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THE EFFECT OF THE MINIMUM WAGE ON PRICES

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It is well established in the international literature that minimum wage increases compress the wages distribution. Firms respond to these higher labour costs by reducing employment, reducing profits, or raising prices. While there are hundreds of studies on the employment effect of the minimum wage, there is less than a handful studies on its profit effects, and only a couple of dozen studies on its price effects. Not only is the literature scanty on the minimum wage price effects, but also it lacks a survey on that. This survey represents an important contribution to the literature because it summarizes and critically compares over twenty price effect studies, providing a benchmark in the literature. This survey further contributes to the literature by offering an input to the recent debate over the direction of employment effects of the minimum wage. With employment and profits not significantly affected, higher prices is an obvious response to a minimum wage increase. Moreover, this survey also contributes to the literature by extending the current understanding on the minimum wage as a policy against inequality and poverty. If the minimum wage does not cause disemployment but causes inflation, it might hurt rather than aid the poor, who disproportionately suffer from inflation.

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INTRODUCTION

It is well established in the international literature that minimum wage increases compress the wages distribution (Card and Krueger, 1995; Brown, 1999). Firms respond to these higher labour costs by reducing employment, reducing profits, or raising prices. While there were over three hundred studies on the *employment* effect of the minimum wage by 1995 (Card and Krueger, 1995), there were none on its *profit* effects, and only three on its *price* effects (Wessels, 1980; Katz and Krueger, 1992; Spriggs and Klein, 1994), plus US Labour Department reports (FLSA 1965 and 1969; MWSC, 1981).

Standard economic theory predicts that minimum wage increases do not reduce profits because low wage firms are usually too small and too competitive to absorb the extra costs. It is then not surprising that empirical evidence is scanty on profit effects. In such competitive markets, prices are assumed to be given, and theory predicts that firms reduce employment in response to minimum wage increases. It is then not surprising that there is such an extensive empirical literature on employment effects. However, theory also predicts that an industry wide cost shock, such as minimum wage increases, will be passed on to prices. The assumption of constant prices is reasonable if firms that are affected compete with firms that are not affected by the increase, but unreasonable if the shock is industry wide. It is then surprising that there is so little empirical evidence on price effects – even though this effect was first noted half a century ago (Stigler, 1946). Perhaps because the international literature mainly utilizes data from the US, and price effects are small there, little further research has been carried out.

A comprehensive survey on the minimum wage price effects is not available in the literature. Brown's (1999) recent survey only includes three such studies: Wessels (1980), Katz and Krueger (1992), and Card and Krueger (1995). This survey represents an important contribution to the literature because it summarizes and critically compares over twenty price effect studies, providing a benchmark in the literature.

This survey also contributes to the literature by offering an input to the recent debate over the direction of employment effects of the minimum wage. The empirical evidence does not always confirm the negative effect that is predicted by theory (Card and Krueger, 1995; Brown, 1999), although small effects, clustered around zero, are becoming prevalent in the literature (Freeman, 1994 and 1996; Brown, 1999). With employment and profits not significantly affected, higher prices is an obvious response to a minimum wage increase. That is because employment is not decreased if firms are able to pass through to prices the higher costs associated to a minimum wage shock. Thus, evidence on price effects might reconcile theory predictions and empirical evidence on employment effects.

This survey further contributes to the literature by extending the current understanding on the minimum wage as a policy against inequality and poverty. If the minimum wage does not cause disemployment but causes inflation, it might hurt rather than aid the poor, who disproportionately suffer from inflation.

