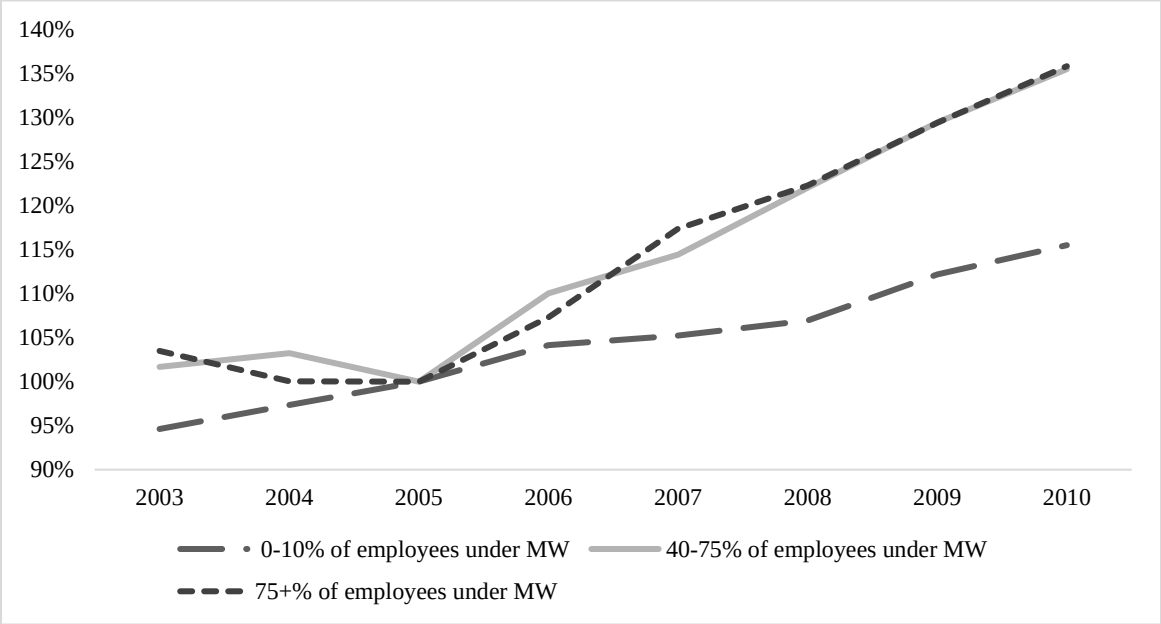
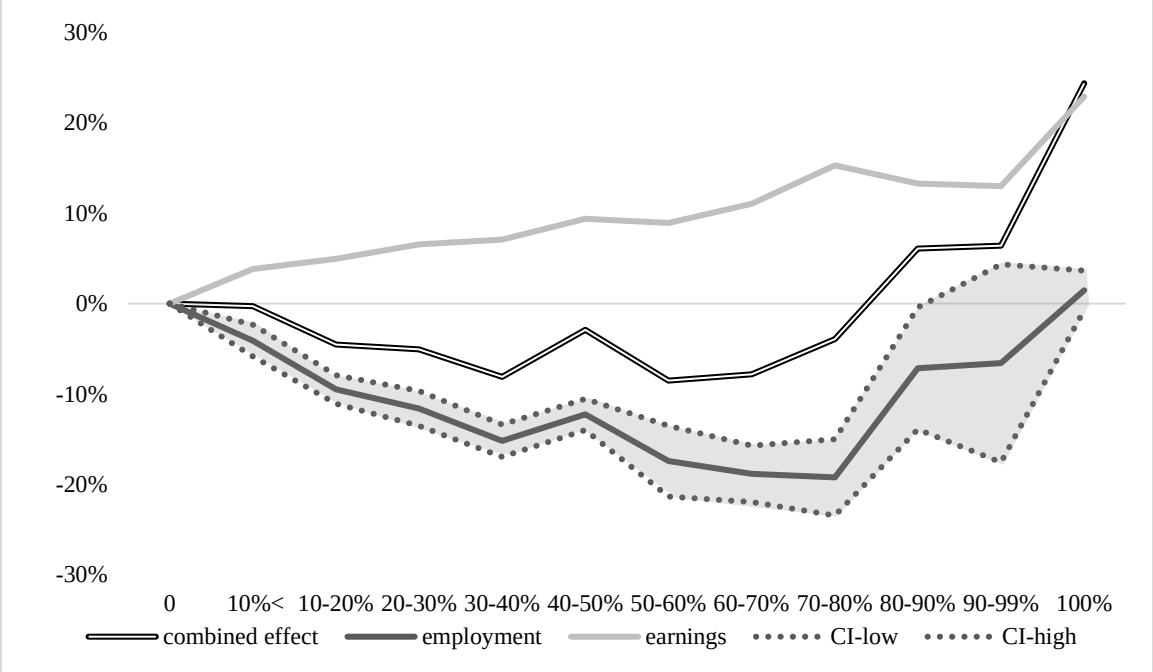


