A National Minimum Wage for South Africa

Gilad Isaacs | July 2016
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The National Minimum Wage Research Initiative (NMW-RI) is an independent academic research project run by the Corporate Strategy and Industrial Development (CSID) Research Unit in the School of Economic and Business Sciences (SEBS) at the University of the Witwatersrand. It is undertaken in the context of a national dialogue on wage inequality and the potential introduction of a national minimum wage in South Africa. Information on the NMW-RI can be found at www.nationalminimumwage.co.za.

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- Our research team.
This summary report draws, in part, on a series of working papers commissioned by the National Minimum Wage Research Initiative:


This report is complemented by another Research Summary focusing on the policy dimensions of the Initiative’s work: Policy Considerations for the Design and Implementation of a National Minimum Wage for South Africa by Ruth Castel-Branco.

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Executive summary

“We need to ensure that the benefits of growth are more equitably shared. We need to confront poverty and inequality … We need to examine and understand income inequality, and develop measures to reduce it. Among other things, we need to examine the value and possible challenges of implementing a national minimum wage.”

- Address by Deputy President Cyril Ramaphosa at the 19th Nedlac Annual Summit, 5 September 2014

The Ekurhuleni Declaration on 4 November 2014 brought to the fore the long-standing issue of a national minimum wage in South Africa. Since then, this issue has elicited great debate. This report investigates the viability of instituting a national minimum wage in South Africa, drawing on a series of working papers commissioned by the National Minimum Wage Research Initiative at the University of the Witwatersrand. It contextualises the debate within an understanding of the South African labour market and current minimum wage system (Sections 2 and 3) and reviews the available local and international evidence regarding the potential consequences of a national minimum wage (Sections 4 and 5). Centrally, it employs economic modelling using the United Nations’ Global Policy Model and the Dynamically Integrated Macro-Micro Economic Simulation Model (DIMMSIM) developed by Applied Development Research Solutions (ADRS) to project the likely effects that a national minimum wage will have in South Africa (Section 6).

Minimum wages establish wage floors below which no employers are permitted to pay the employees covered. According to the International Labour Organization (ILO), the purpose of minimum wages is to ensure wages are able to cover the basic needs of workers and their families, taking into account relevant economic factors. A national minimum wage sets a single economy-wide wage floor. In South Africa, a national minimum wage is also being explored as a tool to reduce inequality and transform the inherited apartheid wage structure.

Such a national wage floor would be an advance over the current sectorally-set minima in South Africa. Compared with a sectorally-differentiated system, a national minimum wage covers all workers, is easier to enforce, and does not set lower minima for sectors with high proportions of vulnerable workers (as has been shown to occur under differentiated systems). Further, a national minimum wage can be set to take account of broad policy objectives such as reducing inequality, and economy-wide economic impacts rather than only narrow sectoral considerations.

This report shows that a national minimum wage in South Africa, if set at an appropriate and meaningful level, can achieve its central objectives of reducing working poverty and inequality. As the ILO insists, economic factors must also be considered. This report shows that a national minimum wage can also support economic growth. Minimum wages do not aim to raise employment levels – for that, other policies are needed – but a national minimum wage can be implemented without significant employment effects. These findings are supported by an extensive international literature, showing the success of minimum wages in reducing poverty and inequality without negative employment impacts, and by the statistical modelling undertaken for South Africa itself. This evidence confirms the logical assumption that firms and the economy adjust to higher wage costs through a variety of mechanisms and that higher wages – particularly
for low-income households – can spur a positive growth- and output-enhancing demand stimulus.

South Africa has the highest level of inequality in the world (see Section 2); in 2014, the average income of the top 10% of full-time employees was 82 times the average income of the bottom 10%. Inequality in South Africa is driven by wage differentials. There is a growing international consensus, led by the IMF, World Bank, and OECD, that inequality retards economic growth. Inequality also undermines social cohesion. Working poverty is also dire in South Africa: 54% of full-time employees – 5.5 million workers – earn below the working-poor line of R4 125, and so cannot meet the most basic needs of themselves and their dependents (see Section 2.3). High dependency ratios mean wages in South Africa stretch to cover many dependents. Higher wages for low-wage workers would benefit both the employed and the unemployed.

Collective bargaining, covering approximately 32% of lower-wage workers, has managed to maintain wage levels but is unable on its own to combat working poverty. Sectorally-set minimum wages, enacted via eight sectoral determinations, cover approximately 46% of lower-wage workers. Since their institution the levels of the sectoral determinations have increased by between 16% and 81% in real terms (see Section 3.1). However, many workers in these sectors still earn exceptionally low wages: 75% of agricultural workers earn below R2 600, 90% of domestic workers below R3 120 (see Section 2.4).

Minimum wages have been successful at raising wages for low-wage earners in both developed and developing countries (see Section 4). In Latin America, a 10% increase in minimum wages led to an increase in average wages of between 3% and 6%, with low-wage workers benefiting disproportionately. In South Africa, minimum wages of between approximately R3 500 and R5 500 would raise average wages over ten years, in real terms, by between 21% and 38%. Without a national minimum wage, average wages, in 2010 rands over our forecast period (2016-2025), are projected to be R7 814. With national minimum wage levels beginning at approximately R3 500 and R4 600, average wages would rise to R9 462 and R10 781, respectively. Wages for low-wage workers are disproportionately boosted (see Section 6.2.5).

The result would be a rise in household income, particularly for low-wage workers, with the household-income growth rate potentially doubling, thus spurring greater consumer spending and hence increased output and raised levels of growth, together with rising productivity. There is a growing body of literature – particularly from OECD countries – that establishes the aggregate demand, productivity, and growth enhancing nature of minimum wages (see Section 5.4). In South Africa, the level of economy-wide output would be 2.1% higher with a national minimum wage (beginning at levels between R3 500 and R4 600) and the average GDP growth rate is projected to be 2.8%-2.9% instead of 2.4% without a national minimum wage (see Section 6.2.5).

Minimum wages have directly reduced inequality in the formal and informal sectors across Latin America, and in Indonesia, Russia, China, India and Europe (see Section 3). The South African statistical modelling projects a fall in the Gini coefficient in South Africa (see Section 6.2.5). Raising the coverage or level of minimum wages can also cause a shift in income from capital towards labour and this is also shown to be beneficial to the overall South African economy (see Section 6.2). Given that poverty lines and minimum wages are close together, rising minimum wages have also reduced poverty in almost all developing countries studied (see Section 4.2.3); in Thailand and
the Philippines, for example, a 1% increase in the minimum wage has been shown to reduce poverty by 0.5%. In South Africa, the poverty headcount is projected to fall by around 2%; the decline is greatest for black South Africans (see Section 6.2.5).

In the international literature, the aggregate effect on employment is marginally negative or neutral, and often statistically undetectable. As Schmidt (2013, p. 2) notes: “The weight of that evidence points to little or no employment response to modest increases in the minimum wage.” This is confirmed in our review of the seven most recent meta-analyses (studies synthesising the large body of existing empirical research) (see Section 5.1). A 10% rise in minimum wages, where there is an effect at all, leads to somewhere between a 0.003% and 0.7% fall in aggregate employment (the effect, of course, varies across country, population group, industry etc., as discussed in Section 5.2). In South Africa, minimum wages have been shown to have no significant impact on employment in five of the six sectors studied; agriculture is the exception (see Section 5.3). The results from the South African statistical modelling are in line with local and international research: employment is projected to be up to 0.3% lower with the institution of a national minimum wage (see Section 6.2.5). Our statistical modelling differs from other common models used, in that raising wages, in our models, may lead to either a positive or negative outcome as is observed in practice; previous South African studies have used a family of models in which economic deterioration is the only possible outcome from minimum wages (see Section 6.1).

The modest effects on employment are because firms and economies adjust to higher minimum wages in a number of ways (see Section 5.4). The most important channels of adjustment are productivity increases due to organisational efficiency and increased effort by workers (‘efficiency wages’), reductions in wages of higher earners (wage compression), and small price increases. In addition, the boost to aggregate demand from higher wages counteracts negative pressures on employment levels; while raising wages may place pressure on individual businesses it can be beneficial to businesses overall. The level at which the national minimum wage is set will strongly influence the manner in which firms and the economy adjust.

We explore three benchmarks for guiding the setting of the national minimum wage: average wages, existing collective bargaining agreements, and poverty lines (see Section 0). In middle-income countries minimum wages are on average set at 48% of the average wage; this translates into R4 161 (in April 2015 rands) in South Africa. In 2015, the weighted average minimum wage for private-sector bargaining councils was R4 355, and for public- and private-sector bargaining councils R5 747. In April 2015 a family of four required R5 276 to meet their most basic needs and not live in poverty; the working-poverty line was R4 125 (based on an analysis of dependency ratios and multiple income sources). The relevant indicators therefore cluster between R4 000 and R5 500. This range is similar to our two ‘indexation’ scenarios modelled in which the national minimum wage begins at levels between R3 500 and R4 600 reaching approximately R3 900 and R5 100 after five years; a national minimum wage set at these levels is shown to be both positive and sustainable.

The national minimum wage policy must be carefully designed (see Castel-Branco 2016) and the wage set at a level that is able meaningfully to improve workers’ livelihoods with sustainable ramifications for the wider economy. It can reduce poverty and inequality, while boosting economic growth, without significant negative economic consequences. This report shows that this has been achieved in other countries and can be emulated in South Africa.
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1 Introduction

The *Ekurhuleni Declaration* on 4 November 2014 brought to the fore the long-standing issue of the possible implementation of a national minimum wage in South Africa. The declaration acknowledged the role of wages as “the most important component of income for South Africa’s working people” and the need to reduce high levels of inequality, as well as the importance of promoting employment. In light of this the ‘social partners’ – comprising Business, Community, Government, and Labour – at the National Economic Development and Labour Council (Nedlac) committed to “engage on the modalities of introducing a national minimum wage in South Africa” (Nedlac 2014).

Minimum wages are a common labour-market policy tool with over 90% of International Labour Organization (ILO) member states having some form of minimum wage system. Minimum wage regimes can be established on the basis of multiple minima, differentiated by sector, region and/or occupation; on the basis of one national minimum wage that applies across the broad; or with some combination of the two. They can be set by either government decree or through engagements between the social partners, or a combination of both. Approximately half of ILO member states with minimum wage systems have national minimum wages while the other half have differentiated minima. South Africa currently has a complex system whereby minimum wages are set by sector, occupation and/or region, through sectoral determinations published by the Minister of Labour, collective bargaining agreements through bargaining councils, and bilateral (company-by-company) agreements (see Section 3).

Minimum wages, according to the ILO’s resolution No. 135, are “one element in a policy designed to overcome poverty and to ensure the satisfaction of the needs of all workers and their families”. Further, the “fundamental purpose of minimum wage fixing should be to give wage earners necessary social protection” (ILO 2014a). More recently the ILO has stressed the importance of “adequate protection in accordance with the Decent Work Agenda” and noted that for a minimum wage to be “meaningful” it must “be set at a level that covers the needs of workers and their families, while taking into account economic factors” (ILO 2015a). Minimum wages are also seen as a means through which to reduce inequality and encourage labour productivity. A single national minimum wage is preferred by the International Labour Organization (ILO) and minimum wage experts because it:

- covers all workers;
- is easier to enforce and enjoys higher compliance;
- benefits all workers equally (while sectoral minima have been shown to discriminate against vulnerable groups such as women and youth);
- can be set to serve broader policy objectives such as the reduction of poverty and inequality;
- can be set to take account of workers’ needs and macroeconomic growth impacts, not only narrow sectoral considerations.

In the context of the proposed institution of a national minimum wage in South Africa, the *National Minimum Wage Research Initiative* at the University of the Witwatersrand (Johannesburg, South Africa) undertook a wide-ranging research project, reviewing the international literature, undertaking South Africa specific labour market analysis and statistical modelling, and interrogating minimum wage policy frameworks. This reports
draws on that research and is complemented by another report, *Considerations for the Design and Implementation of a National Minimum Wage for South Africa* (Castel-Branco 2016), which summarises the policy work undertaken by the Initiative.

This report begins with an analysis of the South African labour market in Section 2, followed by a discussion in Section 3 of the current minimum wage regime in South Africa and possible benchmarks for a future national minimum wage. Section 4 and Section 5 review the international literature on the impact of minimum wages on poverty and inequality, and employment, respectively. In Section 6 we present the findings of two statistical modelling exercises that estimate the potential impact of a national minimum wage. Section 7 concludes.
2 The South African labour market and the working poor

2.1 Introduction: wages, poverty and inequality

The South African labour market is characterised by high levels of inequality, poverty, and unemployment. While poverty has declined in the post-apartheid period, inequality has remained high and unemployment has increased. The labour market is central to these trends. Wages remain the largest source of income for the majority of South Africans, although the lowest 40% of earners also rely heavily on government social grants.

The South African Gini coefficient – the most commonly cited measure of inequality, which ranges from 0 (perfect equality) to 1 (perfect inequality) – is 0.66 (see Table 1), by many accounts the highest in the world. Income inequality is driven by differences between earners: wage differentials account for 62% of inequality while the presence of zero earners (the unemployed) accounts for 38% (Leibbrandt et al. 2012). When differentiating by income source – wages, social grants, remittances, and investment income – the relative contribution of wage income to overall inequality in South Africa was just over 90% in 2012, highlighting the centrality of wage earnings to measures of inequality.

<table>
<thead>
<tr>
<th>Table 1: Gini coefficients for select years</th>
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</tbody>
</table>

Source: Leibbrandt et al. (2010) and Finn (2015)

The national poverty headcount rate – the percentage of the population living below the national poverty line – was 62% in 2012. The poverty line chosen is based on Budlender et al. (2015) and is R1 319 in April 2015 rands (and R1 386 in February 2016 rands). Unsurprisingly, the presence or absence of a wage earner in a household is highly correlated with household poverty. From Table 2, the poverty rate in households without any wage earner was 88% in 2012, while the rate in households with at least one resident wage earner was 50%, showing the centrality of wage earnings to poverty as well as inequality. However, as discussed below, 55% of full-time workers can be categorised as ‘working poor’.

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1 This section predominantly summarises work for this project from Finn (2015) A national minimum wage in the context of the South African labour market. At times, paragraphs or sections are reproduced verbatim. For more details – including methodological specifics – the full paper can be found at: http://nationalminimumwage.co.za/wp-content/uploads/2015/09/NMW-RI-Descriptive-Statistics-Final.pdf.

2 Investment income is far more unequally distributed than wage income (see Daniels et al. 2012) but because wage income is a far larger share of income, its relative contribution to inequality is also much greater.

3 This uses household data from the National Income Dynamics Survey (NIDS), for which the most recent publicly available data, Wave 3, is from 2012.

4 “Poor households”, here and below, are defined as those in which monthly per capita income is less than the poverty line of R1 319.
Table 2: Poverty and wages

<table>
<thead>
<tr>
<th></th>
<th>No earner in household</th>
<th>Earner in household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-poor</td>
<td>11.9</td>
<td>50.0</td>
</tr>
<tr>
<td>Poor</td>
<td>88.1</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


The poorest households are least likely to have wage earners present: in 2012, 85% of people in the poorest decile were not co-resident with an earner. This proportion only falls below 50% from decile 4 onwards. By contrast, over 90% of people living in the top three deciles are co-resident with at least one wage-earner. These data illustrate two important roles that wages play in poverty. First, that lack of access to wage income is a major contributing factor to poverty. Second, that having access to wages does not guarantee household income per capita will rise above the poverty line (see below on the working poor).

It is important to note that poverty remains differentiated along racial lines. As seen in Table 3, almost 71% of Africans fall below the poverty line, with the corresponding poverty rates for Coloured, Asian/Indian and White respondents standing at 57%, 20.5% and 4%, respectively.

Table 3: Poverty and race

<table>
<thead>
<tr>
<th>Population group</th>
<th>Non-poor</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>African</td>
<td>29.3</td>
<td>70.8</td>
</tr>
<tr>
<td>Coloured</td>
<td>43.2</td>
<td>56.8</td>
</tr>
<tr>
<td>Asian/Indian</td>
<td>79.5</td>
<td>20.5</td>
</tr>
<tr>
<td>White</td>
<td>95.9</td>
<td>4.1</td>
</tr>
</tbody>
</table>


It is also important to appreciate the demands placed on wage earners vis-à-vis the distribution of these wages to dependents. The average household size in South Africa is 3.3, but this does not capture the average number of people dependent on each wage earner. To do this we must take account of co-resident non-earners plus those who are non-resident but receive remittances. The average dependency ratio for all earners is 1.55. For non-poor earners the ratio is 1, meaning that each earner in a non-poor household supports herself plus one other person. For earners living in poor households, the ratio is far higher, at 2.65, indicating the extra burden placed on earners in poor households. As shown in Figure 1 below, almost 10% of poor wage earners support themselves and four other people, 6% support five others, 4% support six others and some poor wage earners support up to ten dependents.

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5 Population groups are reported with the labels provided in all Stats SA statistical releases.
2.2 Labour market trends over time

Trends in the composition, earnings, hours worked and inequality of the South African labour market are explored in depth in Finn (2015); here we point to some key findings. Figure 2 presents the compositional shares of the labour force by sector for 2003 and 2012. We see some important changes over that period. The share of the labour force in the primary sector dropped significantly, from 10% to 5.4% in agriculture and from 5.5% to 3.1% in mining. Declining employment in agriculture (and the primary sector more generally) is normal in developing countries but requires a pro-active government response. More concerning is the fall in manufacturing as a share of total employment, from 15% to 13.2%, employing just over 1.5 million in 2012. This is accompanied by a steady rise in employment in the tertiary sector with the services, finance, and trade sectors expanding proportionately and in real terms, increasing by close to 800 000 workers.
Figure 2: Shares of total composition by sector, 2003 and 2012

Source: Finn (2015) from PALMS dataset.

