ABSTRACT

Labour legislation in Barbados only covers a small proportion of the employed labour force. A national minimum wage has therefore been suggested as a means to guarantee some minimum standard of living for workers. To inform discussion on the topic, this study uses micro simulation techniques to assess the potential impact of various levels of the minimum wage rate on poverty and inequality in Barbados. The results obtained from the simulation exercise suggest that once employment effects are taken into account, the effects of a minimum on poverty and inequality are likely to be very small.

Keywords: Minimum Wage; Poverty; Inequality
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Introduction

The establishment of a national minimum wage in Barbados has recently become one of the more contentious issues in national policy debates. At its core, a national minimum wage would guarantee all workers some socially acceptable wage that employers should pay their workers. Such legislation explicitly attempts to ensure the lowest-paid workers are not exploited and labour relations between unions and employers do not deteriorate (Rama, 2001).

Labour legislation specifying minimum rates of pay in Barbados has traditionally only covered selected occupations: domestics, sugar and industrial workers, as well as shop assistants. At present, only shop assistants are covered by minimum wage legislation. These workers earn $5 per hour ($200 per week or $10,400 per year based on a standard 40 hour work week): approximately 55 percent of gross domestic product per capita. However, since many of these individuals generally do not work the typical 40 hour work week, the ratio is likely to be a lot lower.

A minimum wage could therefore, by redistributing earnings to low-paid workers, reduce poverty and inequality. In terms of poverty, the legislation permits those workers affected to move from below to above the poverty line. In addition, by raising the salaries of those workers at the bottom of the income ladder, such legislation can also reduce wage inequality. The influence of the minimum wage on poverty and inequality, however, depends on the strength of the so-called “employment effect”. Brown (1999), for example, presents a neoclassical two-sector model where the introduction of a minimum wage, by pushing up labour costs, reduces employment among both covered and uncovered workers. If this employment effect is large enough, a minimum wage can actually increase both inequality and poverty. Freeman (1996) argues that a minimum wage can also impact on societal welfare through changes in the prices of goods and services. Provided that the minimum wage chosen by policymakers increases the costs of production, firms are likely to raise the prices of goods and services in proportion to minimum wage workers’ share of the cost of production. In addition, if low-income individuals are the primary purchasers of these...
goods and services, the expansion in prices would have a disproportionately greater impact on minimum wage workers.

The implementation of a national minimum wage therefore implies somewhat of a trade-off between providing a safety net or a decent standard of living for workers and employment. This study contributes to the literature by presenting an empirical assessment of the impact that various levels of the minimum wage would have on poverty and inequality. A cross-sectional micro simulation model of the Barbadian labour force is constructed using data from the 1996/1997 Household Budget Survey. The study builds on Downes (2007) who uses a survey of establishments in Barbados to assess the willingness to pay a national minimum among Barbadian business.

The remainder of the paper is structured as follows. After the introduction, Section 2 gives a review of previous research on minimum wages, poverty and inequality. Section 3 provides a description of the micro simulation approach and the various indicators of poverty and inequality employed in the study and section 4 presents the results. A brief summary and policy implications are contained in Section 5.

Review of Previous Literature

The redistributive effects of the minimum wage and its potential (or lack thereof) to reduce poverty have received a significant amount of attention in social and economic debates. This attention could be a result of policy makers placing the reduction of poverty and the exploitation of workers as high priorities. There are two main views regarding the minimum wage and its impacts. The advocacy view holds that for those earning wages below the minimum wage, generally the unschooled and unskilled, setting a fair wage has the potential to improve their economic well being. On the other hand, critics argue that the negative employment effects may be large enough to offset the benefits gained from the additional income. They claim that the minimum wage does not offer any benefits to those outside labour markets such as the elderly, disabled and the unemployed. These negative effects associated with the minimum wage leads critics to argue against minimum wage
legislation as an effective policy tool in the fight against poverty (Behrman, Sickles and Taubman, 1983).

Several studies have tried to estimate the impact minimum wages have on employment, family income and poverty. The findings of these studies tend to vary with regards to whether the effects are positive or negative and the magnitude. These differences also tend to fluctuate depending on the method or approach, time and the country or region studied. For instance, research done in the US often finds that the minimum wage has weak negative effects on poverty, with young workers being the exception (Card, Katz and Krueger, 1993). These weak effects are said to be a product of the minimum wage being so low that it has a negligible effect on wage distribution (Freeman and Freeman, 1991). Leigh (2005) is of the opinion, however, that the effect of minimum wages on distribution depends on who earns the minimum wage. If minimum wage earners are disproportionately teenagers from affluent families, then a rise in wage rates will have less of an impact on poverty than if they were sole parents.