Figure 8: Earnings Trends for Workers in Firms with Low and High Initial Fractions of Minimum Wage (*FMW*) Workers, Normalized to Earnings in 2005, 2003-2010



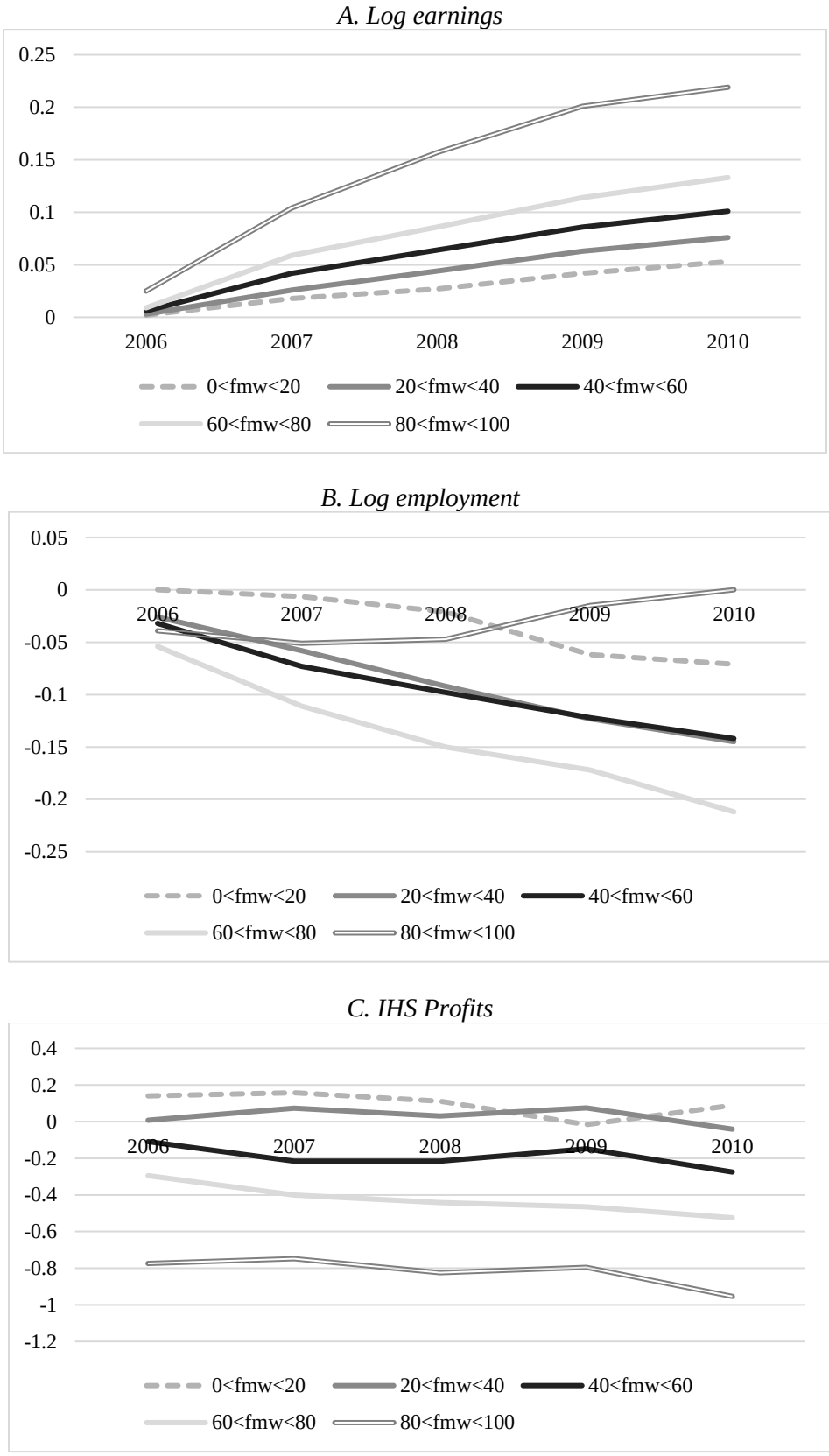
Note: Annual earnings in NIS normalized to earnings in 2005 for each group of workers based on *FMW* at their firms.