2. EMPIRICAL EVIDENCE

The available studies in the literature use five different methodologies: general equilibrium model analysis, Phillips curve estimation analysis, input-output model analysis, difference-in-difference estimation analysis and regression analysis. They can be broadly divided into two categories: estimation of the effect of the minimum wage on prices in various industries and estimation of the effect of the minimum wage on inflation nationwide. This categorization is

associated to the extent to which they account for the several steps through which the minimum wage affects prices and inflation (transmission mechanism). First, there is a direct effect on those between the old and the new minimum wage. Second, there is indirect spillover effects on those above (and below) the new minimum wage. Third, firms raise prices in response to these higher labour cost. Fourth, firms adjust the associated level and mix of input and output (consistent with cost minimisation subject to expected demand). Fifth, the resulting new employment and wage levels combine to produce a new equilibrium income level, aggregate demand and, after some lag, production. Sixth, the inflation and unemployment rates consistent with the new equilibrium might in time again affect wages and prices (Sellekaerts, 1981).

The main difficulty in comparing estimates across studies in the literature is that general equilibrium and input-output models account for all steps of the transmission mechanism whereas difference-in-difference and regression models might or might not do so. That is because the last two models are represented by a single equation and it is not always clear whether such an equation represents a partial or a general equilibrium model, and whether its parameters are structural or reduced form parameters. A single equation can describe two very different processes. If it describes the partial equilibrium adjustment process in a particular market or industry, it does not account for all steps of the transmission mechanism. If it describes the inflation process in the economy, it accounts for all steps. In the first case, the single equation estimates are not comparable to the general equilibrium and input-output model estimates; in the second case, they are.

2.1 GENERAL EQUILIBRIUM MODEL ANALYSIS

Earlier studies of the minimum wage effect on prices and inflation often use general equilibrium model analysis, where the effect of the minimum wage on a number of variables is estimated. A Phillips curve relation, as a function of the minimum wage, is often inserted into the model. Sellekaerts (1981) reviewed four such studies. The effect on wage and price inflation of a 10% increase in the minimum wage across studies ranged from 0.15% to 0.76%. She then criticized these studies on the grounds of several methodological problems, in particular because they did not account for all steps of the transmission mechanism. She attempted to overcome such problems by inserting a modified wage determination equation into the MIT/PENN/SSRC macro model of the US economy, which she estimated using 1974 to 1979 US time series data. One of the main contributions of this study is that the new wage equation accounts for wage increases that would have taken place regardless of changes in the minimum wage. That is because unless the minimum wage increase causes substantial gains in real terms, it might not be more than a change in the timing of the increases. She reported evidence supporting spillover effects; the average annual total impact of a 10% minimum wage increase is 0.6% for wage and 0.2% for price inflation. Sellekaerts' (1981) is one of eight studies published on a special volume on inflation by the US Minimum Wage Survey Commission (MWSC, 1981). The implicit message across these studies is that the effect of the minimum wage on inflation was too small to be a concern. Two of these studies are worth noting, Cox and Oaxaca (1981) and Wolf and Nadiri (1981).

Cox and Oaxaca (1981) used US data from 1974 to 1978 aggregated at industry and macro levels to simulate the effect of freezing the minimum wage at its 1974 level on employment, output, wages and prices using a general equilibrium model of the US. They were primarily concerned with the allocative effects of the minimum wage, which they argue, can only be accurately assessed by a general (not by a partial) equilibrium model. Their results indicate that the minimum wage is not neutral with respect to production, employment, prices and wages, and that structural adjustments occur following an increase. They reported that a 10% increase in the real minimum wage increases

the aggregate real wage bill by 0.1%-0.5% (they do not report the effect on prices, but hint that it is larger than that reported in the then existing literature). One of the main contributions of this study was to account for the crucial role of monetary policy accommodating (or not) the minimum wage increase. An accommodating inflationary monetary policy was found to offset the disemployment effect of the minimum wage and to increase prices. Two drawbacks of this study are noteworthy: the strong assumptions underlying the model and the inappropriate data used to construct empirical counterparts of theoretical variables, which contaminated the results with measurement error (Corcoran, 1981).

More recently, Wilson (1998) reported estimates developed by The Heritage Foundation using the 11 US macro model of the US economy. The proposed 19.4% 1999-2000 increase in the minimum wage was estimated to increase overall prices by 0.2% in the first year and by an additional 0.1% in the second year.