From a business point of view, an increase in the minimum wage can raise the cost of labour. Where wages are set by the markets, they are determined by the employers’ willingness to pay a given rate, and employee willingness to work at the proposed rate. If employees are unwilling to work at the given rate, then the employer can respond by either offering a higher rate and thereby pushing up labour costs, utilise more machinery instead of labour, or go out of business.

Simulation studies done in the US have gone even further to show poverty reducing effects of the minimum wage. By simulating a 27% increase in the minimum wage to the income distribution of 1987, Mincy (1990) found a substantial poverty reducing effect. The author reports that in the case of those partially covered under the minimum wage legislation, the number of poor families would fall by 6% and by 9% for those fully covered. Similarly, Burkhauser and Finegan (1989) reports that in 1984 an increase of 24% would have the effect of reducing the amount of low-wage covered workers in poverty by 12%. They also show that for these workers poverty would have been reduced by 14% to 11%. This study,
however, did not allow for the employment effects of the minimum wage. Addison and Blackburn (1999) argue that assumptions about magnitude and displacement effects may be an important factor to their findings. In addition, these studies do not take into account issues resulting from possible changes in labour supply of other family members and by changes in the family unit.

In an attempt to avoid the issues noted above, Addison and Blackburn (1999) used a reduced-form approach on the state-level data panel data of 1983-96 to investigate the effects of three groups: teenagers, high school drop-outs, and young adults. The authors argue that by taking this approach, this would result in a more direct and improved estimation of minimum wage impacts on the distribution on family income. Adding to the previous evidence, they also obtained poverty reducing effects as a result of minimum wage increases in the 1990s, with the strongest effect among high school drop-outs.

Papers done using databases on lesser developed countries (LDCs), in contrast, tend to support the view of critics. The empirical results commonly show adverse employment effects with regards to the minimum wage. Azam (1997) argues that these adverse effects occur because of improper enforcement of legislation in LDCs (Azam, 1997). For example, Santiago (1986, 1989) as well as Castillo and Freeman (1991) report that the implementation of a minimum wage in Puerto Rico had a significant negative influence on employment.

In Bell’s (1997) Mexico and Columbian study using firm-level panel data, no effects were found on the formal sector in Mexico where the minimum wage was not binding. It was concluded that this resulted from the minimum wage’s position relative to the wages of formal sector workers. The author also reported that the data yielded elasticities with regards to the minimum wage that are statistically insignificant. However, adverse negative employment effects were found in Columbia. Over the period of 1981-1987 disemployment effects for low wage unskilled labour were estimated to be between the ranges of 2%-12%. Similarly, Maloney and Mendez’s (2003) kernel density estimates on Columbia also found negative impacts of the minimum wage in this country. Similar to Bell (1997), they observed that the minimum wage tended to have significant negative impacts on the wage distribution.
around the region of the minimum wage. In addition, the minimum wage has impacts in higher reaches of formal distribution and in the informal labour markets.

Beyond the regular questions of the minimum wage impacts, such as whether minimum wage effects are negative or positive and the magnitude of these effects, Questions about who is affected have also arisen. Questions regarding: the long-run and short-run effects on the distribution on earnings for certain demographic groups, changes in coverage versus changes in minimum wage increases, minimum wage effects on blacks, low-schooled and females have all been raised.

In an attempt to answer such questions, Behrman, Sickles, Taubman (1983) used the 1973 CPS-SSA-IRS exact match sample, only focusing on those born between 1911-1936 who wouldn’t have retired by 1976 and were working in 1951. The aim was to study changes over the entire life cycle. Their evidence showed mixed effects for certain socio-demographic groups. Positive effects were reported for females with an expansion in coverage, but negative effects for black males. Increasing the wage ratio reduced the amount of females and blacks below the poverty line, and raises the mean earnings of white males, white females and black males. Despite the positive effects on the groups just mentioned, increasing the wage ratio did not raise the mean earnings for black females. With regards to the level of schooling, individuals with higher levels of academic attainment tend to benefit more than those with just maybe a primary education. The long-run effects on wage distribution compared with the short-run effects tend to double in magnitude, with periods of adjustment being rather lengthy.