Between 2003 and 2012, private sector employment grew from 7.7 to 9.4 million, peaking above 10 million in 2007/8 and falling in the wake of the global financial crisis. Public sector employment grew steadily from 2 million to 2.4 million. The number of African workers grew sharply between 2003 and 2008, with about 2 million jobs being added to this group. There was then a sharp drop between 2009 and 2010 of about 750 000 jobs. Most of these were low-wage jobs in the agriculture and manufacturing sectors and indicate that African workers were worst affected by the deterioration in the economic climate. This was followed by something of a recovery from 2010 onwards. Trends for the other groups were more or less flat, and they appear to have been relatively well shielded from the global financial crisis of 2008/2009.

Average real wages rose across almost all sectors and demographics between 2003 and 2012. Large average wage gains were made in agriculture, mining, construction, trade and domestic work (see Table 4). However, median earnings – the midpoint in the wage distribution above (and below) which 50% of workers earn – rose more slowly. We see this in Table 4 where real mean wages for all workers rose by 35% during this period while real median wages rose by only 22%. The same trend is observable for the majority of sectors, all race groups but Asian/Indian, and both genders. Most stark is that mean wages in agriculture rose by 114% but median wages by only 39%. The growth in the real mean outpacing growth in the real median is indicative of growing earnings inequality within these sectors and demographic groups (shown in more detail in Finn 2015). This is because wages at the bottom of the distribution are growing more slowly than wages at the top, a trend confirmed in Wittenberg (2014).
Table 4: Mean and median earnings 2003 and 2012

<table>
<thead>
<tr>
<th></th>
<th>Mean 2003</th>
<th>Mean 2012</th>
<th>Percent increase</th>
<th>Median 2003</th>
<th>Median 2012</th>
<th>Percent increase</th>
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</thead>
<tbody>
<tr>
<td>Overall</td>
<td>5 517</td>
<td>7 443</td>
<td>35</td>
<td>3 187</td>
<td>3 897</td>
<td>22</td>
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<tr>
<td>Agriculture</td>
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<td>2 889</td>
<td>114</td>
<td>1 125</td>
<td>1 559</td>
<td>39</td>
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<td>Mining</td>
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<td>10 245</td>
<td>71</td>
<td>3 937</td>
<td>7 195</td>
<td>83</td>
</tr>
<tr>
<td>Manufacturing</td>
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<td>7 654</td>
<td>28</td>
<td>3 750</td>
<td>4 197</td>
<td>12</td>
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<td>Utilities</td>
<td>10 509</td>
<td>11 063</td>
<td>5</td>
<td>5 624</td>
<td>7 195</td>
<td>28</td>
</tr>
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<td>5 162</td>
<td>45</td>
<td>2 531</td>
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<td>23</td>
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<tr>
<td>Trade</td>
<td>4 417</td>
<td>6 192</td>
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<td>2 625</td>
<td>3 597</td>
<td>37</td>
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<tr>
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<td>4 687</td>
<td>5 036</td>
<td>7</td>
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<tr>
<td>Finance</td>
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<td>9 624</td>
<td>-7</td>
<td>5 249</td>
<td>5 396</td>
<td>3</td>
</tr>
<tr>
<td>Services</td>
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<td>10 474</td>
<td>24</td>
<td>7 499</td>
<td>7 195</td>
<td>-4</td>
</tr>
<tr>
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<td>844</td>
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<td>34</td>
<td>2 437</td>
<td>2 998</td>
<td>23</td>
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<tr>
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<td>7 058</td>
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<td>2 437</td>
<td>3 897</td>
<td>60</td>
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<tr>
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<td>4 849</td>
<td>6 399</td>
<td>32</td>
<td>2 435</td>
<td>3 118</td>
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</table>

Source: Own calculations from PALMS dataset. Observations weighted using the bracketweight variable. Outliers excluded.

Persistently high levels of wage inequality are evident from Figure 3 and Figure 4. Figure 3 shows the Gini coefficient of earnings\(^6\) was almost identical at the start of the period (0.553) and at the end (0.554). This compares to a higher Gini coefficient of household income per capita of between 0.65 and 0.70 over the period (Leibbrandt et al., 2012). The compressed bottom half of the labour market is evident in Figure 4, as the total share going to the bottom 60% of the distribution (deciles one to six) is only 20%. The share of wages going to the highest paid decile alone (the highest paid 10%) is about 40%, and this is just over double the share going to the next highest 10% of the earnings distribution (the ninth decile).

\(^6\) This is different to the Gini coefficients presented earlier. We are now focused on earnings inequality only, while before we focused on household income inequality.
These labour market trends capture the difficulties South Africa has had in growing its economy, expanding employment, and reducing poverty and inequality. We turn now to focus specifically on the current labour market, beginning with an investigation of the ‘working poor’.
2.3 The ‘working poor’

There is no agreed method for defining which workers constitute the ‘low-wage’ or the ‘working poor’. In some international literature, and in usage by statistical agencies in the EU, the term ‘working poor’ is used to refer to workers who live in households in which income is less than approximately two-thirds of the national median. Given how low the median is relative to the mean in South Africa (both in absolute terms and compared to other countries), we avoid defining ‘working poor’ in relative terms and choose instead to focus on workers who live in households in which monthly household income per capita falls below the poverty line. This is the approach taken by the US Bureau of Labor Statistics, which considers wage earners living in households that fall below the poverty line as ‘working poor’ (US Bureau of Labor Statistics, 2012).

The question at the centre of our definition of a working-poor line is: What wage level would it take, on average, to bring a household living below the poverty line which has at least one worker, up to the poverty line? This raises a number of issues. First, dependency ratios (including co-resident and non-co-resident dependents) must be taken into account, including that poorer households face higher dependency ratios as discussed above. Second, poverty must be defined. In this study we use the most recent cost-of-basic-needs poverty line available for the country, the upper line\(^7\) of which is R1 319 per capita per month in April 2015 rands (Budlender et al. 2015).\(^8\) Third, we also take into account how far below the poverty line each household is (the depth of poverty). It is worth emphasising that poverty lines represent little more than a subsistence level of living and are not normative levels of what is required for a ‘decent’ standard of living. The line also enforces a strict cut-off – a household that has a per capita income of just R1 over the poverty line is considered non-poor.

In calculating our ‘working-poor’ threshold we first identify ‘full-time’ wage earners who work at least 35 hours a week (for reasons discussed below), and live in poor households, taking household size and a cost-of-basic-needs poverty line into account. We then calculate the household poverty gap – the total amount of money required to lift a poor household up to the poverty line – and average the poverty gap per earner in each working-poor household. This tells us the depth of poverty in each of these households. Next, we compute the mean wages of earners in these households. This mean is then added to the average poverty gap per earner for each household; the sum is sufficient to bring household income per capita in each of these households up to the poverty line. In order to calculate this threshold we use the NIDS Wave 3 (2012) data.

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\(^7\) Most poverty measurements calculate three poverty lines: food, lower and upper. The food poverty line is derived by working out the cost of meeting a basic daily energy requirement of approximately 2 100 kilocalories. The lower poverty line is the food poverty line plus the average amount spent on non-food items (essentials) by households whose total expenditure equals the food poverty line. The upper poverty line is the food poverty line plus the average amount spent on non-food items by households whose food expenditure equals the food poverty line. The upper poverty line is the most widely used, including in this report. This is higher than the StatsSA line (2015) but similar to a previous line devised by Özler (2007), which is used in a number of academic publications on poverty in the country (for example Leibbrandt et al. 2010, 2012) and stands at R1 365 per capita per month in 2015 rands.

\(^8\) The line presented in the Budlender et al. paper is R1 307 in March 2015 rands. In order to convert this to its real April 2015 equivalent we follow the methodology suggested by the authors and adjust the food and non-food components of the line separately for food and non-food inflation, respectively.
We arrive at a working-poor line of R4 125 per month in April 2015 prices (or R4 317 in February 2016 prices) as shown in Table 5 (see Finn 2015 for further detail and methodological caveats).

Table 5: Working-poor line

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Budlender et al.</td>
<td>1 319</td>
<td>4 125</td>
</tr>
</tbody>
</table>


Table 6 shows the proportion in each labour-market category that earns above or below the working-poor line. 95% of those employed in domestic services earn less than R4 125 per month, while the corresponding figure for those employed in agriculture is 89.6%. About half of those employed in manufacturing and transport earn below this line. The industries with the lowest proportion of working poor are mining and utilities, with 23% and 31%, respectively. Around 60% of African workers and 56% of Coloured workers earn below R4 125, while the same holds for 37% of Asian/Indian workers and 22% of White workers. 50.6% of men are considered to be working poor, according to our definition, while the proportion of women is close to 58%. While only 46% of the working poor are women, 58% of women fall below the working-poor line. Similarly, while 22% of White workers fall below the working-poor line, they make up only 5% of these workers – less than half their share of overall earners. This confirms that the relative distribution of the working poor is in line with the racially and gender skewed wage earnings and poverty in South Africa.

Table 6: Proportions above and below working-poor line by different categories

<table>
<thead>
<tr>
<th>Industry</th>
<th>Above line</th>
<th>Below line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>10.4</td>
<td>89.6</td>
</tr>
<tr>
<td>Mining</td>
<td>77.1</td>
<td>22.9</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>50.8</td>
<td>49.3</td>
</tr>
<tr>
<td>Utilities</td>
<td>68.9</td>
<td>31.1</td>
</tr>
<tr>
<td>Construction</td>
<td>36.9</td>
<td>63.1</td>
</tr>
<tr>
<td>Trade</td>
<td>39.8</td>
<td>60.2</td>
</tr>
<tr>
<td>Transport</td>
<td>52.5</td>
<td>47.5</td>
</tr>
<tr>
<td>Finance</td>
<td>52.7</td>
<td>47.4</td>
</tr>
<tr>
<td>Services</td>
<td>61.2</td>
<td>38.8</td>
</tr>
<tr>
<td>Domestic services</td>
<td>4.8</td>
<td>95.2</td>
</tr>
</tbody>
</table>

2.4 The contemporary labour market

We now consider the South African labour market in 2014, using Statistic South Africa’s Labour Market Dynamics South Africa (LMDSA) 2014 dataset. This provides context for our analysis of where a national minimum wage would ‘bind’, considered in the next subsection. The composition of the labour market in 2014 is not greatly different to that shown for 2012 above and is not discussed here. Note that when...
discussing earnings we now limit our sample set to those working 35 hours and above: our measure of ‘full-time’ work. This is important. If we are to discuss and model a monthly national minimum wage – that is, the monthly wage that a full-time worker would receive – and understand what proportion and which segments of the wage structure this will influence, then we need to measure this against mean and median wage earnings for full-time workers.

The various means and medians displayed in Table 7 – each reflecting different restrictions that have been applied to the data – are crucial.9 The lowest mean and median come from a ‘naïve’ approach of using the data without any adjustments. Doing so returns a mean of R8 138 and a median of R3 193. The number of observations – 65 058 – is higher than in any of the other approaches because every possible earner is included. Such an approach is hardly ever used: it is standard practice to remove zero earners and outliers as is done in rows 3 to 11 of Table 7.10 Excluding the 327 zero earners (row 2) raises the mean and the median to R8 173 and R3 224, respectively. In row 3, the 63 outliers are also removed, raising the mean slightly from R8 138 to R8 168, with the median the same as for row 2.

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Mean</th>
<th>Median</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Naïve</td>
<td>8 138</td>
<td>3 193</td>
<td>65 058</td>
</tr>
<tr>
<td>2. Zero earners removed</td>
<td>8 173</td>
<td>3 224</td>
<td>64 731</td>
</tr>
<tr>
<td>3. Outliers and zero earners removed</td>
<td>8 168</td>
<td>3 224</td>
<td>64 668</td>
</tr>
<tr>
<td>4. 35 hours plus</td>
<td>8 669</td>
<td>3 640</td>
<td>54 757</td>
</tr>
<tr>
<td>5. 40 hours plus</td>
<td>8 675</td>
<td>3 640</td>
<td>51 401</td>
</tr>
<tr>
<td>6. Hourly average x 45 x 4.3</td>
<td>8 989</td>
<td>3 510</td>
<td>62 927</td>
</tr>
<tr>
<td>7. Formal only (full-time)</td>
<td>9 809</td>
<td>4 368</td>
<td>44 284</td>
</tr>
<tr>
<td>8. Formal ex. domestic (full-time)</td>
<td>9 965</td>
<td>4 507</td>
<td>43 115</td>
</tr>
<tr>
<td>9. Formal ex. agriculture (full-time)</td>
<td>10 102</td>
<td>4 680</td>
<td>41 739</td>
</tr>
<tr>
<td>10. Formal ex. agriculture and domestic (full-time)</td>
<td>10 274</td>
<td>4 680</td>
<td>40 570</td>
</tr>
<tr>
<td>11. Inflated by 40% for under-reporting (full-time)</td>
<td>12 136</td>
<td>5 097</td>
<td>54 757</td>
</tr>
</tbody>
</table>


Note: Full-time workers are those who work at least 35 hours per week.

Rows 4 through 6 show different approaches to calculating a monthly full-time equivalent. Limiting the earnings distribution to those workers who worked at least 35 hours in the last week returns a mean of R8 669. Extending the cut-off to 40 hours raises this by R6. The median for both cut-offs is the same, and stands at R3 640. Given how little the choice between these two hourly cut-offs matters for the mean and median, we use the 35-hour cut-off as a definition of ‘full-time’ work because it is

9 For a full explanation of the methodologies applied see Finn (2015).

10 Zero earners are those workers who are employed (in our case for at least 35 hours per week) but report an income of zero. They are excluded because it is implausible that there are employed workers who earn nothing. One example of a high outlier in the data is an individual who was coded as earning over R9 million a month. An example of a low outlier in the data is someone who reported working 48 hours a week in the formal sector, yet reported a monthly wage of R4.80.

11 ‘Number’ refers to the number of observations in the LMDSA 2014 dataset used to calculate the means and medians under different assumptions.
associated with a larger sample size. Another way of calculating wages for an equivalent of full-time work would be to calculate an average hourly wage for all workers (excluding outliers and zero-earners), which stands at R46.45, and multiply this by 45 – the maximum work week before overtime takes effect, as outlined in the Basic Conditions of Employment Act (Republic of South Africa, 1997) – and then by 4.3 (the average number of weeks in a month).\(^\text{12}\) Row 6 of Table 7 shows that the mean, at R8 989, is higher than the mean in row 5, though the median is lower, at R3 510.\(^\text{13}\) From this point onwards we calculate means and medians for full-time workers working 35 hours or above, unless otherwise stated.

Restricting the sample to reflect only the earnings of those in the formal sector drops the sample size to under 45 000, and raises the mean and median to R9 809 and R4 368, respectively. Excluding workers from the two lowest paid sectors (agriculture and domestic work) returns a mean of R10 274, and a median of R4 680.

There are a number of South African studies which suggest that the QLFS earnings data are under-reported when benchmarked against other sources such as the QES, administrative data, and industry-level data (Burger et al., forthcoming; Kreuser, 2015; Seekings, 2007; van der Berg et al., 2007; Wittenberg 2014a; Woolard, 2002). The potential level of under-reporting clusters around 40% and so we apply a ‘correction’ by inflating the QLFS/LMDSA data by this percentage, displayed in row 11. This is done so that an upper bound for the true mean and median of monthly earnings for full-time workers may be derived.\(^\text{14}\) This crude adjustment raises the mean to R12 136, which is almost R2 000 higher than the next highest level in the table, while the resulting median of R5 097 is also the highest in the table. The appendix of Finn (2015) contains means and medians for different assumptions, and these are reported so that policymakers have the full range at their disposal.

Table 7 is crucial because we will benchmark potential levels of the national minimum wage against existing mean and median wages in Section 3 and use these when modelling the national minimum wage in Section 6.

Table 8 gives summary statistics for earnings of different groups in the economy. The means of each industry range from a low of R2 210 per month in domestic services to highs of between R10 000 and R13 000 in finance, services, and utilities. This shows that inequality between sectors is significant (even though inequality within sectors has come to play an increasingly prominent role). This is evidenced by the fact that the 90th percentile of wages in the agricultural sector is the same as the 25th percentile in mining, and is five times less than the 90th percentile in the finance sector. Medians range from R1 577 in domestic services to R7 281 in utilities. The national median is R3 640. The mean of public sector wages was almost R5 000 higher than the mean in the private sector, and this difference was slightly lower at the median. Earnings by

---

12 Any method for calculating a monthly ‘full-time equivalent’ from the LMDSA data carries an element of arbitrariness. The objective must be to limit the extent of this. We believe that adopting a 35-hour week is best suited in this regard. The problem with multiplying the hourly wage by 45 hours and 4.3 weeks a month, is that the mean and median are extremely sensitive to the number of hours by which you multiply the hourly rate, and there is no agreed upon number of hours that constitutes full time. A full analysis of the different approaches used can be provided upon request.

13 The hourly wage for those working less than 35 hours a week is R47.16.

14 Again, we refer the interested reader to Finn (2015) where this is dealt with in more depth, and various caveats given.
race show that the mean for African earners is R2 209 lower than the corresponding mean for Coloured workers, and R4 671 and R12 441 lower than the Asian/Indian and White means, respectively. The differences in the wage levels for various sectors or demographic groups at points along the wage distribution highlights that a national minimum wage would cover a different proportion of workers in each of these sectors and groups, an issue to which we now turn.