Figure 9: Employment and Earnings Changes following Minimum Wage Hike by *FMW* Bins, % Change, 2004-2005 to 2009-2010



Note: Earnings growth and combined effect are in real terms. For employment effects, "CI-low" and "CI-high" are the bottom and top of the 95% confidence interval.

Figure 10: Estimated Effects on Earnings, Employment, and Profits by Year, 2006-2010



Note: Specifications correspond to Tables 6 and 9, column (3), except that we include dummy variables for each year rather than a simple *POST* variable.

Table 1: Variables Used in Study

Variable	Description
Company data	
Profits	Taxable corporate income from all sources including reimbursement of owner's salary (1,000's NIS/year)
IHS(π)	Inverse hyperbolic sine (IHS) transformation of corporate income variable, defined as: $\sinh^{-1}(\text{income}) = \log[\text{income} + (\sqrt{\text{income}^2 + 1})]$
Profitability	Corporate income/sales (used for sample restriction)
Initial profit quartiles: Low Medium-low Medium High	Dummy variables for quartiles of companies' profits in the pre-period (2004-2005)
Sector dummies	23 sector dummy variables
Employee data, matched to company	
Employment	Employee headcount at the company level (main position)
Log(employment)	Natural logarithm of employee headcount (main position)
FMW	Fraction of employees paid monthly wages at or below the post-hike minimum wage for 2009-2010 based only on 2005 data on employees who worked continuously throughout the full year on their main job; 2005 is the last year before treatment; *FMW* is measured on a 0-1 scale (although the charts present percentages for clarity)
POST	Post-treatment dummy variable for years 2009-2010 (vs. the 2004-2005 pre-treatment period)
Income variables	
Owners' income percentile (IP) in 2005	Percentiles of business owners' incomes in the total income distribution of business owners and workers, in 2005
Workers' income percentile (IP) in 2005	Percentiles of workers' incomes in the total income distribution of business owners and workers, in 2005
Weighted owners' income percentile by company (IP) in 2005	After calculating owners' income percentile (*IP*) in 2005 at the individual-level, we calculated a weighted average, by percentage of ownership, of *IP* for each company

NIS = New Israeli Shekels. The sectors are: manufacturing (mining, food production, textiles, paper products and , furniture, chemical products, mineral and metal products, electronics and medical, diamonds); agriculture; high tech; electricity and water supply; construction; wholesale and retail trade; accommodation services and restaurants; transport and communications; financial institutions; real estate; computer and related activities; R&D; manpower; security and cleaning; education; health services and social work; communities and other social and personal services; and other business activities.

Table 2: Construction of Analysis Sample, and Descriptive Statistics

Sample	Number of company observations	Number of employee observations on the main job	Employees per company (min, median, mean, max)	Profitability (min, median, mean, max)	*FMW* (min, median, mean, max)
Full sample of companies matched to employees, 2004-2010	658,804	21,719,245	(1, 6, 33.48, 36,387)	(-35,331,478, 0.08, -1,667.6, 9,892,492)	(0.00, 0.00, 0.20, 1.00)
Exclude government sector	654,159	19,668,656	(1, 6, 30.54, 32,606)	(-35,331,478, 0.08, -1,676.2, 9,892,492)	(0.00, 0.00, 0.20, 1.00)
Exclude non-profits	593,865	17,185,309	(1, 6, 29.35, 32,606)	(-35,331,478, 0.09, -1,778.3, 9,892,492)	(0.00, 0.00, 0.18, 1.00)
Exclude companies in liquidation	588,484	17,128,975	(1, 6, 29.51, 32,606)	(-35,331,478, 0.09, -1,793.8, 9,892,492)	(0.00, 0.00, 0.18, 1.00)
Exclude companies likely to be holding companies based on extreme profitability measures	542,583	16,358,953	(1, 7, 30.53, 32,606)	(-1, 0.09, 0.15, 1)	(0.00, 0.00, 0.18, 1.00)
Exclude companies established after 2005	519,050	16,018,885	(1, 7, 31.17, 32,606)	(-1, 0.09, 0.16, 1)	(0.00, 0.00, 0.18, 1.00)
Exclude companies with no earnings data in 2005	356,893	13,120,034	(1, 8, 36.85, 32,606)	(-1, 0.10, 0.16, 1)	(0.00, 0.00, 0.18, 1.00)
Exclude company observations in 2006-2008 (treatment period)	202,187	7,255,846	(1, 8, 35.97, 29,694)	(-1, 0.09, 0.15, 1)	(0.00, 0.00, 0.18, 1.00)