In addition to the criticism on the strong assumptions underlying general equilibrium models, a further criticism is the implicit assumption of a uniformly proportional inflation effect throughout the economy. Minimum wage overall inflation effects are hard to find; the minimum wage might cause more inflation in sectors or industries overpopulated by minimum wage workers. Input-output models and partial equilibrium models (difference-in-difference and regression analysis) discussed below estimate sectoral price effects of the minimum wage.

2.2 PHILLIPS CURVE ESTIMATION ANALYSIS

A Phillips curve relation, as a function of the minimum wage, is not always inserted into general equilibrium models, and it is often estimated on its own. Sellekaerts (1981) reviewed seven such studies on wage and price inflation, among which Gramlich (1976) and Falconer (1978). The effect on wage and price inflation of a 10% increase in the minimum wage across these studies ranged from 0.2% to 1.8%; if the outlier 1.8% is dropped, the upper end of the range is 0.37%.

Not included in Sellekaerts' (1981) survey is a series of four articles, Gordon (1980) Frye and Gordon (1981), Gordon (1981) and Gordon (1982), which are related to an earlier (Gordon, 1975) and a later (Gordon, 1988) studies, where various versions of the Phillips curve are estimated using US annual time series data from 1890 to 1980. The most relevant of these articles to this survey is Frye and Gordon (1981), which focus on the impact of episodes of Government intervention (e.g. minimum wage increases) in the US inflation. A 10% increase in the minimum wage was found to increase inflation by 0.02 percentage points.

The main contribution of Phillips curve estimations is to establish that the econometric explanation of inflation requires supply shocks (e.g. oil price, exchange rate, productivity growth, etc.) and Government intervention or push-factors (e.g. minimum wage, social security taxes, employment protection, unions, etc.) in addition to the usual inertia and aggregate demand variables. This is because push-factors play an important role in the price and wage setting process, affecting real wages and the natural level of unemployment that makes inflation constant (Layard and Nickell, 1985 and 1986; Jackman et al., 1996; Staiger et al., 1996).[1] To the extent that the way endogeneity problems were dealt with is credible (see Section 2.5), the above models describe the inflation process in the economy through a reduced form equation and the minimum wage estimates should be comparable to the general equilibrium model estimates reported above.

[1] See Ball et al. (1988) and Goodfriend and King (1990) for surveys on price and inflation modeling. Also see Gali et al. (2001) on the so-called New Phillips curve, which however, does not include the minimum wage.

2.3 INPUT-OUTPUT MODEL ANALYSIS

Wolf and Nadiri (1981) used an input-output model that simulates the changes in policy parameters (e.g. the minimum wage) on employment, output, and prices in the aggregate economy and in each industry sector by tracing the inter-industry flow of goods and services. They used data from the US CPS to trace the direct and indirect price effects of the 1963, 1972, and 1979 minimum wage increases. Assuming full pass-through effect, no substitution effect, no employment effect and no spillover effects, they estimate that a 10%-25% minimum wage increase raises prices by 0.3%-0.4%. An important contribution of their model is to account for the failure of input-output models to predict longer run responses. This is because of the implicit assumption of no substitution among goods and services, as their relative prices change, and the associated assumption of employment and output fixed in the short run. Wolf and Nadiri (1981) introduced price and (labour-capital) substitution elasticities in their model, which can then be regarded as a medium run model (Adams, 1981). Another important contribution of this study is the broad approach to the benefits and costs of a minimum wage increase. On the costs side, there are the higher consumer prices; on the benefits side, there are the higher productivity and the higher output growth resulting from income distribution towards low wage groups who have an above average propensity to spend. One drawback of their model is underlying strong assumptions that cast doubts on the results (Sheldon, 1981).