Table 8: Summary statistics of earnings by different categories

<table>
<thead>
<tr>
<th>Industry</th>
<th>Mean</th>
<th>p10</th>
<th>p25</th>
<th>Median</th>
<th>p75</th>
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<tbody>
<tr>
<td>Agriculture</td>
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<td>832</td>
<td>1 560</td>
<td>2 253</td>
<td>2 600</td>
<td>4 160</td>
</tr>
<tr>
<td>Mining</td>
<td>10 279</td>
<td>1 768</td>
<td>4 160</td>
<td>7 281</td>
<td>11 441</td>
<td>19 762</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>9 053</td>
<td>901</td>
<td>2 184</td>
<td>4 160</td>
<td>8 338</td>
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<td>3 120</td>
<td>7 281</td>
<td>15 602</td>
<td>26 003</td>
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<td>Construction</td>
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<td>1 126</td>
<td>2 028</td>
<td>3 155</td>
<td>5 409</td>
<td>11 441</td>
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<td>2 080</td>
<td>3 328</td>
<td>6 241</td>
<td>15 602</td>
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<td>2 253</td>
<td>4 160</td>
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<td>2 600</td>
<td>4 160</td>
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<td>6 241</td>
<td>14 562</td>
<td>20 802</td>
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<td>1 577</td>
<td>2 288</td>
<td>3 120</td>
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<tr>
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<td>2 080</td>
<td>3 640</td>
<td>9 014</td>
<td>18 722</td>
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<td>1 976</td>
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<td>7 281</td>
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<td>926</td>
<td>2 600</td>
<td>7 385</td>
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<td>3 536</td>
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<th>p25</th>
<th>Median</th>
<th>p75</th>
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<th>p25</th>
<th>Median</th>
<th>p75</th>
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<td>3 640</td>
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<td>14 125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geotype</th>
<th>Mean</th>
<th>p10</th>
<th>p25</th>
<th>Median</th>
<th>p75</th>
<th>p90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban formal</td>
<td>10 441</td>
<td>1 040</td>
<td>2 288</td>
<td>4 507</td>
<td>11 441</td>
<td>20 802</td>
</tr>
<tr>
<td>Urban informal</td>
<td>4 811</td>
<td>1 040</td>
<td>1 872</td>
<td>3 016</td>
<td>4 889</td>
<td>9 014</td>
</tr>
<tr>
<td>Tribal areas</td>
<td>4 469</td>
<td>728</td>
<td>1 248</td>
<td>2 288</td>
<td>4 699</td>
<td>10 401</td>
</tr>
<tr>
<td>Rural formal</td>
<td>4 269</td>
<td>1 144</td>
<td>1 768</td>
<td>2 366</td>
<td>3 380</td>
<td>8 113</td>
</tr>
</tbody>
</table>

2.5 Where would a potential national minimum wage bind?

The final figures in this section present a graphical description of where a possible national minimum wage would bind. Before decomposing this by sector we depict, in Figure 7, the overall earnings distribution along with the proportion of workers covered at each wage using a cumulative distribution function of earnings. The vertical axis represents the cumulative proportion of wage earners that earn below a given wage, which is shown on the horizontal axis. The figure shows that about one third of workers earn below R2 500 and would thus be covered by a minimum wage at that level, 40% of workers earn below R3 000, and the median is approximately R3 500. Close to 60% of earners earn below R5 000, 70% earn under R7 000, and almost 80% earn less than R10 000, which is the upper limit in the figure. We remind the reader again that we are using our definition of full-time workers and April 2015 prices.

![Figure 7: Cumulative distribution function of earnings](image)


We now split the labour force, dividing the wage distribution into groups of earners: those earning less than R2 500; R2 500 to R2 999; R3 000 to R3 499; R3500 to R3 999; R4 000 to R4 999; R5 000 to R5 999; and more than R6 000. The size of each differently-coloured block in the figures that follow, represents the proportion of workers in each subsection in each earnings category.

---

15 By ‘bind’ we refer to the proportion of the workforce that earns below a proposed national minimum wage level and would thus see their wages rise to the level of the national minimum wage (assuming full compliance).

16 A cumulative distribution function that adjusts for possible under-reporting of earnings is provided in the Appendix of Finn (2015). This serves as a lower bound for the potential extent of coverage, as the figure above serves as the upper bound.

17 Table versions listing the percentages of all figures are available in the appendix of Finn (2015).
In Figure 8 we see that a national minimum wage of R3 000, for example, would cover 82% of workers in the agriculture sector, and 87% of those working in domestic services. Increasing this to R5 000 would raise those proportions to 92% and 97%, respectively. These are the only sectors in which more than half of workers earn below R3 000, in the mining sector a minimum wage of R5 000 per month would only bind for 35% of workers. Wages in the construction and trade sectors look very similar to each other, with about 60% of workers earning below R4 000 in both. 46% of workers in the financial sector earn more than R5 000 per month, and the corresponding proportion for those employed in construction is 28%. These percentages do not indicate the extent to which workers are below each line. For example, while the percentages affected at various levels in agriculture and domestic services are similar, the extent to which they are affected will vary, as 50% of workers in agriculture earn below R2 253, compared to 50% earning below R1 577 in domestic services. Clearly, any reasonable national minimum wage would affect each of the sectors in different ways with agriculture and domestic service being most sensitive. These figures would be lower if wage earnings were under-reported in the dataset used, as shown in Figure 9.

Figure 8: Where a minimum wage would bind, by sector

Figure 9: Where a national minimum wage would bind, by sector, adjusting for under-reporting

Note: The under-reporting adjustment assumes the reported earnings need to be inflated by 40% to reflect true earnings. Source: Finn (2015) from LMDSA 2014 dataset.

Figure 10 and Figure 11 decompose the sectors more finely following the method laid out above. In Finn (2015) similar disaggregation is undertaken by formal vs. informal sector, gender, age, public vs. private sector, urban vs. rural, and province.

Figure 10: Where a minimum wage would bind, by smaller SIC sector

Figure 11: Where a minimum wage would bind, by disaggregated manufacturing sector

2.6 Conclusion

In this section we have explored select aspects of both labour market trends and the current state of the South African labour market. High levels of poverty and inequality are obvious, with wage earnings playing a predominant role. The number of working poor in South Africa is extremely high with just below 54% of full-time employees, close to 5.5 million workers, earning below the working-poor line of R4 125. It is precisely these realities that a national minimum wage seeks to address. Mean and median earnings vary widely between sectors and population groups, with 50% of full-time employees earning less than R3 640 and the average for full-time employees sitting at R8 669. Given the large inequalities between sectors and demographic groups, each of these would be affected by a national minimum wage differently, with agriculture and domestic workers most affected (see our policy summary, Castel-Branco 2016, for a discussion of how this may be accommodated within a national minimum wage policy framework). We turn now to an overview of the current minimum wage framework and possible benchmarks for the new national minimum wage.
3 South African minimum wage systems and setting a national minimum wage

3.1 Current minimum wage systems in South Africa

Minimum wages are currently set on a sector-by-sector basis in South Africa, through a combination of bargaining council agreements, and company level agreements, negotiated between trade unions and employer organisations; and sectoral determinations, set by the Minister of Labour on the recommendation of the Employment Conditions Committee (ECC). Sectoral determinations target sectors where workers are considered to be ‘vulnerable’ and/or sectors that are not represented by workers’ organisations. Bargaining council agreements can be ‘extended’ by the Minister of Labour to cover all companies and workers in that sector, irrespective of whether they are members of the bargaining council. There are 11 sectoral determinations\(^\text{18}\) and 37 private, six public, and three statutory bargaining councils.\(^\text{19}\) There are thousands of different minimum wage rates for different categories of employees. The 120 different wage levels within the sectoral determinations immediately make clear the complexity of the current system.

The Labour Relations Act of 1995 (LRA) and the Basic Conditions of Employment Act of 1997 (BCEA) provide the legal framework for the regulation of minimum wages. The LRA enshrines collective bargaining rights for almost all employees and provides a legal framework within which this takes place. The key institutional bodies are bargaining councils – in the private sector, a rehabilitation of the apartheid-era industrial councils. The regulations within the BCEA lay out basic conditions for all employees whether or not they are members of bargaining councils, for example by defining remuneration, ordinary hours of work, and permissible payroll deductions. The BCEA outlines the process for introducing new sectoral determinations for particular sectors; these set minimum wages and other conditions of employment, for example maximum working hours. The BCEA also mandates the creation of the Employment Conditions Commission which, amongst other duties, is responsible for making recommendations regarding sectoral determinations to the Minister of Labour (Department of Labour 1997).

The DPRU (2016) assesses minimum wage coverage of ‘low-wage’ employees (employees are those who work for someone else for pay) focusing on a sub-sample defined as those earning below the BCEA ‘income threshold’ of R99 per hour or R205 433.30 per annum in 2014 (DPRU 2016, pp. 11, 13, 24, 42). Gazetted regulations exempt those above this threshold from sections 9, 10, 11, 12, 14, 15, 16, 17(2), and 18(3) of the BCEA, all of which fall within Part 2 “Regulation of Working Time”. Applying this threshold to determine a subsample of employees – 10.5 million or around 67% of the total employment – for which to assess minimum wage coverage

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\(^{18}\) Of which nine have wage determinations. The Expanded Public Works Programme is actually a ‘ministerial determination’ and so when we deal with sectoral determination wage rates we use the other eight: domestic work, private security, forestry, agriculture, contract cleaning, hospitality, taxi, and wholesale and retail.

\(^{19}\) The statutory councils (allowed for in the LRA) exist in addition to the ‘voluntarist’ bargaining councils and have an element of ‘compulsion’. The LRA provides that one party, providing it represents at least 30% of the sector, can trigger statutory councils. This mechanism never took off, and was only established in three areas, with no effective bargaining on core issues.
appears arbitrary as there are workers covered by minimum wage agreements, particularly in the public sector, who earn above this threshold. This said, the resulting statistics, shown in Figure 12, are indicative of coverage amongst lower-wage earners.

**Figure 12: Coverage by type of minimum wage institution (2014)**

![Coverage by type of minimum wage institution (2014)](image)

Source: DPRU (2016) from LMDSA 2014 dataset

As the figure shows, 46% of employees in the sample are covered by sectoral determinations, 8% and 14% by private and public sector bargaining councils, respectively, and 10% by trade unions outside the bargaining council framework. This leaves approximately 22% of the sampled workers uncovered. The majority of uncovered workers are found in manufacturing, construction, and financial service sectors, although DPRU suspects the workers in manufacturing may be covered without their knowledge, and hence do not report this (2016, p. 13).

Figure 13 shows the real wage increases in the eight sectoral determinations (in which minimum wages are set) between 2002 and 2015 (with each series beginning in the first year in which the minimum wage was established).\(^{20}\) We see a gradual rise in all sectors with the largest increases in agriculture and forestry, mostly due to the 50% increase in March 2013. In years where no increases were mandated, inflation eroded the real value of the wage. The overall percentage increases can be seen in Figure 14 which shows the percentage real wage increase between the time the sectoral determination was instituted and 2015.

---

\(^{20}\) Given multiple minima in certain sectors, decisions were made as to which minimum wage to use. Large urban areas (Area A) were selected, grade D security guards used, hospitality businesses with less than 10 employees, taxi drivers, and shop assistants in the wholesale and retail sector. The exact level is less important than the trends.
Overall, sectoral determinations have been a means by which to raise wages in these sectors although the success of this also depends on the extent to which the minima are enforced (see Bhorat et al. 2011). This said, the minima set through sectoral determinations remain relatively low, including in comparison to various (internationally established) mechanisms for benchmarking minimum wages, to which we now turn.
3.2 Anchoring the national minimum wage

A number of indicators may be useful in providing guidance in the setting of a national minimum wage level in South Africa. The most important, and most neglected in the current debate in South Africa, is workers’ needs, as discussed in Section 2 regarding poverty measures. Updating the figures in Section 2 to February 2016 rands, we see that the preferred individual poverty line is R1 386 which equates to R5 544 for a family of four and corresponds to a working-poor line of R4 317. It is worth reiterating that poverty lines cover only the basic necessity that a person needs to survive and are not an indication of a ‘decent’ standard of living. Nevertheless, these thresholds serve as indicators of the basic needs of workers and their dependents.

Table 9: Updated poverty lines (February 2016)

<table>
<thead>
<tr>
<th>Poverty line</th>
<th>Apr-15</th>
<th>Feb-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household poverty line (family 4)</td>
<td>1 319</td>
<td>1 386</td>
</tr>
<tr>
<td>Working poor line</td>
<td>5 276</td>
<td>5 544</td>
</tr>
<tr>
<td></td>
<td>4 125</td>
<td>4 317</td>
</tr>
</tbody>
</table>

Source: Updated from Finn (2015) using NIDS Wave 3 and LMDSA datasets

Labour market indicators such as the ratios between minimum wages and mean wages, and minimum wages and median wages are also instructive. International comparisons show that for different country groups, the average ratio of minimum-to-mean wages is typically between 45% and 50%. We consider the middle-income country average of 48% most instructive for South Africa. These ratios are shown in Table 10 and Figure 15, of which the latter includes the full sample used. South Africa falls well below this, with a minimum-to-mean ratio of 36% according to updated information from Rani et al. (2013). The average minimum-to-mean wage ratio is between 65% and 80% for all country groups with the average for middle-income countries at 80%; these ratios are shown in Table 11 and Figure 16. South Africa’s ratio is 74%.

Table 10: Minimum-to-mean wage ratios, various country groups

<table>
<thead>
<tr>
<th>All available countries</th>
<th>Mean</th>
<th>Median</th>
<th>No. of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing countries</td>
<td>0.47</td>
<td>0.40</td>
<td>48</td>
</tr>
<tr>
<td>Middle-income countries</td>
<td>0.48</td>
<td>0.42</td>
<td>43</td>
</tr>
</tbody>
</table>

Source: ILO (2016), Global Wage Database

21 According to data from the Department of Labour (DoL 2015b) the average and median level of the sectoral determinations (using the lowest minima in each) is just over R2 700.

22 The ratios of minimum wages to mean and median wages shown here uses data from the ILO’s Global Wage Database (GWD). Given the difficulty in establishing the level of the ‘minimum wage’ in countries where there are multiple minima the data are viewed with caution. However, given that this is the most comprehensive data source available and has a large sample size, the average ratios we highlight are considered credible indicators. Rani et al. (2013) have collected more detailed data for a sample of eleven developing countries. In this sample, the average minimum-to-mean ratio is 0.51 and the average minimum-to-median ratio is 0.74 (excluding South Africa), both very similar to the ratios in the GWD (the raw data as well as updated data for India and South Africa were provided by the authors of Rani, Belser, Oelz, et al. 2013). The congruence between these ratios lends further credibility to the data.
Table 11: Minimum-to-median wage ratios, various country groups

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>No. of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>All available countries</td>
<td>0.66</td>
<td>0.61</td>
<td>31</td>
</tr>
<tr>
<td>Developing countries</td>
<td>0.78</td>
<td>0.73</td>
<td>15</td>
</tr>
<tr>
<td>Middle-income countries</td>
<td>0.80</td>
<td>0.73</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: ILO (2016), Global Wage Database

Figure 15: Minimum-to-mean wage ratios (all countries)

Source: ILO (2016), Global Wage Database

Figure 16: Minimum-to-median ratios (all countries)

Source: ILO (2016), Global Wage Database
Table 12 takes the average middle-income ratios above and calculates what these would equate to in South Africa using data from the previous section. Depending on how mean and median wages in South Africa are defined in Table 7, 48% of the mean wage is between R4 161 and R4 932 per month and 80% of the median wage is between R3 276 and R3 744 per month in April 2015 rands.

<table>
<thead>
<tr>
<th></th>
<th>48% of Mean</th>
<th>80% of Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>All full-time employees</td>
<td>4 161</td>
<td>3 276</td>
</tr>
<tr>
<td>Formal ex. agriculture ex. domestic work</td>
<td>4 932</td>
<td>3 744</td>
</tr>
</tbody>
</table>

Source: Finn (2015) from LMDSA 2014 dataset, own calculations

As discussed in more detail in the accompanying policy summary – Policy Considerations for the Design and Implementation of a National Minimum Wage for South Africa (Castel-Branco 2016) – and in Policy Brief 7, benchmarking the national minimum wage against the average wage (as opposed to the median wage) may be more appropriate in the South African context given high levels of inequality, very low median wages, and the fact that average-wage growth outpaces median-wage growth. Regarding the latter, it is essential that the national minimum wage rises at a faster rate than average wages in order for it to be effective at reducing inequality; if the minimum-to-median ratio is used as a benchmark this will not be achieved.

Finally, current collectively-bargained minimum wages may also be useful as a benchmark. Using data from the Department of Labour (supplemented by data from the Public Service Co-ordinating Bargaining Council, PSCBC 2014), Table 13 gives the weighted and unweighted averages for bargaining council agreement minima (weighted according to the number of workers covered).23 We see that the private sector weighted average for bargaining council agreements is approximately R4 350 per month, which rises to just under R5 750 per month when the public sector is included. Using weighted averages is certainly more appropriate if wishing to benchmark a national minimum wage against the current levels of collective bargaining agreements in South Africa.24

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23 Robustness checks are applied to the data by checking whether the outputs are altered by supplementing them with other data collected by the authors. They are not. Further checks are performed using the collective bargaining minima in Appendix C (which we corrected slightly) in DPRU (2016), and the results are very similar. An internal memo detailing the full results with extensive methodological discussion can be provided upon request.

24 According to the Department of Labour (DoL 2015b), the average and median levels of the sectoral determinations (using the lowest minima in each determination) are R2 737 and R2 724, respectively.
Table 13: Current collectively bargained minimum wage levels using DoL data

<table>
<thead>
<tr>
<th>Collective bargaining averages</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bargaining councils (private sector) unweighted</td>
<td>3 215</td>
</tr>
<tr>
<td>Bargaining councils (all) unweighted</td>
<td>3 750</td>
</tr>
<tr>
<td>Bargaining councils (private sector) weighted</td>
<td>4 355</td>
</tr>
<tr>
<td>Bargaining councils (all) weighted</td>
<td>5 747</td>
</tr>
</tbody>
</table>

Source: Department of Labour (DoL 2015b), own calculations

As seen in Figure 12, bargaining councils are complemented by bilateral collective bargaining agreements on a company-by-company basis in sectors where bargaining councils are not present or do not cover all firms or categories of workers. Using detailed data provided by the Labour Research Service (LRS 2016) – which compiles all available wage agreements – we isolate 450 agreements with 2015 data. In each, we use the lowest minimum wage specified. The ability to weight the data is very limited, due to insufficient coverage data, and so the weighted means and medians should be viewed with extreme caution. In any event, results from the data are not dissimilar from those in Table 13, with Table 14 showing averages between approximately R4 300 and R5 600.