Note: Pre-treatment years are 2004-2005 and post-treatment years are 2009-2010.

Table 3: Number of Observations Per Year

Year	Number of companies	Number of employees at main position
2004	55,159	1,802,782
2005	57,520	1,945,423
2009	45,955	1,738,612
2010	43,553	1,769,029

Table 4: Descriptive Statistics of the Estimation Sample, 2004-2005 and 2009-2010

Variable	N	Median	Mean	Std. Dev.	Minimum	Maximum
Profits, thousands NIS	202,187	195	1,282	40,859	-1,610,081	8,840,595
IHS(π)	202,187	5.95	4.11	4.80	-14.98	16.69
Profitability	202,187	0.09	0.15	0.27	-1.00	1.00
Initial profit quartiles:						
Low	202,187	0	0.23	0.42	0	1
Medium-low	202,187	0	0.24	0.43	0	1
Medium	202,187	0	0.26	0.44	0	1
High	202,187	0	0.27	0.44	0	1
Employment	201,742	8.00	35.97	254.51	1	29,694
Log(employment)	201,742	2.08	2.15	1.44	0.00	10.30
FMW	202,187	0	0.18	0.28	0	1
POST	202,187	0	0.44	0.50	0	1
Owners' income percentile (*IP*) in 2005	58,384	95	90	15	0	100
Workers income percentile (*IP*) in 2005	1,269,078	48	48	28	0	99
Weighted owners income percentile by company (*IP*) in 2005	44,866	94	90	14	0	99

Table 5: Regression Estimates for Minimum Wage Effect on Log Employment, Based on Fraction Affected by Minimum Wage (*FMW*), 2004-2005 and 2009-2010

Variables	(1)	(2)	(3)
FMW	0.109***	-0.084***	…
	(0.022)	(0.020)	
POST	0.068***	0.023	-0.057
	(0.005)	(0.063)	(0.058)
FMW × *POST*	-0.122***	-0.098***	-0.114***
	(0.019)	(0.018)	(0.013)
Sector dummies and sector dummies × *POST*	no	yes	yes
Firm fixed effects	no	no	yes
Adj. R^2	0.001	0.118	0.925
N	201,742	201,742	201,742

Notes: Dependent variable is log(employment) per firm in each year. Levels of significance: 10%*, 5%**, 1%***. Standard errors are clustered at the firm level. The intercept is not reported. *FMW* is measured on a 0-1 scale in the regressions.

Table 6: Regression Estimates for Minimum Wage Effect on Log Employment, with Separate *FMW* Bins, 2004-2005 and 2009-2010

Variables	(1)	(2)	(3)
FMW >0-20%	…	…	…
FMW 20-40%	…	…	…
FMW 40-60%	…	…	…
FMW 60-80%	…	…	…
FMW 80-100%	…	…	
FMW 80-94%			…
FMW 94-100%			…
FMW 0%	…	…	…
POST	0.029***	-0.035	-0.034
	(0.004)	(0.049)	(0.049)
FMW >0-20% × *POST*	-0.072***	-0.072***	-0.072***
	(0.009)	(0.009)	(0.009)
FMW 20-40% × *POST*	-0.135***	-0.132***	-0.132***
	(0.010)	(0.010)	(0.010)
FMW 40-60% × *POST*	-0.130***	-0.126***	-0.127***
	(0.013)	(0.013)	(0.013)
FMW 60-80% × *POST*	-0.190***	-0.184***	-0.184***
	(0.021)	(0.021)	(0.021)
FMW 80-100% × *POST*	0.005	0.006	
	(0.016)	(0.016)	
FMW 80-94% × *POST*			-0.062*
			(0.037)
FMW 94-100% × *POST*			0.014
			(0.435)
FMW 0% × *POST*	…	…	…
Sector dummies and sector dummies × *POST*	no	yes	yes
Adj. R^2	0.925	0.926	0.926
N	201,742	201,742	201,742