More recently, Lee and O'Roark (1999) used US earnings and industry data from 1992 and 1997, and a similar input-output analysis to compute the minimum wage price effect. Once more assuming full pass-through effect, no substitution effect, no employment effect and no spillover effects, they estimate that a 10% minimum wage increase raises prices among eating and drinking places – industries overpopulated by minimum wage workers – by 0.74%. An important contribution of their work is to produce sectoral estimates. Another important contribution is that they partially relaxed the no spillover effects assumption. Relaxing this assumption is important because further to allowing for the indirect effect of the minimum wage on other wages, it also allows for the wage price interaction in the real wages bargaining process that follows a minimum wage increase. The inflationary effects of the minimum wage might be understated if these effects are ignored. They re-estimated their model allowing for different degrees of spillover effects and found that the larger the extent of spillover effects, the larger the price effects, up to 1.5%.

As Wolf and Nadiri (1981), MaCurdy and O'Brien-Strain (1997), O'Brien-Strain (1999) and O'Brien-Strain and MaCurdy (2000) also have an approach to the benefits and costs of minimum wage increases. They use a similar input-output model and data from the SIPP and CES to show that the 1999-2000 US minimum wage increase would drive California's families to pay more for goods and services than they would receive through higher earnings. To calculate the benefits, they identify which families have workers earning below the new minimum wage, assume they will have their wages increased to the new minimum wage, and then calculate the new family's earnings. To calculate the costs, they first determine the costs of the minimum wage increase by estimating the expected increase in labour costs and then they trace these costs through to consumer prices. These implied price increases are then used to determine what the extra (consumption) cost is for all families. Once again assuming full pass-through effect, no substitution effect, no employment effect and no spillover effects, they estimate that a 10% minimum wage increase raises prices by 0.3% to 2.16%, depending on the commodity. They compare their results to Lee and O'Roark's (1999). Using an extended sample of US states, MaCurdy and McIntyre (2001) applied the same methodology and data from the SIPP and US Census to analyze the 1996-1997 US minimum wage increase. They estimated that a 10% minimum wage increase raises overall prices by 0.25%, and prices of food consumed outside (inside) home by 1.2% (0.8%). They compared their results with

Lee and O'Roark's (1999) and Aaronson's (2001) (they compare it with an earlier version of Aaronson's paper) and argue that differences with the later stem from the difference in methodology. They also estimated the effect of the national 1996-1997 minimum wage increase on four states: California, Florida, New York and Texas but did not find qualitatively different results.

Despite of the insightful way the authors exploit the short run nature of the input-output model, an important drawback of these studies is the model's underlying assumptions. The assumption that employment is fixed, and therefore that output is fixed, can only be maintained because of the assumption of no change in the spending patterns. However, most people will adjust their spending in response to higher prices, affecting employment and output, as acknowledged by the authors. This might overestimate the cost (and price) effects of a minimum wage increase, which would be mitigated by a reduction of employment or profits (although adverse employment effects might also mitigate the benefits of a minimum wage increase). Furthermore, the benefit effects of the minimum wage might be underestimated because of the no spillovers assumption, whereby only families with workers earning below the minimum wage benefit from the increase. These underlying assumptions produce a highly stylized and unrealistic model and cast doubts on the results.

Three other usual assumptions in input-output models are full pass-through, full coverage and full compliance, which might overstate the price effects of the minimum wage. Because of these, the estimates produced by input-output models are usually regarded as upper bound effects of the increase. An advantage of input-output models is that they account for the minimum wage effect propagated throughout the economy via its effects on intermediate goods. Even if an industry employs no minimum wage workers, its prices might rise because of its use of goods or contracts for services produced with minimum wage labour.

To the extent that the way the assumptions underlying input-output models were dealt with is credible, the (overall effect) minimum wage estimates should be comparable to the general equilibrium model and Phillips curve relation model estimates reported above. It appears, however, that despite of important improvements, the final estimates still did not account for all the steps in the transmission mechanism (and therefore would not be fully comparable to the above estimates). Nonetheless, it is noteworthy that their directions and magnitudes are in line with those above. Despite all that, the above studies represent valuable evidence, especially given that empirical evidence is so limited.