Table 14: Current minimum wage levels from Labour Research Services (2015)

<table>
<thead>
<tr>
<th></th>
<th>Unweighted</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bargaining councils</td>
<td>4 289</td>
<td>3 691</td>
<td></td>
</tr>
<tr>
<td>Bargaining councils and bilaterals</td>
<td>4 315</td>
<td>3 700</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Weighted</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bargaining councils</td>
<td>5 430</td>
<td>6 015</td>
<td></td>
</tr>
<tr>
<td>Bargaining councils and bilaterals</td>
<td>5 635</td>
<td>6 015</td>
<td></td>
</tr>
</tbody>
</table>

Source: LRS (2016), own calculations.

3.3 Conclusion

Using these three international recognised measures – poverty lines as a proxy for workers’ basic needs, ratios of minimum wages to mean wages, and current minimum wage levels through collective bargaining – we see how these benchmarks fall predominantly between R4 000 and R5 500 in 2015 rands. This is congruous with our statistical modelling (see Section 6.3) which indicates that a phased-in national minimum wage in the R3 500 to R5 500 band has positive effects on the economy and is economically sustainable.

This section has concluded our analysis on the current South African context by exploring the current minimum wage regime and three different approaches to benchmarking a future national minimum wage in South Africa. We turn now to reviews of the international evidence regarding the impact of minimum wages on inequality and poverty (Section 4) and on employment levels (Section 5).

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25 We would like to thank the LRS, and Eddie Cottle and George Mthethwa in particular, for making their data available to us.

26 There are data issues with both the DoL and LRS data which we have discussed in separate documentation available upon request. Nevertheless they offer a clear indication of current minimum wage levels.
4 Literature review: the impact of minimum wages on inequality and poverty

This report takes two approaches to understanding the potential impact of a national minimum wage. In Section 6 we use econometric modelling techniques to estimate the effect of a national minimum wage on the South African economy, in this and the next section we look closely at the experiences of other countries. While South Africa will not precisely replicate the experience of any other country, the body of evidence helps us to understand the possible consequences in South Africa. Minimum wages are consistently found to have positive effects on reducing poverty and inequality, with aggregate small, neutral or statistically insignificant impacts on employment. These issues are explored in Sections 4 and 5, respectively.

The literature shows that minimum wages are increasingly seen as a tool through which to tackle inequality and poverty. This forms part of a shift in the literature, from emphasising the possible employment effects of implementing or increasing minimum wages, to focusing on their redistributive potential. Increasing minimum wages or instituting a meaningful national minimum wage could directly raise low-income wages and increase the labour share.

Wage-income inequality plays the largest role in driving overall inequality in South Africa and elsewhere (see Section 2.1), due in large part to wage-income being the largest single source of income in the economy, including for the majority of low-income households. Increasing wage income for low-wage earners therefore has the potential to directly reduce inequality. Furthermore, shifting income from profits to wages can also be inequality reducing as wage income is often more evenly distributed than income from property and financial assets (see Section 6.2.1 and Strauss and Isaacs 2016). Both of these potentially inequality-reducing outcomes, arising out of an increase in low-income wages, are projected to occur in South Africa (see Section 6). For these reasons minimum wages have become one of the labour-market policies advocated by the International Labour Organization as an important lever for redistribution (ILO 2015b). As noted, reduction of inequality is a key motivation for the proposed introduction of a national minimum wage in South Africa.

When interrogating the relationship between increased wages (caused by the introduction or increase of minimum wages) and inequality, it is important to distinguish between effects on average wages and effects on the wage distribution. Whereas minimum wages may coincide with an increase in average wages, for inequality-reducing purposes it is crucial that such an increase happen to a greater extent at the bottom end of the wage distribution, thus positively affecting earnings of low-paid workers, rather than at the middle or upper end of the wage distribution. Minimum wages have had this inequality reducing impact in both developed and developing countries.

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27 This section draws extensively from Mudronova (2016) *The international experience of the relationship between inequality, poverty and the national minimum wage.*

28 The share of income which accrues to workers in the form of wages, is discussed in further depth in Section 6.2.
4.1 Evidence from developed countries

Despite economic theory warning against state intervention in labour markets, the experience of developed countries has led to broad consensus that minimum wages reduce wage inequality and can improve the wellbeing of low-paid workers (Garnero et al. 2014). A large share of the literature regarding advanced countries focuses on the United States and the United Kingdom, and we present, as illustrative, these two contrasting and illuminating examples here.

Between 1979 and 1988, the United States saw a substantial erosion of the real value of the national minimum wage together with rising inequality. Lee (1999) has argued that the increase in inequality in the 1980s was entirely caused by the erosion of the minimum wage. More modest estimates are given by DiNardo et al. (1996), who show that the decline in the real value of the national minimum accounted for 25% of the rise in inequality, and by Autor et al. (2016) who show that the decline in the real value of the national minimum accounts for 35% to 45% of the increase in inequality.29 The latter also show that the inequality-inducing effects were worse for women than men.

In the United Kingdom a national minimum wage was introduced in 1999. The research finds that there was little or no impact on employment (see Leonard et al. 2014 meta-analysis) and that it has had significant positive impacts on wage inequality. The introduction of the national minimum wage explains 50% of the reduction of wage inequality at the bottom half of the wage distribution between 1998 and 2010 (Dickens et al. 2012). In this period the largest increases in wages, a 50% growth in real wages, occurred at the bottom of the wage distribution. In contrast, workers earning at the median experienced only an 18% wage increase.

In addition it has been found that the United Kingdom’s national minimum wage had much greater spillover effects than originally predicted, by raising the wages of other low-income earners who already earned above the national minimum wage.30 Dickens et al. (2012) found that the benefits of the national minimum wage reached up to the 25th percentile, that is, to workers earning approximately 40% above the national minimum wage level. In addition, the national minimum wage has the potential to partly equalise gender disparities, by benefiting 13% of women compared to 6% of men, as well as regional disparities by raising wages in low-wage regions such as Wales.31

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29 The lower half of the wage distribution refers to the difference between 5th and 1st deciles or the 50th and 10th percentiles (the 50/10 ratio) of the wage distribution. The erosion of the real value of the minimum wage accounted for increasing inequality in this subsection of the wage distribution because the lowest earners moved further away from the median earners. Huge increases in salaries at the top of the distribution would be very significant when measuring inequality between the top and bottom of the distribution.

30 These ‘spillover effects’ occur because wages of workers who earn above the minimum wage increase along with the minimum wage due to shifts in demand for low-skilled labour or the need to preserve wage differentials, productivity, and incentives. Moreover, the minimum wage can signal what is a fair wage within the economy thus boosting wages outside of its purview, for example in the informal sector.

31 Similar findings exist in other developed countries. France, for example, experienced a rapid increase in the minimum wage; between 1968 and 1983 the purchasing power of the minimum wage increased by more than 130% while the mean wage rose by only 50%. This was accompanied by a sharp decrease in inequality (Piketty 2014, pp. 206–220).
These experiences lay the foundation for an approach to minimum wages that appreciates their redistributive potential. The fall in the real value of the national minimum wage, and the stagnation in median wage earnings in the United States, is instructive for South Africa. If South Africa cannot achieve significant real wage growth at the lower end and in the middle of the distribution – at a rate greater than at the upper end – then wage inequality will not be reduced. The British example cannot be directly transposed onto South Africa, but offers a hopeful backdrop against which to examine the impact of minimum wages in developing countries. The overall finding from these case studies is that minimum wages may have no “detectable impact on employment but they do seem to have sizeable impacts on wage inequality that stretch beyond those workers directly affected” (Dickens and Manning 2004, p. 21).

4.2 Evidence from developing countries

It is sometimes argued that the inequality-reducing potential of minimum wages is strong in developed countries because wages represent the largest source of income in these countries, and that the same may not hold true in developing countries. However, wage income is still the predominant source of income in middle-income countries like South Africa, including for lower-income households (ILO 2015c), and wage inequality is a major driver of overall inequality (UNDP 2014). In the lower half of the income distribution wages make up between 45% and 60% of household income in Brazil, between 60% and 80% in China (ILO 2015c), and between 20% and 65% in South Africa (Finn 2015). In many countries, wage compression between those who are in work has been the most important factor in reducing inequality. For example, between 2002 and 2012, changes in the wage distribution accounted for 87% and 72% of the reduction in inequality in Argentina and Brazil, respectively, with employment gains accounting for the remainder (ILO 2015c, p. 33). Minimum wages have been found to be particularly important in spurring the necessary wage increases for low-wage workers.

4.2.1 The formal sector

In their study of nineteen Latin American and Caribbean countries between 1997 and 2001, Kristensen and Cunningham (2006) observed that minimum wages increased wages at the bottom end of the wage distribution and lifted earnings for both formal and informal sectors, although these effects were not uniform across low-wage workers. This confirmed the equalising effects of minimum wages, with minimum wages positively altering the wage distribution in the formal sector in ten out of the nineteen countries. A more recent comparative analysis by Maurizio and Vazquez (2015) of Argentina, Brazil, Chile, and Uruguay found positive effects of minimum wages on full-time salaried workers in all four countries between 2003 and 2012. In Figure 17 we see that the ratios of earnings between low- and middle-income wage earners (p50/p10) fell dramatically, as did the Gini coefficients, in tandem with large increases to minimum

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32 This range is large (and relatively low) in South Africa due to a high incidence of unemployment and the provision of social grants to very poor individuals and households.

33 The nineteen countries comprise Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. The countries where minimum wages affected the formal-sector wage distributions were Brazil, Colombia, Chile, Ecuador, Guyana, Nicaragua, Panama, Paraguay, Peru, and Venezuela.
wages; the p90/p10 ratio also falls but less dramatically in Brazil and Chile. In Brazil and Argentina, where minimum wages rose by 130% and 200%, respectively, minimum wages explain 85% and 32% of the decline in their respective Gini coefficients (Maurizio 2016). In Chile, where the minimum wage rose less dramatically, the fall in the Gini coefficient was much more muted (dropping by just 6%). No negative employment effects were observed.

In Mexico, like the United States, the erosion of the real value of the minimum wage increased inequality. Between 1989 and 2001 the national minimum wage declined by 50% relative to median earnings, accounting for most of the rise in inequality in the bottom end of the distribution (Keifman and Maurizio 2012, Rani and Ranjbar 2015). According to data from ECLAC (see Marinakis 2015), Mexico is the only country in the region where the minimum wage is significantly below the poverty line (for an individual). Indeed, poverty amongst workers has increased since 2013.

**Figure 17: National minimum wages and inequality in four Latin American countries (2000-2012)**

There is further evidence from elsewhere in the developing world. In Russia between 2005 and 2009, the increase in the real minimum wage contributed to 50% of the compression of the lower half of the wage distribution. This effect was higher for women for whom it accounted for 75% of the compression compared to 30% for men (Lukiyanova 2011). In India, greater compliance with minimum wage legislation – from a compliance rate of 32% in 2004/05 to 61% in 2009/10 – gradually increased the marginal effect of the minimum wage. In 2004/5 the effect of the minimum wage

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34 To measure lower-tail inequality the author uses the log-wage differential between 50th and 10th percentiles.
on low and high earners was similar, with a 1% increase in the effective minimum wage leading to a 0.33% increase in wages at the 20th percentile and a 0.35% increase at the 80th percentile. However, by 2009/10 the same increase in the minimum wage resulted in a 0.47% and 0.41% increase for the 20th and 80th percentile, respectively, indicating an inequality-reducing effect (Rani and Ranjbar 2015, p. 16). Similar inequality-reducing effects are observed in Indonesia and China (Rama 2001, Chun and Khor 2010, Lu 2015).

Research also indicates that the effect of minimum wages on inequality is greater in developing countries than in developed countries (Maloney and Mendez 2003, Rani and Ranjbar 2015). For example, in Colombia the change in the real minimum wage affects real wages up to four times the value of the minimum wage. This means that the rise in the real minimum wage translates into higher wages not only for the workers whose earnings are concentrated near the minimum wage level, but also for those earning significantly more. In comparison, in the United States this effect dies off faster, at between two to three times the minimum wage (Maloney and Mendez 2003).

Box 1: Brazilian case study

Brazil has achieved impressive results in reducing inequality over the past twenty years. According to estimates by Ferreira et al. (2014), between 1995 and 2012 wage and income inequality in Brazil (measured by Gini coefficients) declined by 20% and 12%, respectively, and the ratio between earners at the 90th and 10th percentiles (the 90/10 ratio) dropped by almost 40%. The most rapid decrease in income and wage inequality was observed between 2003 and 2012, during which real mean and median earnings increased by 28% and 46%, respectively (median wages increasing by a greater amount than average wages indicates lower wages growing faster than higher wages). In this period the decline in household-income inequality accelerated, falling from 0.58 in 2003 to 0.52 in 2012. At the same time, wage inequality dropped from 0.47 to 0.40 (Ferreira et al. 2014, p. 5). The growth in earnings and decline in inequality were associated with large and rapid increases in the national minimum wage, which rose by 130% between 2000 and 2013 (Maurizio 2016).

Inequality fell due to both a reduction in wage inequality and increases in non-wage income for lower-income earners. Ferreira et al. (2014) estimate that the fall in wage-income inequality contributed between 40% and 55% to the decline in overall inequality. An additional 35% to 50% of the fall in inequality can be attributed to non-labour programmes adopted by the government – the most prominent being the Bolsa Familia, a scheme via which access to conditional social grants was expanded – with demographic changes accounting for the final 10%.

In Brazil the national minimum wage consistently achieved stronger wage growth at the bottom end of the wage distribution (Rani and Ranjbar 2015). It also helped to decrease inequality between demographic groups, ensuring rising real wages for the most vulnerable groups in the labour market – 16- to 19-year-olds, female workers, and those with only primary education or no education – groups that are over-represented among minimum wage earners (Kristensen and Cunningham 2006, Melo 2015).
4.2.2 The informal sector

Dual labour-market models have been used to argue that the introduction of minimum wages expands employment and reduces wages in the informal sector due to the displacement of workers from the formal sector (Khamis 2008). This is contradicted both by the mixed evidence on employment effects discussed in Section 5, and by research from developing countries that finds positive effects from formal-sector minimum wages on average wages in informal sectors. The reason for this ‘spillover effect’ is close interlinkages between the two sectors. Apart from the supply of labour, the formal and informal sectors are also linked through demand for informal-sector goods and services (Maloney and Mendez 2003). Thus, increasing wages in the formal sector can increase demand in the informal sector and hence increase employment and wages in the informal economy. In addition, minimum wages in the formal sector can establish a higher reservation wage – the lowest wage that workers are prepared to accept – in the economy as a whole. There is strong evidence of the existence of the so-called ‘lighthouse effect’, through which a national minimum wage can serve as an indicator of a fair wage in the informal sector and thus as a tool for increasing the bargaining power of workers (Saget 2001, Boeri et al. 2010, Belser and Rani 2015, World Bank 2015).

This lighthouse effect was confirmed by a number of Latin American country studies (see Neri et al. 1998, Amadeo et al. 2000, Maloney and Nuñez 2000, Fajnzylber 2001, Maloney and Mendez 2003). Kristensen and Cunningham (2006), for example, in their study of nineteen Latin American countries (see above) demonstrated that minimum wages affected the wage distribution in the informal sectors in fourteen of these countries; four more than the ten in which the formal sector was affected.35 A study of ten developing countries by Belser and Rani (2015) shows that average wages in the

35 These fourteen countries were Bolivia, Brazil, Colombia, Chile, Ecuador, El Salvador, Guatemala, Guyana, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela.
informal sector increased between 0.33% to 18% due to the institution or increase of minimum wages; South Africa and Mali demonstrated the highest increase.\(^{36}\) Spillover and lighthouse effects were observed by Keifman and Maurizio (2012) in Argentina, Brazil, Chile, Mexico, Uruguay, and Paraguay; and in Nicaragua by Alaniz et al. (2011).

Overall, the evidence suggests that the movement of minimum wages in the formal sector determines the direction of average earnings in the informal sector, and in some cases the impact on the informal sector can be more significant than on the formal sector (Maloney and Mendez 2003, Rani and Ranjbar 2015).

4.2.3 Poverty reducing effects of the minimum wage

The ability of the minimum wage to affect the incidence of poverty depends on the composition of the labour market and the proportion of minimum-wage earners living in poor households. Scepticism over minimum wages as an anti-poverty instruments is influenced by studies of advanced countries, where most of the poor (the jobless and pensioners) are not part of the labour market (Rubery 2003). As minimum wages and poverty lines are much closer together in developing countries and there is a large working-poor, the impact on poverty reduction can be more significant. In their classic work on minimum wages in developing countries, Lustig and McLeod (1996) use cross-national evidence from twenty-two developing countries and find higher minimum wages are associated with lower levels of poverty. They observe that minimum wages are better predictors of change in the incidence of poverty than average wages.

A range of developing-country case studies, confirm the correlation between minimum wages and lower rates of poverty. These include: Honduras (Gindling and Terrell 2010); India, where a simulation showed that if minimum wages were expanded to all low-wage earners, poverty would be reduced by seven percentage points (Belser and Rani 2015); Thailand and the Philippines, where a 1% increase in the minimum wage reduces poverty by 0.46% (Saget 2001); and Nicaragua, where the relationship was dependent on intra-household wage sharing (Alaniz et al. 2011, see also Arango and Pachón 2004).