Notes: Dependent variable is log(employment) per firm in each year. Specifications include firm fixed effects. Levels of significance: 10%*, 5%**, 1%***. Standard errors are clustered at the firm level. The intercept is not reported. *FMW* is measured on a 0-1 scale in the regressions. Specification (3) splits the top *FMW* 80-100% bin into two groups that are more homogenous, as explained in the text.

Table 7: Regression Estimates of Minimum Wage Effect on Profits (*IHS*(π)), Based on Fraction Affected by Minimum Wage (*FMW*), 2004-2005 and 2009-2010

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample	Full sample	Full sample	Sample: low initial profits	Sample: medium low initial profits	Sample: medium initial profits	Sample: high initial profits
FMW	0.155*** (0.022)	0.179*** (0.023)	…	…	…	…	…
POST	-1.416*** (0.034)	-2.022*** (0.224)	-2.017*** (0.227)	4.603*** (0.503)	-1.330*** (0.354)	-1.668*** (0.387)	-1.841*** (0.553)
FMW × *POST*	-0.749*** (0.068)	-0.795*** (0.070)	-0.720*** (0.070)	-1.805*** (0.152)	-0.172* (0.105)	-0.362** (0.123)	0.026 (0.167)
Initial profits dummies	yes	yes	yes	no	no	no	no
Initial profits × *POST*	yes	yes	yes	no	no	no	no
Sector dummies and sector dummies × *POST*	no	yes	yes	yes	yes	yes	yes
Firm fixed effects	no	no	yes	yes	yes	yes	yes
Adj. R^2	0.551	0.554	0.732	0.641	0.471	0.465	0.483
N	202,187	202,187	202,187	47,146	48,082	52,332	54,627

Notes: Dependent variable is *IHS(π)* per firm in each year. Levels of significance: 10%*, 5%**, 1%***. Standard errors are clustered at the firm level. The intercept is not reported. *FMW* is measured on a 0-1 scale in the regressions.

Table 8: Regression Estimates of Minimum Wage Effect on Profits (*IHS*(π)), Based on Estimated Mechanical Cost of Minimum Wage Increase, 2004-2005 and 2009-2010

Variables	(1)
	Full sample
Log wage bill for minimum wage workers (Log WBMW)	…
Log relative minimum wage (*log RMW)*	-13.065***
	(1.713)
Log wage bill for minimum wage workers × log relative minimum wage	-0.269***
	(0.093)
Initial profits dummies	yes
Initial profits × *POST*	yes
Sector dummies and sector dummies × *POST*	yes
Adj. R^2	0.732
N	202,187

Notes: Dependent variable is *IHS(π)* per firm in each year. Specification includes firm fixed effects. *Log wage bill for minimum wage workers* is computed as the log of the wage bill for minimum wage workers, with the wage bill computed as the number of minimum wage workers in 2005 multiplied by the statutory 2005 minimum wage, where minimum wage workers are defined as those below the deflated minimum wage in the post-period. *Log relative minimum wage* is defined as zero (log(1)) for the pre-period and log(1.154) for the post-period, given the 15.4% increase in the minimum wage. The interaction measures the percent change in profits for a one-percent higher effect of the minimum wage increase of the wage bill (based on minimum wage workers in 2005). Levels of significance: 10%*, 5%**, 1%***. Standard errors are clustered at the firm level. The intercept is not reported. *FMW* is measured on a 0-1 scale in the regressions.