2.4 DIFFERENCE-IN-DIFFERENCE ESTIMATION ANALYSIS

A technique to estimate the minimum wage effect on other variables (e.g. prices) that has been extensively used in the minimum wage literature is difference-in-difference estimation (Brown, 1999). The idea is to compare high and low wage regions, on the assumption that the minimum wage has a larger effect on prices in lower wage regions. This makes it possible to remove the effect of factors that affect prices of all regions, such as common macro shocks. If the remaining factors are randomly distributed across regions, the change in relative prices is a measure of the minimum wage effect on prices.

The Department of Labor studies published several studies on the effects of the 1961 and 1967 US minimum wage increases (FLSA, 1965 and 1969) using difference-in-difference estimators to compare US Southern and non-Southern industry prices, assuming a larger minimum wage effect in the first. Wholesale prices of industrial commodities and price trends for low wage industries were relatively stable. Even though the minimum wage increases became effective during a period of rising prices, they were said to have had little influence on this upward trend.

Using the same method and data, Wessels (1980) re-examined the evidence from the Department of Labor Studies. He hypothesized that prices should be identical if Southern and non-Southern industries sell their goods in the same markets and consumers regard these goods as nearly the same. In this case a minimum wage increase would have no effect on the relative prices of Southern goods but would decrease Southern employment. He concluded that evidence supporting the competitive assumption is weak and that Southern firms should be able to pass higher relative costs on to consumers' prices. He found little consistent pattern in price increases in manufacturing, but faster price increases in Southern services. A 10% increase in the minimum wage was found to increase prices in the services sector by 2.71% following the 1966-1967 minimum wage increase.

Using difference-in-difference estimation and data on fast-food restaurants, overpopulated by minimum wage workers, Katz and Krueger (1992) and Card and Krueger (1995) compared prices in New Jersey and Pennsylvania following the 1992 New Jersey minimum wage increase. They also used the same data and regression analysis to estimate the minimum wage price effect using reduced form equations. They found that average prices rose in New Jersey by about enough to cover the costs of the higher minimum wage (they found a positive but statistically not significant estimate). Within New Jersey however, they found that prices rose just as quickly at restaurants paying the minimum wage and at restaurants already paying as much as, or more than the new minimum wage. They argued that restaurants within New Jersey compete in the same product market, and therefore those most affected by the minimum wage increase are unable to increase their prices by more, whereas restaurants in Pennsylvania compete in a different product market, enabling prices to rise in New Jersey relative to Pennsylvania. Similar findings in their Texas survey suggest that prices rose at about the same rate in fast-food restaurants that made larger or smaller wage adjustments following the 1990-1991 US federal minimum wage increases (they found a negative but not statistically significant estimate). Card and Krueger (1995) provided further evidence by comparing restaurant average price increases across a broader cross-section of cities and states following the 1990-1991 US federal minimum wage increases. They used regression analysis and two different sources of price data, CPI and ACCRA. They found evidence that restaurant prices rose faster in states that made larger adjustments following the federal minimum wage increase, and cities with higher proportions of low wage workers in 1989.

Overall, Card and Krueger's (1995) findings are imprecise and mixed, but suggest that a 10% minimum wage increase raises prices by up to 4%. This is consistent with predictions from a competitive model. A minimum wage increase raises prices in proportion to the minimum wage workers labour's share in total cost; they find that the ratio between the price and wage effects approximates this share.

Spriggs and Klein (1994) conducted a similar experiment to Katz and Krueger (1992), differing only in the timing between the change in the minimum wage and the follow-up survey. They utilize data for one month before and after the 1991 US minimum wage increase, which, they argue, already accounts for long run adjustments because the increase was announced two years in advance. Their findings suggest that the minimum wage did not significantly affect prices, which continued changing following a prior trend.