Whether minimum wages are poverty-reducing also depends on where poverty lines sit in relation to the wage distribution and which parts of the wage distribution are most affected by minimum wages. If set correctly, minimum wages predominantly raise the wages of low-income earners. However, in a small number of cases (predominately Columbia) it is argued that minimum wages have benefited earners in the middle or upper end of the distribution rather than those at the bottom. Also, if set too low – as in Mexico – minimum wages do not change the likelihood of moving out of poverty (Cunningham and Siga 2006 in Gindling 2014).\(^{37}\) Overall, minimum wages are poverty reducing. This said, common definitions of ‘poverty reduction’ may not be particularly useful in understanding the effects of minimum wages, as poverty reduction basically involves moving from just below a (more or less arbitrary) ‘poverty line’ to just above.

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\(^{36}\) Countries included Brazil, Costa Rica, India, Indonesia, Mali, Mexico, Peru, Philippines, South Africa and Vietnam.

\(^{37}\) In Colombia, increases in minimum wages between 1984 and 2001 had a greater redistributive effect on household incomes of those above the 20\(^{th}\) percentile. However, given that 50% of families in Colombia were below the poverty line, these changes in the minimum wage had poverty-reducing impacts (Arango and Pachon 2004).
What is critical is that minimum wages raise incomes for low-income households irrespective of whether a family remains below the poverty line, or is already above the poverty threshold; in this way welfare is improved even if ‘poverty’ is not reduced. This is precisely the outcome we see in the statistical modelling undertaken in Section 6.3.

In South Africa, sectoral minimum wages do not guarantee that workers are able to move out of poverty because many of them are set well below household poverty lines. In 2007, two thirds of households in which all workers were covered by sectoral determinations were either poor or ultra-poor. At the individual level this accounts for approximately 2.2 million people (DPRU 2010:42) (this study uses a very low poverty line and so underestimates the number of working poor).38 According to our working-poor line, 54% of full-time workers in South Africa, or 5.5 million workers, can be considered working poor, earning too little to bring them and their dependents above the poverty line.

4.3 Conclusion

Both the developed- and developing-country literatures demonstrate the inequality-reducing effect of minimum wages. The scale of the effect remains debated and depends on the effects on employment and the earnings of those in the lower half of the wage distribution. In the overwhelming majority of cases, effects on employment are slight (see Section 5) and income gains from minimum wages are higher in the lower half of the wage distribution. Such gains are more far-reaching in developing than developed countries and occur in both the formal and informal sectors.

The poverty-reducing impacts of the minimum wage stem from the fact that the working poor account for large portions of the working population in developing countries. Increasing wages in Latin America was recognised by the World Bank (2015) to be the main driver of poverty reduction between 2003 and 2013. As demonstrated, in a large number of countries, rising wages were primarily due to increases in minimum wages.

The ills of poverty and inequality interact with one another, with a growing consensus that both retard overall economic growth and social development (Cingano 2014, Dabla-Norris et al. 2015). There is no research that directly compares the poverty- and inequality-reducing effects of national, sectoral and regional minimum wages. However, as in the case of India, there is evidence to suggest that the wider the coverage of the minimum wage and the higher the level of compliance, the greater the impact on poverty and on inequality. National minimum wages are associated with greater coverage and higher compliance. The existing evidence therefore suggests that increasing the level and expanding the coverage of minimum wages, including via implementing a national minimum wage, can be an important labour-market intervention to tackle poverty and inequality.

38 Using the R322 per month poverty line. When using the R174 per month the number of poor individual declines to 1.4 million.
5 Literature review: the impact of minimum wages on employment

A considerable volume of evidence exists regarding the relationship between minimum wages and employment. The traditional ‘competitive market’ theory holds that an increase in the price of labour will lead to a decrease in the demand for the labour and hence greater unemployment. Over the last two decades this premise and perception of a universal, uniform, and negative relationship between wages and employment has been challenged. Overwhelmingly the impact of the institution and increase of minimum wages on employment has been found to be small and often statistically insignificant, and sometimes positive. The question of the impact of a minimum wage in a given context is therefore an empirical one. The empirical evidence suggests that different country contexts matter, and that developing economies may respond to minimum wages differently to developed ones. Furthermore, the impact may vary across industries and regions, as well as across different labour categories (age, gender, skilled/unskilled, private/public, formal/informal etc.).

The limited employment effects of minimum wages should not be surprising given that we know that: a) firms have multiple cost inputs not just wage costs; b) firms adjust to wage increases in a variety of ways including productivity increases, slight price rises, wage compression and reduced profit margins; c) reducing the number of employees is often not the most efficient manner of cutting costs while maintaining levels of output and service; and d) higher wages can spur greater spending and demand for goods and services in the economy.

Until the 1990s, the prevailing research argued negative employment impacts from minimum wages. Card and Krueger’s (1993) seminal study on the fast food industry in New Jersey and Pennsylvania marked a turning-point and beginning of the era of ‘new minimum wage research’ (see also Card 1992a, 1992b, Card et al. 1993, 1994, Card and Krueger 1995b). Their study found “no evidence that the rise in New Jersey’s minimum wage reduced employment at fast-food restaurants in the state” (Card and Krueger 1993, p. 34). Neumark and Washer (1995) challenged these results, instead showing a 4.6% decline in employment in New Jersey; it is widely held that “Card and Krueger had the better of this exchange” (Belman and Wolfson 2014b, p. 4). Broecke (2015, p. 1) notes that there were two important conclusions to emerge from the new minimum wage literature: “The first is that most effects appear to be small and that the ‘debate over the employment effects of the minimum wage is [essentially] a debate of values around zero’ (Freeman, 1996). The second is that the sign of the effect, if significant, appears often to boil down to a choice of methodology.” As Schmidt (2013, p. 2) notes: “The weight of that evidence points to little or no employment response to modest increases in the minimum wage.”

Our review of the international evidence draws from a series of recent meta-regression analyses (MRAs) that compile the results of individual studies in order to offer an

39 This differentiation is explored in detail in a working paper as part of this National Minimum Wage Research Initiative (Takala-Greenish and Sipula forthcoming)
40 Despite this, Neumark and Washer have maintained their position of predominant aggregate negative employment impacts of minimum wages, including more recently for developing countries (Neumark and Wascher 2007); the weight of evidence, however, (discussed below) remains against them.
aggregate estimation of the relationship between minimum wages and employment. These MRAs correct for methodological biases and thus offer a rigorous manner of assessing a particular body of evidence. This differs from a straightforward compilation and averaging of employment elasticities – measures of the extent to which a change in wages affects employment – from different studies (as was done in DPRU 2016) which does not appropriately aggregate the evidence. When reporting the results of the meta-analyses we see the significant and important differences between straightforward ‘unadjusted’ or ‘raw’ averages (of the studies included) and the outcome after applying the corrections inherent in the meta-analysis methodology. We review these methodological choices in the accompanying box.

It is also worth noting that much of the existing literature is limited in that it concentrates on studying the employment effect of a change in minimum wages on a specific subsector or population. This likely misses the macroeconomic consequences of rising wages, including stimulus from increased aggregate demand. A minimum wage rise could very likely cause a shift in employment between sectors in the economy, which might see aggregate employment rise or remain at the same level even if there is a decline in a particular sector. The meta-analyses, while appropriating aggregating the individual studies cannot correct for this limitation.

Box 2: A note on methodology

It is worth elaborating on our decision to draw, in the main, from the recent wave of meta-analyses. We also contrast this with other approaches taken, specifically that within the DPRU’s (2016) *Investigating the feasibility of a national minimum wage for South Africa* as this is the other major study on the potential implementation of a national minimum wage in South Africa. On an individual level the nature and robustness of the methodology employed in each study should be evaluated against standard economic and econometric best practice (this is not discussed here but see Belman and Wolfson 2016). Regarding the synthesising of the body of evidence, in order to determine common effects, a ‘new new wave’ of minimum wage research has emerged using meta-analysis, as Schmitt (2013, p. 4) explains:

“Meta-studies are “studies of studies” that use a set of well-defined statistical techniques to pool the results of a large number of separate analyses. Meta-study techniques effectively increase the amount of data available for analysis and can provide a much sharper picture of statistical relationships than is possible in any individual study.”

Meta-regression analysis (MRA), synthesising previously published regressions analyses (which determine correlation or causation between variables), has therefore become the gold standard for understanding the body of minimum wage research. A straightforward compilation of employment elasticities – the extent to which a change in minimum wages causes a change in employment – is inappropriate for aggregating the available evidence (this was the approach taken in DPRU 2016). This is because combining the data faces three common problems. First, not all studies are measuring the same thing nor using the same methodology.

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41 If the elasticity is -0.1 then a 10% increase in the wage will results in a 1% fall in employment. If the elasticity is positive then an increase in wages results in an increase in employment.
or type of data. Second, “estimates are not all created equally” and should be appropriately weighted, including for precision (Belman and Wolfson 2014a, p. 147). Third, a large body of evidence points towards significant selection bias amongst published minimum wage research: authors may be more interested in reporting substantial statistically significant effects and journal editors more keen to publish them, and study results may be expected to fit within prevailing economic ‘wisdom’ (see Doucouliagos and Stanley 2009, Stanley and Doucouliagos 2012, Belman and Wolfson 2014a).

MRAs, by applying various weightings and corrections, are able to overcome these pitfalls in aggregating the data. This is not an obscure or trivial technical point. In Doucouliagos and Stanley (2009) the raw or unadjusted average (prior to the meta-analysis) of the 1 474 elasticities included is a statistically significant -0.19, meaning an increase in the minimum wage has a small adverse employment effect. However, when the MRA corrects for selection bias no adverse employment effect remains. Not applying such corrections is one of a number of methodological weaknesses in the calculation of the mean and median elasticities by DPRU (2016). This would explain why the reported means and medians (particularly for the high-income country sample, but also for the sample of low- and middle-income countries) are so much larger (more negative) than in all recent meta-analyses.

In DPRU (2016) it is also not clear how the elasticities that were used to calculate the mean and median elasticities were selected from the multiple elasticities reported in each study. In addition, it is not explained in the main body of the report whether the studies referred to particular subpopulations, for example teenagers, which some evidence suggests suffer from larger negative employment impacts. For both these reasons it is possible that certain groups that are more (or less) affected by minimum wages may skew the results reported by DPRU. Finally, the DPRU (2016) only uses studies which report ‘statistically significant’ results, that is results in which a change in the minimum wage has a statistically discernable impact on employment. This is also problematic in that the absence of a statistically significant relationship between minimum wage increases and change in employment is itself instructive; an exclusion of non-statistically significant studies biases the sample.

For these reasons we resist presenting our own aggregation of the available evidence; instead we review the findings of recent meta-analyses. Takala-Greenish and Sipula (forthcoming), in an associated working paper, give a descriptive review of available developing country studies with the purpose of highlighting the heterogeneity of the employment impacts. This is also discussed below.

### 5.1 Aggregate evidence on employment effects from meta-analyses

The majority of minimum-wage research has been conducted in the United States. Within the US there has historically been a strong focus on teenagers and workers in the hospitality and restaurant sectors, groups with high proportions of minimum-wage workers and thus potentially sectors in which the effect of minimum-wage increases is felt strongly. The meta-analyses discussed below are summarised in Table 19 in Appendix A. In the third and fourth columns, the table gives the raw (or unadjusted) average of the estimates included and the associated impact that a 10% increase in the minimum wage would have. Some studies also summarise the number of estimates that
are positive, negative or zero (a ‘sign analysis’), this is given in column five. The rest of the columns report the results from the meta-analyses.

Doucouliagos and Stanley (2009) incorporate 64 US minimum-wage studies focused on teenagers.\(^{42}\) The raw (uncorrected) average elasticity is -0.19 (a 10% increase in minimum wages would cause a 1.9% fall in employment). However, “once the effects of publication selection are filtered out, an adverse employment effect is not supported by this large and rich research record on the employment effects of minimum-wage regulation” (2009, p. 407). The only statistically significant estimate, the reliability of which they doubt, indicates a doubling of the minimum wage would cause only a 1% fall in teenage employment; they consider this to have “no meaningful policy implications” (2009, p. 416).\(^{43}\)

Boockmann’s (2010) meta-analysis moves beyond the United States with 55 studies focusing on 15 industrial countries. Their ‘sign analysis’ shows that only one third of the estimates are statistically significant and negative. Boockmann does not report an aggregate result, instead focusing on the heterogeneity of studies and the key variables that influence whether there is a negative employment impact or not (discussed below). Belman and Wolfson (2014a) have undertaken one of the most sophisticated recent meta-analyses focusing on 23 developed country studies. Their meta-analysis yields a statistically significant average (precision-weighted) employment elasticity of -0.07; they consider this to indicate no meaningful impact on employment.

Leonard et al. (2014) focus specifically on the UK.\(^{44}\) The raw average wage elasticity is -0.19, meaning a 10% increase would result in a 1.9% decline in employment (the raw average including partial correlation coefficients is actually positive at 0.009). The meta-analysis, however, yields a partial correlation of -0.005. These numbers are so small as to “represent practical inconsequentiality” and be “of no practical importance” (2014, p. 505); it is found, therefore, that the minimum wage “has virtually no effect, neither positive nor negative, on employment” (2014, p. 503).

Cheletos and Giotis (2015) cover studies from both developed and developing countries, with 18 of the 77 studies focusing on the latter. Almost two thirds of the estimated elasticities are negative with a raw average elasticity of -0.18. However, like in Doucouliagos and Stanley (2009) there is strong evidence of selection bias and once the meta-analysis accounts for this “no genuine effect of minimum wages on employment measures” is found (2015, p. 14). Importantly, the results also do not change when controls for the US and Europe are added (2015, p. 28), indicating that the results are also relevant to the other countries included, many of which are developing countries.

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\(^{42}\) Doucouliagos and Stanley (2009) also replicate Card and Krueger’s original meta-analysis (1995a) (not discussed here given that it is more than twenty years old) but with an improved methodology, and confirm their finding of no employment effect.

\(^{43}\) In Doucouliagos and Stanley (2012) they include extra controls and confirm these findings.

\(^{44}\) Leonard et al. (2014) use 236 estimated minimum wage elasticities and 710 partial correlation coefficients. “The partial regression [i.e. to produce partial correlation coefficients] … is used in the context of multiple linear regression (MLR) analysis and gives the amount by which the dependent variable (DV) increases when one independent variable (IV) is increased by one unit and all the other independent variables are held constant.” (Abdi 2003, p. 795/796)
Nataraj et al. (2014) attempt to fill a deficiency in the literature by focusing specifically on low income countries (LICs) and countries which were recently LICs. They identify a very small sample: two studies for LICs (Kenya and Bangladesh) and seven from recent LICs (four from Indonesia and one each from Ghana, Honduras and Nicaragua). Using various subsets of the data, their study finds an overall neutral aggregate impact on employment. Broecke et al. (2015) conduct a more robust analysis using ten major emerging economies – Brazil, Chile, China, Colombia, Indonesia, Mexico, India, Russia, South Africa, and Turkey (their meta-analysis uses the first six). The overall relationship is very marginally negative – a 100% increase to the minimum wage results in only a 0.03% reduction in employment – and loses statistical significance when controls are included. They conclude that “minimum wages are found to have very little, or no, effect on overall employment in emerging economies” (2015, p. 3).

5.2 Disaggregated evidence on employment effects from meta-analyses

While the aggregate evidence indicates the overall neutral impact of minimum wages on employment, we do not argue here that this means there is uniformly no impact. To the contrary, there is ample evidence and agreement that an increase in minimum wages is likely to result in a mix of negative, positive, and neutral effects, differentiated across labour groups, sectors, types of employers, forms of employment, and regions, amongst other categories, although aggregate evidence suggests minimal combined effects. All of the meta-analyses discussed above add ‘control variables’ to try and distinguish whether particular characteristics of the studies are driving the results and if any of these are more prone to employment effects. The heterogeneity revealed, is shown in Table 20 in Appendix A. In addition to the variables we discuss, methodological differences between studies have been shown to influence the results, discussion of this can be found in Takala-Greenish and Sipula (forthcoming).

Many studies attempt to distinguish between different types of workers. In particular age, gender, and skill levels have received significant attention. Boockmann (2010) (fifteen industrialised countries) finds a statistically significant negative impact (an elasticity of -0.60) for low-skilled workers. Nataraj et al. (2014) also find a more negative (-0.071) but very small impact on low-skilled workers. Similarly, in Broecke (2015) (ten emerging markets) low-skilled workers are very marginally more negatively affected (an elasticity of -0.007 only significant at the 10% level), as are low-wage workers (-0.008), but these effects are so small as to be meaningless. In Boockmann (2010) low-wage workers suffer losses no greater than other workers.

It is ambiguous whether there are greater or lesser employment effects for female workers. Chletos and Giotis (2015) find a very marginal greater negative impact (statistically significant elasticity of -0.039) and Nataraj et al. (2014) a slightly more pronounced negative impact (statistically significant elasticity of -0.12). However, Doucouliagos and Stanley (2009), Boockmann (2010), and Broecke (2015) find no significant negative impact for female workers. Similarly, the findings for younger workers are conflicting, with two meta-analyses that find a statistically significant impact (Broecke et al. 2015, Chletos and Giotis 2015) and three finding little or no differentiation for younger workers (Boockmann 2010, Belman and Wolfson 2014a, Leonard et al. 2014).