Table 9: Regression Estimates of Minimum Wage Effect on Profits (*IHS*(π)), Based on Fraction Affected by Minimum Wage (*FMW*), with Separate *FMW* Bins, 2004-2005 and 2009-2010

Variables	(1)	(2)
FMW >0-20%	…	…
FMW 20-40%	…	…
FMW 40-60%	…	…
FMW 60-80%	…	…
FMW 80-100%	…	…
FMW 0%	…	…
POST	-1.431***	-2.088***
	(0.037)	(0.227)
FMW >0-20% × *POST*	0.015	0.098*
	(0.059)	(0.059)
FMW 20-40% × *POST*	-0.004	0.032
	(0.056)	(0.056)
FMW 40-60% × *POST*	-0.201***	-0.197***
	(0.064)	(0.065)
FMW 60-80% × *POST*	-0.438***	-0.451***
	(0.105)	(0.106)
FMW 80-100% × *POST*	-0.874***	-0.924***
	(0.084)	(0.085)
*FMW*00 × *POST*	…	…
Initial profit dummies	yes	yes
Initial profit dummies × *POST*	yes	yes
Sector dummies and sector dummies × *POST*	no	yes
Adj. R^2	0.730	0.732
N	202,187	202,187

Notes: Dependent variable is *IHS(π)* per firm in each year. Specifications include firm fixed effects. Levels of significance: 10%*, 5%**, 1%***. Standard errors are clustered at the firm level. The intercept is not reported.

Table 10: Regression Estimates of Minimum Wage Effect on Profits (*IHS*(π)), Based on Income Percentile for Incomes of Business Owners, 2004-2005 and 2009-2010

Variables	(1)	(2)
Income percentile (IP)	…	…
POST	-3.431***	-3.909***
	(0.175)	(0.285)
Income percentile (IP) × *POST*	2.395***	2.351***
	(0.178)	(0.178)
Initial profit dummies	yes	yes
Initial profit dummies × POST	yes	yes
Sector dummies and sector dummies × *POST*	no	yes
Adj. R^2	0.724	0.725
N	155,647	155,647

Notes: Dependent variable is *IHS(π)* per firm in each year. Specifications include firm fixed effects. Levels of significance: 10%*, 5%**, 1%***. Standard errors are clustered at the firm level. (Clustering at the owner level is complicated because there can be multiple and overlapping owners.) The intercept is not reported. *IP* is measured on a 0-1 scale in the regressions.

Table 11: **Income Percentiles of Business Owners and Workers, Individual and Family, by *FMW*, 2005**

	(1)	(2)	(3)	(4)
FMW	Business owners' income percentile	Workers' income percentile	Business owners' family income percentile	Workers' family income percentile
0	88	77	71	57
< 10%	94	77	82	57
10-20%	87	60	72	44
20-30%	85	54	69	40
30-40%	81	48	63	37
40-50%	79	44	60	35
50-60%	80	38	61	31
60-70%	78	38	56	30
70-80%	78	38	57	28
80-90%	79	34	53	25
90-100%	74	36	48	24
Total	87	68	68	49

Note: Individual figures represent approximate rank of column (5) in Tables 12 and 13. Family figures represent approximate rank of column (10) in Table 12. Family income represents combined income of both married spouses in the year 2005. Annual owner or worker earnings below 6,000 NIS were omitted from calculation, as these can reflect small components of income that are not labor income from the main job. The rank was calculated based on the family distribution including both owners' and workers' families.

Table 12: **Descriptive Statistics for Family Income by *FMW*: Married Business Owners and Workers, 2005**