There has been much debate and criticism in the literature regarding three methodological issues in difference-in-difference estimation. The first is the validity of the control group, which needs to capture the change that would happen to the variable of interest (e.g. prices) in the absence of a minimum wage increase, i.e. changes due to other common macro shocks. The second is the contamination of the treatment group prior to the treatment (for example, because minimum wage changes are announced in advance, firms might start adjusting prices prior to the enactment date). The third is the amount of time elapsed between the minimum wage increase enactment date and the

"after" survey (for example, if data is collected too soon after the increase, there might not have been enough time to allow for the impact of the increase on prices). The first two can bias the estimates; the third determines whether the estimates are short or long run. In other words, the reliability of the estimates lies on the non-contamination of the control and treatment groups by the treatment, and by the appropriate timing of the surveys. Card and Krueger (1995) have been extensively criticized on these three issues (Brown, 1999). Hamermesh (1995) is particularly critical of the timing of their surveys, arguing that the "before" survey was after firms had already started to adjust to the minimum wage increase and the "after" survey was before full adjustment had occurred. Card and Krueger (1995) rely on the traditional argument that adjustment occurs with neither leads nor lags because turnover is high in the fast food industry. Despite the criticisms, Card and Krueger's (1995) studies represent a valuable attempt to estimate the minimum wage price effects.

Difference-in-difference estimates do not compare to the above general equilibrium model, Phillips curve relation and input-output model estimates because they do not account for all the steps in the transmission mechanism. They describe the partial equilibrium adjustment process to minimum wage increases in a particular industry (for example, fast-food industry). The estimates here reported can be compared to the sectoral (food industry) estimates in Lee and O'Roark (1999) and in MaCurdy and McIntyre (2001), which however, are not restricted to the fast-food industry.

2.5 REGRESSION ANALYSIS

In addition to the Katz and Krueger (1992) and Card and Krueger (1995) regression models estimates discussed in Section 2.4, Aaronson (2001), MacDonald and Aaronson (2002), and Aaronson et al. (2003) used regression analysis to examine the effect of the 80s and 90s minimum wage increases on prices in the US and Canada. This allowed them to exploit variation in time and location to identify their estimates. Aaronson (2001) used data from BLS for metro areas between 1978 and 1997, and from ACCRA and StatCan data; Macdonald and Aaronson (2002) used data from the Food Away from Home component of the CPI in a wider sample of metro areas from 1995 to 1997 as well as data from CPS and MSA. They estimate that a 10% minimum wage increase raises prices by 0.72%-0.73%. These estimates are remarkably close to Lee and O'Roark's (1999) estimates, which use an entirely different methodology and data.

The authors contributed to the literature by performing a number of robustness checks, for example: (a) They argued that the minimum wage might be endogenously determined with prices if politicians favour minimum wage increases in high inflation periods (when the real minimum wage erodes faster). However, in their re-estimations, they found robust estimates and concluded that endogeneity was not much of a concern. (b) They estimated the minimum wage price effect in low and high inflation periods and found that high inflation partially drives the significant minimum wage pass-through coefficient, which can be as large as 1.6%. (c) They also found evidence that prices respond quickly to minimum wage increases, within a 4 to 6 months window around the increase. This suggests that although the increase is announced many months in advance, there is no price response leading up to the enactment date. It also suggests that the price effect of the minimum wage is a short run phenomenon that dissipates over time. This is in line with the traditional argument that adjustment occurs with neither leads nor lags discussed above. They warn that minimum wage increases might not generate the sort of coordination failure and stickiness in prices that other costs or demand shocks produce. (d) Their evidence also suggests that prices increase more in low wage areas, in line with prior expectations. Similar to Card and Krueger (1995), the authors remarked that the evidence they found is consistent with predictions from a competitive model of full pass-through of costs onto prices.

Machin et al. (2003) use regression analysis to estimate the effects of the introduction of the UK national minimum wage in April 1999 on the residential care homes industry, a heavily affected sector. They found no evidence that prices rose by more in low wage firms. However, an important drawback, acknowledged by the authors, is that price regulations limit the extent of price adjustments on this particular market.

As always, the main issue in regression analysis is identification. To ensure identification: (a) the empirical model needs to be correctly specified according to theory; (b) observable and unobservable variables that have a direct effect on prices need to be controlled for; (c) the empirical model needs to be flexible enough to capture the short and long run effect of the minimum wage on prices; and (d) the empirical counterpart of the theoretical variables needs to be constructed as accurately as possible, which hinges on the quality of the data.