The critical conclusion from Nataraj et al.’s (2014) study on seven low-income countries is that, despite neutral aggregate impacts, there is a small, negative,
statistically significant impact on formal sector employment; a 10% increase in minimum wages leads to a reduction in formal employment of approximately 0.8%. However, there is a corresponding statistically significant increase in informal sector employment. Contrary to this, Broecke’s (2015) descriptive review, sign analysis, and meta-analysis of up to ten emerging economies (including South Africa), finds that minimum wages are associated with increases in formal employment and decreases in informal employment (potentially workers shifting from informal to formal work), although the effects are “miniscule” (2015, p. 3). They consider their findings to be “remarkable, and very much in line with the growing consensus around the impact of minimum wages on employment in more advanced economies” (2015, p. 22). Overall, “there is very little evidence that increases in minimum wages lead to more informality” (2015, p. 22).

Industries are only differentiated in four of the meta-analyses. Employment in the US in the food, retail, and agricultural sectors (in Doucouliagos and Stanley 2009) suffers no worse than employment overall. This is significant given the higher concentration of minimum-wage workers in these sectors. To the contrary, employment in the home care and food industries is more negatively impacted in the UK (Leonard et al. 2014). In a mix of eighteen developed and developing economies the retail, food, and manufacturing sectors tend to show slight statistically significant negative impacts (Chletsos and Giotis 2015) as does “eating and drinking places” in Belman and Wolfson (2014a). Industry size is only investigated in Boockmann (2010) and shown to have no impact.

Interestingly, in all the meta-analyses that investigate the period over which the studies were conducted (Doucouliagos and Stanley 2009, Boockmann 2010, Leonard et al. 2014, Broecke et al. 2015, Chletsos and Giotis 2015) negative effects of minimum wages on employment were scarcer in more recent the studies. Doucouliagos and Stanley (2009, p. 421) find that “no practically significant, adverse employment effect [for teenagers] remains for the US labour market in the twenty-first century”. This could have occurred because the ‘new minimum wage research’ allowed space for more positive studies, or due to advances in methods and new (or better) data sources (Broecke et al. 2015, p. 15). Also important is that studies focused on the longer term, indicate positive impacts of minimum wages on employment (Broecke et al. 2015, Chletsos and Giotis 2015).

### 5.3 The South African evidence on employment effects

There is limited research on the impact of minimum wages in South Africa, with six sectoral determinations studied. The results from Bhorat et al. (2013, 2013) are summarised in Table 15 and show that in five of the six sectors – retail, domestic work, forestry, taxi, and private security – the institution of a minimum wage had no statistically significant impact on employment. In agriculture on the other hand there was a statistically significant decline in employment. Dinkelman and Ranchhod (2010) likewise show no negative impact on employment or hours worked for domestic workers and strong evidence of an increase in wages; Hertz (2005) finds a small disemployment effect. In Bhorat et al. hourly wages rose in five of the six sectors (only forestry shows no statistically significant rise) while hours worked fell marginally in retail and private security. Overall, workers were better off in the majority of sectors and no worse off in any. On aggregate, employment in the sectors studied rose over the period studied (DPRU 2010).
Table 15: Summary of South African employment studies

<table>
<thead>
<tr>
<th>Employment elasticity*</th>
<th>Retail</th>
<th>Domestic work</th>
<th>Forestry</th>
<th>Taxi</th>
<th>Security</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistically significant</td>
<td>-0.0002</td>
<td>-0.0005</td>
<td>-0.0001</td>
<td>0.00005</td>
<td>0.0001</td>
<td>-0.0418</td>
</tr>
<tr>
<td>Hourly wage elasticity**</td>
<td>0.0568</td>
<td>0.0698</td>
<td>-0.0079</td>
<td>0.0152</td>
<td>0.272</td>
<td>0.1751</td>
</tr>
<tr>
<td>Statistically significant</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Hours worked elasticity***</td>
<td>-1.203</td>
<td>-0.325</td>
<td>0.0757</td>
<td>-0.789</td>
<td>-1.741</td>
<td>0.106</td>
</tr>
<tr>
<td>Statistically significant</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Better overall based on monthly income****</td>
<td>Yes</td>
<td>Yes</td>
<td>No change</td>
<td>No change</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * Wage gap*Post - Specification I  ** Wage gap*Post - Specification III  *** Sector*Post - Specification I  **** As reported in study

Source: Bhorat et al. (2013, 2013)

5.4 Explaining the findings – economic theory and empirical reality

These findings, of minimal or no employment impacts in response to higher wages are at odds with the predictions of many economic models. However, they are in line with intuitive understandings of the economy in which firms face significant uncertainty from a range of quarters and multiple cost pressures leading them to adjust to higher wages through a range of channels. We see, as summarised in Table 16, that firms most commonly adjust to higher wages through productivity increases due to organisational efficiency and efficiency wages, reductions in wages of higher earners (wage compression), and small price increases. In addition there is likely to be a demand stimulus from higher wages.

The dominant neoclassical ‘competitive market’ framework underpins the prevalent assumption of inevitable employment losses resulting from higher wages. Neoclassical economics foregrounds the role of prices in the economy and conceives of labour markets as akin to any other commodity market, subject to the same universal principles of analysis: when prices go up, demand goes down. Thus the minimum wage has no beneficial role to play in the labour market. If set below the ‘equilibrium’ wage rate, minimum wages would be ineffective as the market wage would be higher. If set above the market wage it is perceived to distort the self-equilibrating market mechanism, lower the demand for labour and increase supply, and generate

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45 The price at which labour supply meets demand represents the equilibrium, the point at which employers and employees are both willing to conclude a transaction. Increased pressure to allow for labour market flexibility as a source of international competitiveness draws on the supremacy of the market mechanism and the potential existence of a stable equilibrium.
unemployment. This would lead to a misallocation of labour and other factors of production between industries and a distortion of demand for other products.

In this theoretical paradigm, firms can only respond negatively to higher wages. The ‘channels of adjustment’ include: reduction of employment or hours worked, reduction in non-wage benefits such as health insurance or retirement plans, reduction in training, and shifts in the composition of employment (Schmitt 2013, p. 12). Regarding hours worked and in-firm training the evidence is inconclusive and points towards little or no effect (Neumark and Wascher 2008, Dube et al. 2010, Belman and Wolfson 2014a). Even if hours of work fell, higher wages are likely to leave workers better off, either due to higher incomes, or shorter workdays (as was the case in South Africa). There is also a strong argument that training may increase in order to raise productivity (see below). The empirical evidence is even thinner for a possible reduction in non-wage benefits. Simon and Kaetner’s (2004) review reveals very few studies find such an impact and their own work shows “no discernible effect on fringe benefits” (2004, p. 67).

A competitive market framework also predicts firms passing on costs in the form of higher prices. Reviews by Lemos (2008) and Neumark and Wascher (2008, p. 248) find increases to overall prices to be small, with Lemos finding that a 10% increase in minimum wages leads to a 0.4% increase in overall prices. Lemos’ conclusion is that “policy makers can use the minimum wage to increase the wages of the poor, without destroying too many jobs or causing too much inflation” (Lemos 2008, p. 208). More prosaically, the lack of employment effects may be because they are “too difficult to detect and/or are very small” (Doucouliagos and Stanley 2009, p. 423) or due to endogeneity, that is, it is conceivable that “minimum wage tends to be raised only when employment is high or expected to grow” (Leonard et al. 2014, p. 506).

The stringent assumptions that underpin the competitive market paradigm have been challenged and relaxed. An alternative ‘institutionalist’ view still operates within a neoclassical paradigm but acknowledges a range of ‘market imperfections’ allowing for a broader range of adjustment mechanisms, including those in which higher wages may increase employment. Central to this is the possibility of improvements in productivity in response to higher wages. One element of this relates to “greater

46 Within competitive market theory (involuntary) unemployment is only possible as a result of ‘excessively high’ wages and their downward inflexibility; this is one of a number of highly restrictive, and implausible, assumptions necessary for the theory to hold. Others include: “(1) workers are perfectly informed about wages across firms and perfectly mobile i.e. no transaction costs; (2) labour markets are homogenous, with labour represented by a ‘representative individual’; (3) nominal wage change leads to real wage change; (4) individual workers are price takers; and (5) there is perfect substitutability between labour and capital (Herr et al, 2009). Differences between work or workers, knowledge of these differences, variation in negotiating ability or position, or other asymmetric information are held to be negligible. Variations in the nature of the work, or in the historical, political, or institutional setting for a firm, industry, or economy, are perceived not to matter. These assumptions ensure that firms and individuals always act in the same predictable way and also ensure mathematical tractability (Fleetwood, 2006).” (Takala-Greenish and Sipula forthcoming) They make little empirical sense.

47 Key features include: “rejection of a well-defined downward sloping labor demand curve; labor markets that are imperfectly competitive, institutionally segmented, socially embedded, and prone to excess supply; and the importance of technological and psycho-social factors in firm-level production systems and internal labor markets … as determinants of cost and productivity” (Katz 1986 quoted in Schmitt 2013, p. 12).
managerial effort on productivity-enhancing activities, including the reorganization of work, setting higher performance standards, or demanding greater work intensity” (Schmitt 2013, p. 13). Some cursory evidence supports this (for instance Hirsch et al. 2011) and it may be particularly relevant in South Africa where the apartheid legacy of cheap labour meant shop-floor management inefficiency, poor training and low skills (Joffe et al. 1995).

A second element is ‘efficiency wages’ where higher wages may spur workers to work harder, independently of any actions employers may take, thus raising productivity. Higher wages may also attract higher productivity workers (see Dickens et al. 1994) and reduce turnover as employees work harder in order to keep a job they prize more. Dube et al. (2010, p. 2) find “striking evidence” for the latter. A meta-analysis of the efficiency wage research shows robust and clear evidence that these effects take place (Peach and Stanley 2009). Minimum wages therefore appear to impact productivity positively. In a systematic analysis of eighteen OECD countries between 1979 and 2003, Bassanini and Venn (2007) estimate that a 10 percentage point increase in the minimum wage-to-median wage ratio was associated with an increase of between 1.7 and 2 percentage points in productivity levels (see also Nickell and Layard 1999, Mayneris et al. 2014, Rizov et al. 2016). This may, however, be driven by either the efficiency gains described above or more capital-intensive production, with very different implications for employment (Broecke et al. 2015, p. 16).

The institutionalist approach also highlights the importance of considering the consequences of monopsony labour markets, where an employer has disproportionate power to set wages and therefore sets them below the ‘market price’. Minimum wages may therefore not be raising wages above the market price (for a more detailed discussion see Dickens et al. 1994). In monopsony markets, employers habitually operate with unfilled vacancies to avoid paying higher wages that would more easily attract workers. In such circumstances enforcing higher wages, through minimum wages, can actually raise employment.

Some alternatives to the neoclassical framework have also been advanced. Importantly, these do not presuppose the possibility of perfectly functioning markets in which supply and demand neatly adjust to each other as wages change. Critical scholars (see Fine 1998) have drawn attention to how a wide range of variables (not simply wage costs) shape employment levels and how the response to higher wages is also shaped by inter- and intra-class distributional struggles.

Such approaches allow us to understand how firms may react to higher minimum wages via wage compression, by cutting the earnings of higher-wage workers. As we noted in the previous section on the inequality-reducing impact of minimum wages, minimum wages directly reduce inequality, and there is also evidence that pay rises or bonuses for higher-earning workers are curtailed in the wake of minimum wage

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48 In the institutional framework, firms are “assumed to often operate below their peak efficiency because it is costly to managers and to workers to identify, implement, and maintain practices that continuously maximize efficiency”, in contrast to the competitive model where “firms are assumed already to be operating at peak efficiency” (Schmitt 2013, p. 13).

49 Leonard et al. (2014, p. 513) stress that: “The efficiency wage elasticity only gets stronger when researchers control for the simultaneity between wages and productivity; thus, the observed support for EWH in the research literature cannot be dismissed as the artefact of reverse causation or the marginal productivity theory of wages.”
increases (Hirsch et al. 2011). This is highly relevant in the South African context as reducing inequality is a primary motivation behind the institution of a national minimum wage. Firms may also absorb extra costs by accepting lower profit margins. This was found to (strongly) be the case in the UK by Draca, Machin, and Van Reenen (2011). This is also relevant to South Africa given that average profit margins for South African firms are well above their emerging market peers, as noted by the IMF (2013).

Finally, significant increases to aggregate demand have been shown to occur as a result of higher wages for low-income earners; Alonso (2015) shows how in the US minimum wages boost consumption. Importantly, Schmitt (2013, p. 20) notes that this is particularly the case when the “the economy is in a recession or operating below full employment” as “a minimum-wage increase may also increase demand for firms’ goods and services, offsetting the increase in employer costs”. This fits within a broadly Keynesian paradigm in which aggregate demand (rather than costs) determines levels of investment, production, and output, and hence employment (Herr et al. 2009, Rani, Belser, and Ranjbar 2013); wage increases may be negative for an individual firm but wage rises may be good for firms in general if the resultant increases in consumption raise economic activity and aggregate profit. There is evidence that, through these increases in economic activity, minimum wages also raise GDP growth: Askenazy, for example, observes a 0.2% per annum benefit (see also Cahuc and Michel 1996). In the South African case, Section 6 shows that such a ‘virtuous cycle’ from increased wages is possible, even likely, with the institution of a national minimum wage.

Table 16: Summary of adjustment mechanisms

<table>
<thead>
<tr>
<th>Adjustments</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in hours worked</td>
<td>Inconclusive, points towards little or no effect</td>
</tr>
<tr>
<td>Reduction in in-firm training</td>
<td>Inconclusive, points towards little or no effect; might raise training</td>
</tr>
<tr>
<td>Reduction in non-wage benefits</td>
<td>No discernible impact</td>
</tr>
<tr>
<td>Shifts in composition of employment away from low-wage/low-skill workers</td>
<td>Inconclusive, points towards little or no effect.</td>
</tr>
<tr>
<td>Rising prices</td>
<td>Present but small</td>
</tr>
<tr>
<td>Rising productivity due to organisational efficiencies</td>
<td>Insufficient research but points towards an important impact</td>
</tr>
<tr>
<td>Rising productivity due to ‘efficiency wages’</td>
<td>Strongly present</td>
</tr>
<tr>
<td>Rising employment due to monopsony markets</td>
<td>Strong theoretical foundation</td>
</tr>
<tr>
<td>Wage compression / reduction of wages for higher-end earners</td>
<td>Strongly present</td>
</tr>
<tr>
<td>Trimming profit margins</td>
<td>Present</td>
</tr>
<tr>
<td>Boosts to aggregate demand</td>
<td>Present (country specific)</td>
</tr>
</tbody>
</table>

43
Table 16 summarises the various channels of adjustments that firms and the economy take to minimum wage increases. We should stress that different employers (and workers) will respond in different and multiple ways depending on their specific context. It is also almost certain that ‘thresholds’ exist, above which wage costs will trigger different responses including job losses. These thresholds (and responses) most likely differ by sector with the economy-wide employment effect uncertain. We see that, on aggregate, the most important channels of adjustment to higher wage costs are productivity increases due to organisational efficiency and efficiency wages, reductions in wages of higher earners (wage compression), and small price increases; in addition there is almost certain to be a demand stimulus from higher wages. All of this challenges the ‘competitive market’ framework. As Belman and Wolfson (2014a, p. 405) argue, “the stylization of decision making used in economics does not reasonably approximate decision makers’ actual situations”. They conclude:

“Decision makers are daily confronted not with a situation in which all is constant except the change in the minimum wage. Rather, they face a world in which little is constant from day to day, week to week, month to month, or year to year. Not only does the minimum wage change, so do prices of supplies, fuel, rental, and myriad other factors. Demand is constantly changing as economic conditions, changes in views and tastes, and chance influence consumers’ choices. In a situation where so much is in flux ... the human resources executive decision maker has no more certainty about the appropriate number of employees to hire than about the price and quantity needed to exactly satisfy demand.

In such a world, one dominated by change rather than comparative static exercises, economic actors are unlikely to make decisions on the knife edge depicted in economic diagrams. Rather, small changes in prices are unlikely to move the decision maker to action. [...] With such an understanding of the world, the lack of a relationship between moderate increases in the minimum wage and employment no longer stands in contradiction to core economic theory.” (Belman and Wolfson 2014a, pp. 405–406 emphasis in original).
6  Modelling the impact of a national minimum wage in South Africa

Statistical modelling is a useful way to assess the possible effects of a particular policy, although it should be approached with caution. This section summarises the findings of the two statistical modelling exercises commissioned by the National Minimum Wage Research Initiative. This is preceded by a discussion of the reasons for selecting these models, and accompanied by explanations of the models (which are further elaborated in Appendices B and C). The first modelling exercise presented, undertaken by Strauss and Isaacs (2016), uses the United Nations Global Policy Model (GPM) and analyses the macroeconomic impact of a rising labour share in South Africa. The second, by Adelzadeh and Alvillar (2016), uses the Dynamically Integrated Macro-Micro Economic Simulation Model (DIMMSIM) developed by Applied Development Research Solutions (ADRS), and models the macroeconomic and microeconomic consequences of directly raising wages through the institution of a national minimum wage.

Interestingly, the observed changes in the economy in the two models are consistent with one another. The way the model economies adapt is also consistent with the manner in which firms and economies have been shown to respond to higher wages in practice, as discussed in Section 5. In Adelzadeh and Alvillar (2016) a national minimum wage would raise wages, particularly for the lowest earners, and increase household income and hence household expenditure; in Strauss and Isaacs (2016) a rising wage share also raises spending. In both exercises, the policy adjustments raise aggregate demand and output and enhance labour productivity while inflation is contained. Shifts in investment and the current account do not outweigh the positive domestic-demand stimulus. Employment, in both models, falls very slightly, in line with the international and local evidence, and in Adelzadeh and Alvillar (2016) the highest national minimum wage modelled (R6 000) introduces some instability into the economy indication of a possible threshold near this level. Also in line with the international evidence already presented, Adelzadeh and Alvillar (2016) show how a national minimum wage set at a level that meaningfully boosts low-wage earnings can also meaningfully reduce poverty and inequality.