A. Owners												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FMW	N	Average age	% female	# children under 18 in 2005	Owners income	Spouse age	Spouse % female	Annual spouse income	% of spouses working	Family income	Family income relative to average in $0<FMW\leq 0.1$ range	Owner/ spouse income ratio
0	28,904	49.85	4.4%	2.33	235,192	46.9	95.7%	116,235	64.3%	312,083	68%	3.1
< 10%	3,419	52.66	2.7%	2.32	372,911	49.4	97.3%	140,150	59.4%	458,600	100%	4.5
10-20%	5,181	50.92	3.4%	2.34	230,751	47.7	96.6%	104,015	63.7%	298,226	65%	3.5
20-30%	3,086	49.50	4.5%	2.38	202,910	46.4	95.5%	101,814	66.1%	269,795	59%	3.0
30-40%	3,712	49.05	4.4%	2.44	168,659	45.8	95.7%	91,188	66.9%	229,877	50%	2.8
40-50%	3,962	49.26	5.1%	2.38	159,372	46.1	95.0%	88,750	67.4%	221,902	48%	2.7
50-60%	801	48.37	4.4%	2.45	166,414	45.0	95.7%	86,703	63.8%	223,853	49%	3.0
60-70%	1,149	48.63	5.0%	2.48	159,633	45.2	95.1%	82,982	64.2%	215,152	47%	3.0
70-80%	628	47.16	6.2%	2.64	149,760	44.1	93.9%	87,533	64.3%	206,732	45%	2.7
80-90%	258	45.96	5.8%	2.63	168,803	42.3	94.1%	92,481	53.9%	217,249	47%	3.4
90-100%	2,728	50.83	6.0%	2.42	134,650	47.7	94.2%	91,137	62.0%	198,334	43%	2.4
B. Workers												
FMW	N	Average age	% female	# children under 18 in 2005	Annual earnings	Spouse age	Spouse % female	Annual spouse income	% of spouses working	Family income	Family income relative to $0<FMW\leq 0.1$ range	Worker/ spouse income ratio
0	228,395	40.72	29.3%	1.44	131,069	39.1	66.1%	104,518	67.4%	207,498	102%	1.9
< 10%	263,140	40.06	34.5%	1.35	130,888	38.6	61.6%	98,712	70.8%	202,744	100%	1.9
10-20%	100,238	40.04	45.7%	1.35	73,505	39.4	47.5%	89,811	65.1%	138,431	68%	1.3
20-30%	60,511	38.54	46.5%	1.26	62,541	37.9	47.0%	85,500	65.1%	122,979	61%	1.1
30-40%	60,808	38.47	50.1%	1.22	53,218	38.0	42.6%	81,848	64.6%	112,959	56%	1.0
40-50%	37,324	38.42	48.7%	1.27	49,519	38.2	43.6%	83,757	63.0%	107,895	53%	0.9
50-60%	19,391	38.35	52.4%	1.22	41,239	38.3	39.4%	74,144	62.3%	93,238	46%	0.9
60-70%	23,041	39.63	59.0%	1.26	38,086	39.9	33.6%	74,344	63.7%	89,567	44%	0.8
70-80%	10,339	38.18	55.0%	1.32	37,129	38.4	34.8%	73,247	60.2%	85,074	42%	0.8
80-90%	9,759	40.66	66.7%	1.40	29,494	41.2	24.1%	71,446	59.8%	74,276	37%	0.7
90-100%	18,561	43.81	70.1%	1.32	28,652	44.1	21.9%	79,643	58.7%	74,137	37%	0.6

Notes: Annual owner or worker earnings below 6,000 NIS were omitted from calculation. Family income is calculated by combining spouses' incomes.

Table 13: **Descriptive Statistics by *FMW:* Single Business Owners and Workers, 2005**

A. Owners					
	(1)	(2)	(3)	(4)	(5)
FMW	N	Age	% female	# children under 18 in 2005	Annual owner earnings
0	5,347	47.38	21.5%	1.80	191,728
< 10%	491	53.35	25.7%	1.79	393,442
10-20%	766	49.20	23.5%	1.82	199,852
20-30%	489	46.60	26.6%	1.89	160,847
30-40%	667	47.07	25.8%	1.81	142,512
40-50%	773	45.72	25.5%	1.86	124,418
50-60%	150	44.31	19.3%	2.00	151,856
60-70%	236	43.35	23.7%	1.79	105,619
70-80%	123	43.11	28.5%	2.21	113,148
80-90%	62	39.81	16.1%	2.58	108,605
90-100%	742	45.48	24.4%	1.76	81,367
B. Workers					
FMW	N	Age	% female	# children under 18 in 2005	Annual earnings
0	100,316	32.26	37.5%	0.36	72,937
< 10%	111,393	32.37	44.3%	0.33	75,927
10-20%	62,031	31.12	47.8%	0.31	43,042
20-30%	48,414	28.90	44.9%	0.23	37,045
30-40%	52,701	28.09	47.6%	0.22	30,853
40-50%	35,770	27.51	46.6%	0.20	27,958
50-60%	21,264	27.11	47.5%	0.21	24,578
60-70%	22,865	28.37	55.2%	0.24	23,465
70-80%	10,429	27.75	49.9%	0.22	23,289
80-90%	8,215	31.61	60.4%	0.33	20,296
90-100%	12,312	38.46	71.6%	0.44	21,396

Notes: Annual owner or worker earnings below 6,000 NIS were omitted from calculation.