Methodology and Data

3.1 Micro simulation

To assess the potential impact of a minimum wage, the authors develop a static micro simulation model that simulates wage earnings. The model consists of two components: the base files and the simulation algorithms. The base files use household level data from the 1996/97 Continuous Labour Force Household Survey. Unlike previous surveys, this
database also asked for information on poverty and living conditions (Browne, 2004). The database provides observations on 2063 households or about 2.6 percent of all households in Barbados. Simulation algorithms are then applied to these base files to simulate wage earnings of households.

A conceptual representation of the model is provided in Figure 1. The figure shows that from the database, the authors obtain information on weekly wages and employment. To account for part-time employment, when total wage income falls below $150 per week, it is assumed that the individual only worked for a proportion of the year. Following the literature highlighted earlier, the minimum wage impacts on wages, employment and hours of employment. Similar to Downes (2007), the minimum wage values studied range from $200 to $650 per week. Only those individuals currently working for a wage below the threshold are affected by the implementation of the minimum wage, i.e. there is no feed through effect to salaries of other workers.

**Figure 1: Overview of Micro Simulation Model**
The employment effect of the introduction of the minimum wage enters through the weeks worked and employment variables. It is assumed that as a result of the introduction of the minimum wage that firms can respond in one of two ways: (1) reduce employment \( E \), and/or; (2) reduce the number of hours worked \( H \). The two key equations in the micro simulation model were therefore:

\[
\begin{align*}
\% \Delta E &= \beta \% \Delta MW \\
\% \Delta H &= \gamma \% \Delta MW
\end{align*}
\]

Brown, Gilroy and Kohren (1982) and Kennan (1995), through surveys of previous studies, find that \( \beta \) and \( \gamma \) usually take values between -0.1 and -0.2. These values imply that for every 10 percentage point increase in the minimum wage, employment and hours worked usually fall by between 1 and 2 percent points. Due to the rigidity of the Barbadian labour market, however, the authors set these parameters at -0.05.

3.2 Measuring Poverty and Inequality

Poverty, having less than what is required to maintain some minimum decent standard of living, is usually assessed with reference to the poverty line. Two measures of poverty are employed in the study: (1) the number and percentage of households falling below the poverty line, and; (2) the poverty gap. The 1996/97 Poverty Survey for Barbados estimates that the poverty line is BDS$5,503. This value takes into account minimum nutritional requirements and an estimate of the cost of non-food requirements (ex. housing, utilities, etc.). Based on this estimate, Browne (2004) reports that approximately 8.7 percent of households fall below the poverty line or 35,000 persons.

As an alternative to the poverty line indicator, the authors also derive a poverty gap type measure. The measure indicates the proportion of total national income that must be transferred to the poor to make up for income shortfalls due to the implementation of a minimum wage. Using \( y \) to denote a vector of household incomes in increasing order and \( z \) as the predetermined poverty line, the income shortfall of the \( i^{th} \) household would be given by \( g_i = z - y_i \). The number of poor households, \( q = q(y, z) \) and the total number of
households is \( n = n(y) \). The poverty gap is then defined as:

\[
P = \left( \frac{1}{n\bar{y}} \sum_{i=1}^{n} g_i \right) \times 100
\]

where \( \bar{y} \) is mean level of national income. The higher the value of the poverty measure, \( P \), the higher the rate of poverty in the island. Therefore if the introduction of a particular minimum wage reduces the income of poor households \( P \) will rise. The measure is also quite intuitively appealing since it provides an estimate of the level of transfers that government will need to pay to support those individuals that are adversely affected by the minimum wage legislation.

Two measures of inequality are also provided: the Lorenz curve and the Gini coefficient. The Lorenz curve gives a graphical representation of income inequality in the population by plotting the cumulative amount of the population on one axis and the cumulative amount of income on the other axis. The curve is usually compared to a 45\(^\circ\) line that represents perfect equality, i.e. the lower 10 percent of the population receives 10 percent of the nation’s income. The further the Lorenz curve from the 45\(^\circ\) line, therefore, the greater the rate of inequality.