6.1  Statistical models used to evaluate the impact of a national minimum wage in South Africa

Macroeconomic models contain a large series of equations and coefficients. The equations mimic the interrelations between sectors within the economy, such as mining and manufacturing, and variables, such as GDP growth and employment rates. The coefficients within each equation measure the magnitude of the impact of a change in one variable upon another. When one variable is ‘shocked’ (altered) this creates a ripple effect throughout the model economy. The benefit of macroeconomic models is that the consequences for the economy as a whole – rather just one particular sector – can be estimated.

The choice of model is very important: the model must realistically capture the interrelations within the South African economy and be appropriate to modelling the impact of wage increases. It should be based on a well-formulated theoretical and empirical analysis of the functioning of the South African economy, and how it evolves over time. Two different types of models were available for use by the Initiative:
neoclassical computable general equilibrium (CGE) models and macro-econometric models. When deciding which type of model to use we considered a number of factors.

First, are the economic relationships captured by the model’s equation system a realistic depiction of the actual workings of the economy? Neoclassical CGE models rely on neoclassical economic theory to establish these relationships. This means that changes in prices – or supply-side effects – are dominant in the model. In practical terms, when simulating wage increases in neoclassical CGE models, firms are only able to respond to wage increases by shedding jobs and/or raising the prices for their goods or services; this is acknowledged by Pauw (2009, pp. 141–142) a leading contributor to such modelling in South Africa. As we have seen above, this is not how firms have been observed to respond to actual wage increases due to the increase or institution of minimum wages. Moreover, CGE models do not take account of productivity increases – which we have noted above are an important endogenous response to higher wages – unless such productivity increases are guessed at and imposed exogenously (externally) (as in Pauw 2009, DPRU 2010).

As explained in greater detail in Storm and Isaacs (2016), the CGE model’s supply-side dominance means that any stimulus to the economy from increased domestic demand is always outweighed by the negative effects from rising prices. This means that, within these models, rising unemployment and economic deterioration is the inevitable and unavoidable outcome of wage increases even before the model is run; the only question is the magnitudes of these declines. This can be clearly seen in the outcomes from the National Treasury (2015) and DPRU (2016) in which very low minimum wages of R1 258 and R1 619, respectively – well below the level of the current lowest sectoral determinations – have devastating economic consequences with the latter resulting in up to 450 000 job losses. Given the comprehensive international evidence laid out above, these results are highly implausible. By contrast, the macro-econometric models used here avoid producing outcomes that are imposed on the model of the economy by neoclassical economic theory. Negative results may still occur but, based on a pluralist theoretical approach, both supply and demand factors are taken into account; a concrete example of this is given in Section 6.3.1 and Appendix C. The importance of considering demand effects in South Africa has been widely noted. Kantor (2012) argues that “[t]oo little demand is now the major problem” for South Africa and that “more goods and services would be produced and more income would be earned in the process of expanded production, if only economic agents would spend more”.

Second, and related, we may then ask how the extent to which a change in one variable affects others (the coefficient) is calculated? The coefficients in CGE models are often selected from other studies or an ‘educated guess’ is made. This is shown clearly in DPRU (2016) where three different wage-employment elasticities are selected and modelled. Alternately, the coefficients can be ‘calibrated’ based on data from an arbitrarily chosen single ‘benchmark year’. The DIMMSIM model of ADRS instead relies on actual econometric estimations of these coefficients using South African specific time-series data from 1970 onwards. Third, and related, the data used as the basis for the model is important; while both econometric models used by the NMW-RI make use of over 40 years of South African data, the CGE models work on the basis of an arbitrarily chosen single ‘benchmark year’.

Fourth, it was particularly important that we could take account of distributional issues (the distribution of income and inequality) in our models. Neoclassical CGE models do
a poor job at this, in part because they usually make use of ‘representative households’, or because the integration between the main CGE model and household variables is weak (see Adelzadeh and Alvillar 2016 for a discussion of this), for instance by only allowing the macroeconomic changes to impact the microeconomic variables and not visa versa. By contrast the question at the heart of the modelling by Strauss and Isaacs (2016) using the UN Global Policy Model is a distributional one, and the ADRS DIMMSIM model involves a sophisticated two-way integration between the macro-econometric model and the micro-simulation module, with over 125 000 individuals and almost 30 000 households used to estimate microeconomic impacts.

With these considerations in mind we avoided using neoclassical CGE models – recently used by the National Treasury (2015) and DPRU (2016), and in Pauw (2009), DPRU (2010), and Pauw and Leibbrandt (2012) (see Storm and Isaacs 2016 for a discussion of these papers) – and instead selected the UN GPM and ADRS DIMMSIM macro-econometric models described below. The results from the modelling as summarised here are encouraging on two levels. First, despite significant differences between the two models, their results are consistent with one another. Second, their findings closely reflect domestic and international studies that have examined the actual consequences of instituting or increasing minimum wages (as discussed in previous sections).

6.2 The consequences of a rising labour share: UN Global Policy Model

The United Nations Global Policy Model (GPM) was used to simulate the effect of an increase to the labour share in South Africa (the full paper is Strauss and Isaacs 2016). A national minimum wage, set at a level above the current (often low) sectoral minima, will (under all reasonable assumptions) increase the labour share. The proximate justification for increasing the labour share in South Africa is twofold. First, the labour share has fallen significantly in post-apartheid South Africa (Burger 2015), as shown in Figure 18, as it has globally. This by definition occurred because real wage growth has lagged behind labour productivity growth in the post-apartheid period. Second, South Africa’s labour share is low relative to other emerging economies: approximately 5% lower than the emerging market average according to the GPM. In this exercise, we do not directly model wage increases, rather asking: what happens to the South African macroeconomy when workers get a larger slice of the economic pie? It does so by applying various increases to the labour share and modelling the consequences over a ten-year period (2015–2025).
In all scenarios the South African economy benefits overall from a more equal distribution of income due to a higher labour share, with no significant negative impacts. Strong consumption effects outweigh negative investment effects as income flows to those who have a higher propensity to consume.

### 6.2.1 The labour share and a national minimum wage

Increasingly it is recognised that issues of growth and distribution should not be separated in order to understand and model the macroeconomy (Mian and Sufi 2014, Krusell and Smith 2006, Bertola et al. 2014). Recent research led by the IMF (Dabla-Norris et al. 2015) finds a strong link between growth and distribution, drawing on a growing body of evidence on why inequality might be harmful for an economy (Aghion et al. 1999, Galor and Moav 2004, Bourguignon and Dessus 2009, Acemoglu 2011, Ostry and Berg 2011, Ostry et al. 2014).

The ‘functional distribution of income’ – which distinguishes between the share of value added going towards wages (the labour share) and profits (the property or profit share) – plays an important role in the dynamics of inequality and accumulation, and is at the core of the GPM model.\(^5\) At the macro level, the global contraction in labour shares appears to have harmed global aggregate demand (ILO 2013, 2014b). This is consistent with the evidence that the richer deciles have a greater propensity to save, whereas lower-income earners (whose income overwhelmingly takes the form of

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\(^5\) The concept divides the economy into workers and the owners of capital, and focuses on the division of income between these two groups. The labour share, or wage share, is defined as the share of value added paid to workers in an economy. There is no longer a neat differentiation between either economic classes (workers vs. capitalists) or income sources (wages vs. property income). Nonetheless the functional distribution of income has been shown to play important roles in the economy including driving accumulation and inequality (Atkinson 2009, Glyn 2011).
wages) spend a higher proportion of their income (see, for example, Dynan et al. 2004, OECD 2012). It is also consistent with evidence of capital hoarding by large corporations. At the micro level, changes in the functional distribution of income impact the actual distribution of overall income between individuals or households. This is because there is generally a far higher concentration of property income which forms part of the profit share (for example, net dividends, interest, rental income) than wage income which forms part of the labour share; a reallocation from the former to the latter is therefore inequality reducing. The fall in the labour share in South Africa, as shown in Figure 18, may have had adverse aggregate macroeconomic economic consequences and exacerbated inequality. A national minimum wage in South Africa could increase the labour share, and by doing so has the potential to decrease overall income inequality as well as expand aggregate demand.51

The GPM finds overall positive effects on the South African macroeconomy from increasing the labour share (this is not always the case, for example a rising labour share does not cause the same benefits in the case of India according to the GPM). Elsewhere it has been argued – most recently by MacLeod (2015) and Nattrass and Seekings (2015) – that even if rising wages reduce overall income inequality they would nevertheless depress investment, output and hence growth, implying the economy is ‘profit-led’. This claim – that South Africa is ‘profit-led’ and not ‘wage-led’ – is premised on CGE modelling results, as well as work by Onaran and Galanis (2012) who employ a highly simplistic four-equation model. Modelling an increase in the labour share with the GPM offers a more detailed and data-rich approach to evaluating whether a rising labour share is beneficial to the South African economy, once endogenous adjustments and feedback effects are taken into account.

6.2.2 The United Nations Global Policy Model

The United Nations Global Policy Model (GPM) is a demand-driven, global econometric model that draws on an UN-compiled dataset of consistent macroeconomic data for every major country or economic bloc. It is used by the G20 and the UN for medium-term (15 to 20 year) forecasting. Strauss and Isaacs provide an overview of the dynamics with the GPM which is summarised in Appendix A; more detail can be found in Untcad (2014) and Cripps and Izurieta (2014). Briefly, a number of unique features make the GPM well-suited to assess the complex macroeconomic effects of a policy change in a country such as South Africa. As noted above, the relationships within the model are based on the observed interactions within the South African economy and the extent to which each variable affects others is estimated econometrically; and both supply- and demand-side effects play important roles. Distributional issues are well accounted for in the GPM, allowing the level of economic activity to vary depending on the distribution of income. Furthermore, investment and employment are both determined by a range of factors (including financial sector variables for the former), and thus modelled in a realistic manner without the unrealistic assumptions imposed by CGE models (see Storm and Isaacs 2016). In

It is not guaranteed that a national minimum wage would increase the labour share, which depends on the specific configuration of the South African economy as well as the national minimum wage being set in a manner in which wages at the lower end of the wage-income distribution rise more quickly than wages at the middle and top end. Ways in which this can be achieved are discussed in an accompanying policy summary Policy Considerations for the Design and Implementation of a National Minimum Wage for South Africa (Castel-Branco 2016), with indexation to the average wage being the preferred method in South Africa.
addition, changes in productivity are made endogenous (internal) to the model and respond to both supply and demand effects through so-called ‘Kaldor-Verdoorn’ effects, through which increases in productivity and growth reinforce each other. Together, these facets offer multiple channels through which the modelled economy can adjust to higher wages, mirroring the actual adjustments witnessed in the real world (Section 5.4). Finally, the GPM model is globally consistent, so that the benefits (or costs) of a policy to a single country always take into account its effect on other countries and the resulting feedback effects.

### 6.2.3 The results

Beginning in 2015 we set a target growth path for the economy that increases the labour share by a prescribed percentage by 2025. We develop three different ‘scenarios’, involving three different increases, and compare these with a baseline ‘business-as-usual’ scenario in which the economy is allowed to continue along its current growth path. In scenario 1 we set an adjustment path so that the labour share in South Africa in 2025 is two percentage points above the baseline scenario. In scenario 2, the labour share ends four percentage points above the baseline and public investment is expanded by 5% of GDP, roughly simulating an increase in infrastructure spending as envisaged by South Africa’s National Development Plan. In scenario 3 we set a path so that the labour share rises in South Africa by five percentage points above the baseline, and, for all countries who experienced a fall in the labour share since 2002, we set growth paths so that each country’s labour share returns to its 2002 level by 2025. This investigates if such policies are globally sustainable, and the sensitivity of the South African economy to the global environment.\(^{52}\) The changes in the labour share over the forecast period are shown in Figure 19; the impact on key variables summarised in Table 17; and the levels they reach by 2025 shown in Table 18.

\(^{52}\) We offer in this report a narrative of what happens when these changes are implemented. It should be noted that in a model of this complexity it is difficult, if not impossible, to establish exact lines of causality. By analysing the results and the most relevant equations, one is able to piece together an imperfect explanation of the casual relationships and outcomes.
The most immediate consequence of a rising labour share is a strong consumption effect as income flows to those who have a higher propensity to consume. The increase in the labour share is not due to increases in the employment rate; instead, real labour compensation rises (at a faster rate than productivity growth). Private consumption rises as a share of GDP increases relative to the baseline in all scenarios (see Figure 20): in scenario 1 by 0.5 percentage points, in scenario 2 by 1 percentage point, and in scenario 3 by 1.2 percentage points. This consumption growth naturally leads to an increase in domestic demand.

Higher demand expands domestic output and thus growth. As such in all three scenarios the GDP growth rate increases, peaking at 0.5 and 1 percentage points higher for scenarios 1 and 3, respectively; scenario 2 lies in between this range (see Figure 21). By 2025, real GDP is 1.1%, 2.3%, and 2.9% higher than the baseline in scenarios 1, 2, and 3 respectively. Endogenous changes in monetary policy act as reinforcing mechanisms through financial sector adjustments, including an expansion of lending from banks to the private sector as income grows, with loans and deposits rising together.
It is possible that rising input costs could result in falling investment, a worsening current account, rising inflation, and falling employment, thus offsetting the demand stimulus from higher consumption. This is not the case in the South African projections. Investment (in absolute terms) expands even though investment as a percentage of GDP falls very marginally below the baseline (by between 0.06 and 0.14 percentage
This indicates that in the case of South Africa investment responds strongly enough to a rise in consumption and an expansion in output, that rising input costs do not result in any significant dampening of investment. The current account does suffer in all three scenarios as imports increase relative to exports, although only very marginally. It deteriorates, as a share of GDP relative to the baseline, by 0.23, 0.56, and 0.51 percentage points in scenarios 1, 2, and 3, respectively. The deterioration is contained in part because price competitiveness is maintained through strong productivity increases. An increase in output and GDP growth raises productivity through the estimated Kaldor-Verdoorn effects. Inflation falls mildly in the model due to productivity increases, reductions in the profit mark-up, sufficient spare capacity, and increases in imports. The estimated ‘Okun’s Law’ means that as GDP grows so does employment, even though the relationship is very subdued for South Africa. This leaves the employment rate very slightly below the baseline scenario in all three scenarios, by at most 0.05 percentage points, as shown in Figure 22. These supply-side constraints and countervailing tendencies therefore do not offset demand-stimulated gains, although the gains to the economy are, on the whole, modest.

**Figure 22: Employment rate in baseline and three scenarios (2014 – 2025)**

When comparing scenario 1 to scenarios 2 and 3, we see that the South African economy exhibits a high degree of path dependency that is difficult to alter through single interventions. The inclusion of infrastructure spending in scenario 2 helps to increase the positive impact of increasing the labour share in South Africa. Scenario 3

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53 The fall in the rate of investment is partly mitigated by the investment ‘accelerator’, such that investment expands as the GDP growth accelerates.

54 Such productivity growth helps to contain the unit labour costs (ULC) facing firms, as well as generally maintain external-facing competitiveness by alleviating pressure on the exchange rate. Slight declines in investment as a share of GDP will also dampen the deterioration in the current account given that investment, by requiring capital goods, is found to be more import-intensive by the model. This deterioration highlights the importance of complementary industrial development and trade facilitation policies to boost domestic supply capacity.
shows the strong influence that the global policy environment has on the South African economy. The scenarios indicate that growth paths are difficult to change within smaller open economies when they act alone. Table 17 summarises changes in the key variables and Table 18 gives the levels they reach by 2025.

| Table 17: Percentage points increase in key variables relative to baseline by 2025 |
|---------------------------------|-----------------|-----------------|-----------------|
| Labour share | GDP | Private Consumption | Government net lending to GDP |
| Scenario 1 | 2.0 | 1.1 | 0.5 | -0.2 |
| Scenario 2 | 4.0 | 2.3 | 1.0 | -0.5 |
| Scenario 3 | 5.0 | 2.9 | 1.2 | -0.6 |

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<thead>
<tr>
<th>Employment rate</th>
<th>Private investment to GDP</th>
<th>Current account deficit to GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>≈</td>
<td>≈</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>≈</td>
<td>-0.1</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>-0.1</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

Source: GPM model
Note: GDP shows percentage rise above baseline rather than percentage points above.

| Table 18: Key variables by 2025 for baseline and all three scenarios |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| Labour share (%) | GDP (USD PPP) | Private Consumption to GDP (%) | Government net lending to GDP (%) |
| Baseline | 42.1 | 739 956 | 60.8 | -6.9 |
| Scenario 1 | 44.1 | 748 431 | 61.3 | -6.7 |
| Scenario 2 | 46.1 | 757 078 | 61.8 | -6.5 |
| Scenario 3 | 47.1 | 761 522 | 62.0 | -6.3 |

<table>
<thead>
<tr>
<th>Employment rate (%)</th>
<th>Private investment to GDP (%)</th>
<th>Current account deficit to GDP (%)</th>
<th>Price inflation (%)</th>
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<td>Baseline</td>
<td>40.3</td>
<td>14.4</td>
<td>-6.1</td>
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<tr>
<td>Scenario 1</td>
<td>40.3</td>
<td>14.4</td>
<td>-6.3</td>
</tr>
<tr>
<td>Scenario 2</td>
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<td>-6.5</td>
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<tr>
<td>Scenario 3</td>
<td>40.4</td>
<td>14.3</td>
<td>-6.6</td>
</tr>
</tbody>
</table>

Source: GPM model.