The main drawback of the above regression models is the missing link between the empirical specifications and theory. These studies are grounded on the standard theory prediction that if employers do not respond to changes in the minimum wage by reducing employment or profits, they respond by raising prices. However, none of them explicitly discusses the theoretical model that delivered their empirical equation specification. This is a generalized problem in the minimum wage literature, where empirical models are only loosely related to theory (Brown, 1999). It is a particularly worrying problem in price models because of the various channels through which the minimum wage affects prices. Unless the empirical equation is clearly grounded on theory, it is difficult to pinpoint which step of the transmission mechanism is being estimated. The failure in accessing to which extent the pass-through coefficient accounts for the transmission mechanism makes it difficult to compare estimates across studies. A related issue is the estimation of short and long run price effects; only MacDonald and Aaronson (2002) and Aaronson (2001) estimate the long run effects, which for Canada and the US seem to be small. A further criticism, of which few econometrics models are exempt, is whether unobservable variables, possibly correlated to the minimum wage, have been controlled for. Only Aaronson (2001) attempted to discuss the potential endogeneity of the minimum wage in price models, which for the US does not seem to be strong.

As for the difference-in-difference estimates, the above regression analysis estimates do not compare to the above general equilibrium model, Phillips curve relation and input-output model estimates because they do not account for all the steps in the transmission mechanism. Once again, they describe the partial equilibrium adjustment process to minimum wage increases in a particular industry (for example, fast-food industry, care homes industry, etc.). As before, these estimates can be compared to the sectoral (food industry) estimates in Lee and O'Roark (1999) and MaCurdy and McIntyre (2001) and in addition, to the difference-in-difference estimates above.[2]

[2] While empirical work on the price response to minimum wage increases is limited, there is a large empirical literature on the price response to changes in other industry wide costs, such as sales taxes and exchange rates. This so-called pass through literature is primarily concerned with the burden of higher costs on consumers, and thus can be used to study the extent to which higher labour costs associated to minimum wage increases are passed on to consumers. The primary objective of this literature is to measure whether 100% of the shock is passed through or not. This is estimated by a reduced form equation where price is explained by a cost shock and other controls (grounded on imperfect competition theoretical models). See Kotlikoff and Summers (1987) for a compendium on tax incidence and Poterba (1996) for a survey. Some authors found full pass-through (Poterba, 1996) and others, overshifting (Besley and Rosen, 1994) in contrast with partial pass-through in the earlier literature (Haig and Shoup, 1934). The literature on the impact of exchange rate movements on import and export prices (Goldberg and Knetter, 1997) usually finds partial pass-through (Gron and Swenson, 1996; Lee, 1997; Yang, 1997). As in the minimum wage price effects literature, the sale taxes and exchange rate literature also used before-and-after, input-output and econometrics analysis.

3. CONCLUSION

Despite the different methodologies, data periods and data sources, most studies found that a 10% US minimum wage increase raises food prices by no more than 4% and overall prices by no more than 0.4%. This is a small effect. Brown (1999, p. 2150) in his survey remarks, "the limited price data suggest that, if anything, prices rise after a minimum wage increase".

The overall reading of the above evidence on price effects, together with the evidence in the literature on wages and employment effects is that the minimum wage increases the wages of the poor, does not destroy too many jobs, and does not raise prices by too much. This evidence is an important input to reconcile theory predictions of negative employment effect and the mixed empirical evidence of negative and non-negative employment effects in the literature. Empirical evidence of positive wage and price effects and non-negative employment effects is consistent with standard theory. This suggests that firms respond to minimum wage increases not by reducing production and employment, but by raising prices. This is indeed what is observed in practice, as documented by Converse et al. (1981), "The most common types of responses to the increase in the minimum wage were price increases and wage ripples. No single type of disemployment response was reported with nearly the frequency of these".

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