The Gini coefficient provides a numerical measure of inequality based on the Lorenz curve. It essentially attempts to measure the distance between the Lorenz curve and the line of perfect equality. The Gini coefficient is defined as:

\[
G = \frac{2}{n^2\bar{y}} \sum_{i=1}^{n} i(y_i - \bar{y})
\]

where \( \bar{y} \) represents mean household income. Similar to the poverty measure presented earlier the greater the value of the Gini coefficient the greater the rate of income inequality.
Simulation Results

4.1 Impact on Poverty

Table 1 provides estimates of the simulated effects of various levels of a minimum wage – between $200 and $650 per week – on poverty. The table also gives the poverty indicators with and without employment effects. Looking first at the results without employment effects, the table shows a consistent decline in all three poverty indicators resulting from the implementation of the minimum wage. The impact on poverty is, however, quite small: for every 10 percentage point increase in the minimum wage, the percentage of households falling below the poverty line decreases by 0.05 of a percentage point. The relationship between the minimum wage and poverty is also non-linear. For example, raising the minimum wage from $200 to $320 would reduce the number of households falling below the poverty line by 12 percent, compared to just 4 percent when the wage is raised from $320 to $440.

Table 1: Impact of Minimum Wage on Poverty

<table>
<thead>
<tr>
<th>National Minimum Wage (BDSS)</th>
<th>Employment Effects</th>
<th>No Employment Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Households Below Poverty Line</td>
<td>% of Households Below Poverty Line</td>
<td>Poverty Gap (%)</td>
</tr>
<tr>
<td>200</td>
<td>6225</td>
<td>7.8</td>
</tr>
<tr>
<td>240</td>
<td>6088</td>
<td>7.7</td>
</tr>
<tr>
<td>280</td>
<td>7182</td>
<td>9.1</td>
</tr>
<tr>
<td>320</td>
<td>8208</td>
<td>10.3</td>
</tr>
<tr>
<td>360</td>
<td>8892</td>
<td>11.2</td>
</tr>
<tr>
<td>400</td>
<td>10329</td>
<td>13.0</td>
</tr>
<tr>
<td>440</td>
<td>11423</td>
<td>14.4</td>
</tr>
<tr>
<td>480</td>
<td>12312</td>
<td>15.5</td>
</tr>
<tr>
<td>520</td>
<td>12312</td>
<td>15.5</td>
</tr>
<tr>
<td>560</td>
<td>13954</td>
<td>17.6</td>
</tr>
<tr>
<td>600</td>
<td>15596</td>
<td>19.7</td>
</tr>
<tr>
<td>650</td>
<td>16827</td>
<td>21.2</td>
</tr>
</tbody>
</table>

Source: Authors’ Calculations
The estimates of the poverty gap without employment effects also imply that a minimum wage would have only marginal effects on poverty. At a minimum wage of $200 per week approximately 0.3 percent of total income would have to be transferred to individuals falling below the poverty line to bring them above this threshold. The table shows that it would take a doubling of the minimum wage to reduce this ratio by 0.1 of a percentage point. At the maximum wage considered, $650 per week, the proportion of total income to be transferred to those below the poverty threshold falls to 0.03 percent.

Table 1 also presents the simulated impact of various levels of the minimum wage with employment effects. In this case, higher values of the minimum wage reduce employment as firms attempt to reduce their labour costs. Once employment effects are taken into account, the introduction of the minimum wage can have a negative impact on poverty after a certain level. If the minimum wage is set between $200 and $280 per week, there would be little or no change in the rate of poverty from its present level. Above $280, however, there is a 1 to 1 relationship between increases in the minimum wage and increases in the number of households below the poverty line: for every 1 percentage point increase in the minimum wage, the number of households falling below the poverty line rises by 1 percentage point.

The poverty gap estimates also suggest that the implementation of a minimum wage would lead to a rise in transfers to low-wage workers. A wage rate of $320 or below would only require a 1 percentage point increase in transfers, as a portion of national income, to low wage workers. However, at higher levels of the minimum wage greater transfers will be needed as some workers find it more difficult to find employment. At $650 per week the amount of transfers required to compensate affected workers triples, suggesting that government will be faced with significant demands for unemployment and other welfare claims by citizens.

4.2 Impact on Inequality

Set at the appropriate level, and assuming there is no feed-through to the wages of uncovered workers, a minimum wage can reduce wage differentials and thereby diminish income inequality. Figure 2 provides estimates of the impact of various levels of the
minimum wage on income inequality assuming that there are no negative employment effects. The figure shows that higher values of the minimum wage can significantly reduce income equality, with a wage of $650 pushing the Lorenz curve fairly close to the line of perfect inequality.

**Figure 2: Impact of Minimum Wage on Lorenz Curve (No Employment Effect)**

The assumption that there would be no employment effects is, however, unrealistic. Nevertheless, Figure 3 shows that even when employment effects are taken into account, a minimum wage can still have a beneficial impact on income inequality. There are two important findings to be derived from this figure. First, although the implementation of a minimum wage shifts the Lorenz curve closer to the line of perfect equality, the gains are quite small. For example, a rise in the minimum wage from $200 to $400 would increase the cumulative household income of the bottom half of the population from 20 percent to 25 percent. Second, these gains are disproportionate. A minimum wage of $520, for example, pushes more individuals into the middle-income class. However, those individuals at the
lower-end of the wage rung, due to negative employment effects are actually worse off. For example, while at a minimum wage of $200, the lower 15 percent of households receive about 5 percent of national income, at a wage of $520, they receive around 2 percent of national income.

Figure 3: Impact of Minimum Wage on Lorenz Curve (Employment Effect)

To provide a numerical estimate of the change in equality, Table 2 gives the Gini coefficient with and without employment effects. Similar to Figure 2, the Gini coefficient indicates that a rise in the minimum wage would reduce inequality, assuming no employment effects. However, once employment effects are taken into account the results suggest that a rise in the minimum wage between $200 and $440 would increase the Gini coefficient from 0.381 to 0.416, which implies a rise in inequality. Between $440 and $650 the large rise in the wage rate to some degree offsets the negative employment effects.
<table>
<thead>
<tr>
<th>National Minimum Wage (BDSS)</th>
<th>Employment Effects</th>
<th>No Employment Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>0.381</td>
<td>0.377</td>
</tr>
<tr>
<td>240</td>
<td>0.386</td>
<td>0.372</td>
</tr>
<tr>
<td>280</td>
<td>0.392</td>
<td>0.366</td>
</tr>
<tr>
<td>320</td>
<td>0.400</td>
<td>0.360</td>
</tr>
<tr>
<td>360</td>
<td>0.407</td>
<td>0.355</td>
</tr>
<tr>
<td>400</td>
<td>0.409</td>
<td>0.346</td>
</tr>
<tr>
<td>440</td>
<td>0.416</td>
<td>0.332</td>
</tr>
<tr>
<td>480</td>
<td>0.408</td>
<td>0.316</td>
</tr>
<tr>
<td>520</td>
<td>0.408</td>
<td>0.303</td>
</tr>
<tr>
<td>560</td>
<td>0.399</td>
<td>0.285</td>
</tr>
<tr>
<td>600</td>
<td>0.399</td>
<td>0.267</td>
</tr>
<tr>
<td>650</td>
<td>0.413</td>
<td>0.243</td>
</tr>
</tbody>
</table>

Source: Authors’ Calculations
Conclusions

At present labour legislation in Barbados only covers a small proportion of the labour force. Policymakers have therefore considered the minimum wage as a tool to reduce poverty and inequality. This study uses micro simulation techniques to assess the potential impact of various wage rates on poverty and inequality. The results suggest that the implementation of a minimum wage would have only marginal effects on poverty. Assuming the absence of employment effects, a 10 percentage point increase in the minimum wage, would reduce the percentage of households falling below the poverty line by 0.05 of a percentage point. Once employment effects are taken into account, the introduction of the minimum wage leads an increase in the poverty rate. In addition, at $650 per week the amount of transfers required to compensate low income workers rises from 1 to 3 percent of national income and therefore places a strain on government for unemployment and other social claims.

Similar to the findings obtained for poverty, the analysis also indicates that the implementation of a minimum wage would have only a marginal impact on inequality. Further, these gains are disproportionate, as the minimum wage pushes more individuals into the middle-income or lower middle-income groups, and at the same time reduces the incomes of those individuals at the bottom of the income ladder. Indeed, the Gini coefficient shows that inequality is likely to rise, although only marginally, as the level of the minimum wage rises.

The empirical results in the paper suggest that as a redistributive tool, the minimum wage would be fairly ineffective. Choosing the most appropriate level of the minimum wage involves a trade-off between employment and welfare. A higher minimum wage improves the living conditions of those workers that remain in the employed labour force. However, the higher wage also results in a fall in employment and hours worked, which can offset the beneficial effects of the legislation.
References