6.2.4 Conclusion

In sum, increasing the labour share has a positive overall effect on the South African economy and no significant negative effect. The most notable positive effect is an increase in private consumption and GDP growth. Although the increase in growth rates dissipates in the longer term, the level of GDP is left permanently higher. Increasing the labour share has a negative effect on South Africa’s current account and a marginally negative effect on private investment as a percentage of GDP. Private
investment still expands in absolute terms. Gains are greater when accompanied by fiscal policy ‘multipliers’ or similar international interventions. Overall, South Africa’s present economy benefits from a more equal distribution of income (a larger labour share) in line with the recent wave of international evidence on the deleterious consequences of falling labour shares. One means to achieve such increases to the labour share is through a national minimum wage. A modest redistribution of income in the South African economy has positive consequences but alone does not radically alter the economy’s trajectory. The model illustrates that the South African economy is indeed ‘wage-led’: an increasing labour share is beneficial to the economy as a whole.

6.3 The potential impact of a national minimum wage: the ADRS DIMMSIM model

Adelzadeh and Alvillar (2016) use the ADRS Dynamically Integrated Macro-Micro Economic Simulation Model (DIMMSIM) to quantify the impact of directly raising the wages of low-wage earners in the economy based on different national minimum wage scenarios. The overall impact of implementing a national minimum wage is positive, although the highest level (of R6 000) produces significant volatility and the lowest level (of R2 250) results in very few benefits. In line with the international evidence discussed in Section 4, the institution of a national minimum wage raises wages and household income, and hence consumption expenditure. As suggested in Section 5.4 the economy adjusts to higher wages via increases in productivity, and gains to output and growth, together with wage compression and a very small fall in the economy-wide employment rate (although employment gains occur in 85% of economic sectors). Very importantly, and also in line with the international experience (as presented in Section 4), there is a projected reduction in both poverty and inequality.

6.3.1 Model summary: the Dynamically Integrated Macro-Micro Economic Simulation Model (DIMMSIM)

Adelzadeh and Alvillar (2016) use DIMMSIM to measure the macroeconomic impacts (for example, growth or employment rates) and microeconomic impacts (for example, poverty or inequality levels) of instituting a national minimum wage at different hypothetical levels. In addition to the general facets of the model described above, DIMMSIM has a number of features that make it highly appropriate for modelling the effects of minimum wages. DIMMSIM comprises a highly disaggregated non-linear macro-econometric model – the Macroeconometric Model of South Africa (or MEMSA) – and a micro-simulation module – South African Tax and Transfer Simulation Model (SATTSIM). MEMSA is built on the basis of a detailed econometric study of the South African economy. Its disaggregated structure is a significant strength, with 45 economic sectors and nine equation ‘blocks’ (for more information on the model’s design see Appendix C and Adelzadeh and Alvillar 2016).

Within these blocks there are more than 3 200 equations capturing the accounting and behavioural relationships within the economy in real and nominal terms. The model includes approximately 400 ‘estimated’ or ‘behavioural’ equations that determine how, and by what magnitude, changes in particular variables affect other variables. The best way to explain the approach is via a specific example. The example of the sectoral-level employment equation is given in Adelzadeh and Alvillar (2016) where employment in each sector is determined on the basis of a range of factors. This includes: the wage rate; the capital-labour ratio (the extent to which capital goods are
used per unit of labour in that sector); labour productivity; exports and imports; investment; gross domestic expenditure; GDP; the real effective exchange rate; expectations of output in the sector; and the economy-wide price index. This illustrates the pluralist approach to economy theory adopted: neoclassical supply-side determinants of employment, such as the wage level, are included, as are Keynesian consideration of the relationship between employment and domestic demand, and the Phillips curve trade-off between inflation and unemployment.

Using South African time-series data beginning in 1970, the nature and magnitude of the relationship between sector employment and one or more of the above demand, supply, and price variables is determined through time-series regression analysis. In the metals subsector, for example, a 1% increase in wages leads to a 0.6% decline in employment, but a 1% increase in gross domestic expenditure is expected to lead to a 0.24% increase in employment. In 36 of the 40 sectors the direct relationship between wages and employment was statistically significant and negative, with short-term wage-employment elasticities in the various sectors ranging from -0.11 to -0.85. However, in the model, the eventual level of sector employment is determined by changes in all the factors that were found to affect the sector, not just the real wage rate; this is why a change in wages may cause the employment rate to go up in some sectors and down in others, depending on how the change to wages ripples through all the variables in the economy. Some sectors and relationships are more supply-driven, while others are more demand-driven. Despite how intuitive such a method appears, this is not how CGE models work (see Storm and Isaacs 2016); for instance, CGE employment equations are not as nuanced and the magnitude of the relationships not estimated using historical data.

The micro-simulation component of the model uses StatsSA official household survey data for 125,830 individuals, making up 61,684 families or 29,800 households. DIMMSIM establishes two-way interactions between its macro and micro components such that changes in macroeconomic variables (for example, changes in prices, employment, and wage rates) influence welfare of individuals and families, and changes in household level economic conditions (for example, poverty, inequality, consumption, taxes, and eligibility for social security) influence macroeconomic outcomes. The model’s simulation process allows a series of interactions between the two components before it converges and generates the final results for each year of the forecast period. This ensures that each period’s results reflect convergence of the macroeconomic variables and household level variables at the aggregate level.

### 6.3.2 The scenarios

Four scenarios were developed and compared with a baseline ‘business-as-usual’ scenario with the effects shown over a ten-year period (2016-2015).

*Baseline*: The baseline scenario is premised on existing policies which do not include a national minimum wage, capturing the economy ‘as it is’ currently. In order to isolate the impact of a national minimum wage policy, this scenario establishes an overall economic policy outlook for the country to which a national minimum wage policy can be added. The baseline scenario reflects a combination of the status quo in domestic economic policy – for example, National Treasury’s concern for reducing the debt-to-GDP ratio and the policy of inflation targeting are incorporated, while public investment, government expenditure, and social grants are increased broadly in line
with inflation – and a relatively low growth path for the rest of the world, especially among the OECD countries.

**Minimalist**: The ‘minimalist’ scenario sets the national minimum wage, in 2016, at R2 250 in 2015 rands, slightly above the current lowest sectoral determinations. The national minimum wage is adjusted for inflation each year over the course of the period modelled.

The next two scenarios both tie the national minimum wage to a gradually increasing percentage of the average wage over a period of five years, after which increases occur in line with inflation. Such ‘indexation’ links the national minimum wage to overall conditions in the labour market and ensures that the national minimum wage increases at a rate above the rate at which average wages increase. This is done in order to reduce inequality. To allow the economy to adjust gradually, ultra low-wage sectors are ‘tiered’ per established international practice (Castel-Branco 2016, see Konopelko 2016). This tiering means agricultural workers earn 80% of the national minimum wage, and domestic workers and employees of the government’s Expanded Public Works Programme earn 70%. These tiers should be gradually phased out over time but this is not included in the modelling (see Castel-Branco 2016).

**Index 40%-45%**: The first indexation scenario starts at 40% of the 2015 average wage for full-time workers, R3 467, and increases yearly by 1% (of the average wage) to reach 45% by 2021 (adjusted for inflation). Thereafter the national minimum wage is maintained at 45% of the average wage and increased annually by inflation.

**Index 45%-50%**: In the second indexation scenario the starting point is 45% of the 2015 average wage for formal sector full-time workers, excluding agriculture and domestic work, which comes to R4 623. This is gradually increased to 50% of the inflation-adjusted average by 2021, and thereafter maintained at 45% of the average wage and increased annually by inflation. The higher amount ensures that workers earn enough to meet their basic needs, the central purpose of a national minimum wage.

**Maximalist**: The ‘maximalist’ scenario is the most aggressive and sets the national minimum wage at R6000, covering about 65% of full-time workers. It represents the upper bound of the current publicly proposed national minimum wage levels in South Africa. Until 2021 it is increased annually by inflation plus 2% to close the gap that has emerged between labour productivity growth and growth in real wages; thereafter it rises in line with inflation. It makes use of slightly lower tiers, with agricultural workers earning 80% of the national minimum wage, domestic workers 70%, and employees of the government’s Expanded Public Works Programme 60%.

All scenarios assume full compliance with the national minimum wage, with wages for all workers currently earning below the national minimum wage level rising to the level stipulated. This is, admittedly, an unrealistic assumption but the results illustrate the maximum impact a national minimum wage, as defined in each scenario, would have. The results given below are extracted from Adelzadeh and Alvillar (2016), which offers more detail and greater disaggregation (see also Adelzadeh 2016).

### 6.3.3 The results

In all scenarios the national minimum wage rises steadily over time – in real terms by between zero percent and 1.32% – although obviously to different degrees and with
The finding that the national minimum wage raises real wages and household income is in line with the international literature, much of it discussed in Section 4 (see, for example, DiNardo et al. 1996, Lee 1999, Harris and Kearney 2014). In Latin America, for example, a 10% increase in minimum wages resulted in an increase in average wages of between 1% and 6% (Cunningham 2007). The increase is particularly strong at the bottom end of the distribution, in line with the international evidence (for instance, see Lee 1999, Dube et al. 2010, Autor et al. 2016).

The boost to real wages and household incomes naturally raises household consumption expenditure as shown in Figure 24; this is particularly true for low-income households. We see that the Minimalist scenario, while giving an initial boost to consumption expenditure, does not manage to change the pace (slope) at which real household consumption expenditure grows over time, whereas the other national minimum wage scenarios do. Again, the disaggregated and detailed nature of DIMMSIM means this is carefully quantified, with twenty-seven equations pertaining to five categories of durable goods, five categories of semi-durable goods, six categories of non-durable goods, and six categories of services. Given the increases shown in Figure 24, household consumption expenditure as a share of GDP is projected to increase from 59.2% in the baseline scenario to 60.6% (Minimalist), 62.6% (Index 40% - 45%), 62.7% (Index 45% - 50%), and 64.2% (Maximalist) in the respective scenarios.

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55 For compatibility purposes the model makes use of constant 2010 prices. This is why the average wage level is lower than in the 2015 levels discussed in Section 2.

56 Average real wage levels are not only affected by the direct increase to low wages via the national minimum wage. This is because average real wage levels are determined by a diverse range of variables (for example, sector labour productivity, the general price index, the exchange rate, etc.) and these variables will also be affected by the national minimum, leading to dynamic and indirect adjustments that will influence wage levels. Similarly, household incomes will also be determined dynamically, for example, rising wages may change a household’s illegibility for social grants. This illustrates the complex and dynamic nature of the model.

57 Between 2004 and 2014, the real gross primary income of households increased at a compound annual growth rate of only 2.5% (Adelzadeh and Alvillar 2016, p. 33).
Given the positive impact on consumption expenditure it is not surprising that economic output is projected to increase at a rate above the baseline scenario (although output is also determined by a range of other supply- and demand-side variables). As shown in Figure 25, the national minimum wage is most effective at boosting manufacturing output through demand-side stimulus, with manufacturing output expanding by between 5.1% and 18.9% relative to the baseline. A boon to manufacturing is a positive development for South Africa. The lower output in the construction and engineering subsector and the wholesale, retail, catering, and
accommodation subsector (due to the negative employment impacts of the national minimum wage in these subsectors) means that the total output of the service sector is projected to be lower in most of the national minimum wage scenarios. Even given this, economy-wide economic output is still 2.1% above the baseline in the indexation scenarios.

**Figure 25: Economic output: average annual percentage change relative to baseline (2016 – 2025)**

Spurred by rising total output, GDP growth rates are projected to be higher with the institution of a national minimum wage, by between 0.1 and 0.7 percentage points, relative to the baseline scenario, as shown in Figure 26. Gains in labour (and capital) productivity are central to the manner in which the economy adjusts. Average annual labour productivity relative to the baseline is shown in Figure 27 where the manufacturing sector exhibits the largest divergence from the baseline, rising above the baseline by 1.6% (Minimalist) 5.2% (Index 40% - 45%) 6.3% (Index 45% - 50%) and 9.0% (Maximalist) in the four national minimum wage scenarios. Productivity gains exist for the economy as a whole but are less strong than in manufacturing given the smaller increments in the primary and service sectors. The consistency in the direction of changes in the output, GDP growth, and productivity variables mirrors the observed workings of economies in practice.

Once again we note that, these results are in line with the international literature, which illustrates that firms and the economy can adjust to minimum wages through increases in productivity, output and growth, as discussed in Section 5.4 (see Cahuc and Michel 1996, Nickell and Layard 1999, Askenazy 2001, Bassanini and Venn 2007, Schmitt 2013, Mayneris et al. 2014, Rizov et al. 2016). The findings, as noted by

58 “Changes in employment, labour productivity, production techniques (capital-labour ratio), and sector and general prices are among the price and supply side factors that impact the evolution of sector output. These, together with the impact of changes in demand factors determine DIMSIM’s annual projections of sector and total economic outputs.” (Adelzadeh and Alvillar 2016, p. 36)
Adelzadeh and Alvillar (2016, p. 38), are “also in line with Kaldor’s three growth laws related to the causation in economic growth, including the proposition that a faster rate of growth of manufacturing output supports [a] faster rate of growth of non-manufacturing [output]”.

Figure 26: GDP: average annual real growth rate (2016 – 2025)

Source: Adelzadeh and Alvillar (2016) from DIMMSIM model

Figure 27: Labour productivity: average annual percentage change relative to baseline (2016 – 2025)

Source: Adelzadeh and Alvillar (2016) from DIMMSIM model
The net effects on employment – after accounting for the various positive and negative effects described above – are similarly in line with the international experience (as discussed in depth in Section 5). Overall there is a very small negative impact with the economy-wide average annual level of employment for the indexation scenarios falling by -0.3% (below the baseline) over the period, as shown in Figure 28. This drop is driven by the service sector, in particular the construction and engineering subsector, and wholesale, retail, catering, and accommodation subsector. Employment in manufacturing is lifted by the institution of a national minimum wage by, at most, 318 000 jobs, and the general long-term decline in primary sector employment is slowed. Overall employment is up to 43 000 jobs lower in the indexation scenarios (compared with the baseline). Adelzadeh and Alvillar (2016, p. 33) argue that “the overall number of workers that are projected to benefit from the policy far exceeds the relatively small number of workers that may lose their jobs as a result,” but this marginal decline in employment does indicate the need to complement the national minimum wage with job-creating policies.

In addition to the variables shown here, the model projects that inflation will fall due to strong productivity effects outweighing price pressures from increased wages (as in the UN GPM outputs). Like in the GPM, investment expenditure rises in the national minimum wage scenarios but falls slightly as a percentage of GDP. The debt-to-GDP ratio is maintained within reasonable limits, reaching at most 1.5 percentage points above the baseline. Notably, the demand for social grants falls due to higher wages and the tax intake increases (Adelzadeh 2016, Adelzadeh and Alvillar 2016).

Regarding microeconomic household impacts, the model shows a modest but important decline in inequality and a significant fall in the poverty headcount. The Gini index in 2025 is up to 1.7% below the baseline projection, as shown in Figure 29. Changes in income ratios were not measured but given the manner in which the wage distribution is impacted by the national minimum wage in the model, the decline in
these ratios (in particular between the 50th and 10th percentile) is likely to be higher than the fall in the Gini coefficient. In addition, rural-urban inequality is also projected to fall. The reported favourable impact of the national minimum wage on inequality is also in line with the international evidence presented in Section 4. Also in line with our discussion in Section 4, the model results show a significant fall in poverty. This makes sense given the large number of working poor (discussed in Section 2.3) that are likely to benefit from the introduction of a national minimum wage.\textsuperscript{59} As shown in Figure 30, the fall in poverty is greatest for Black people (up to 3 percentage points), followed by Coloureds (up to 1.8 percentage points), Indians (up to 0.4 percentage points), and then Whites (at 0.1 percentage points in all scenarios); naturally poverty also falls most amongst the lowest quintiles of earners.

\textbf{Figure 29: Inequality relative to baseline in 2025}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{inequality_fig}
\caption{Inequality relative to baseline in 2025}
\end{figure}

Source: Adelzadeh and Alvillar (2016) from DIMMSIM model

\textsuperscript{59} The poverty line used in the modelling is based on the StatsSA poverty line and different to our preferred measure; it sits at R720 per capita and R930 per adult equivalent per month. What matters here, however, is the relative changes between the scenarios, rather than absolute value of the line itself.
6.3.4 Conclusion

The DIMMSIM is a sophisticated, data-informed model built from the ‘bottom up’ on the basis of the observed relationships within the South African economy. Adelzadeh and Alvillar (2016) have used this model to quantify the possible impact of a national minimum wage by directly increasing wage levels within the model. In line with the other evidence presented in this report, the projected consequences of instituting a national minimum wage at a meaningful level are, on balance, positive. The indexation scenarios offer a viable way forward. They begin at levels between R3 500 and R4 600 reaching approximately R3 900 and R5 100 after five years. The gradual increases – achieved through indexing them against an increasing share of the average wage – allow the economy to adjust, as do the tiers for ultra-low wage sectors. These indexation scenarios do not produce the volatility observed in the maximalist scenario. These levels are also congruous with the benchmarks we explore in Section 3 which cluster between R4 000 and R5 500.

The reliability of these results are reinforced by the fact that the economy in the model adjusts in similar ways to what has been observed to occur in practice as a result of rising minimum wages (Section 5). A national minimum wage, set at a meaningful level above the current lowest sectoral determination, lifts wages, income, and spending, and increases productivity, investment, output, and growth. This occurs with a minimal effect on employment and sustainable movements in the current account, inflation, and debt-to-GDP ratio. Most importantly, a national minimum wage is projected to reduce poverty and inequality.
7 Conclusion

The possible implementation of a national minimum wage in South Africa has elicited great debate over the past eighteen months. This report has investigated the viability of instituting a national minimum wage in South Africa, drawing in part on a series of working papers commissioned by the National Minimum Wage Research Initiative at the University of the Witwatersrand. A national minimum wage would provide a wage floor under which no employer would be permitted to pay employees. Compared with a sectorally-differentiated system, a national minimum wage covers all workers, is easier to enforce and does not set lower minima in sectors with a high concentration of vulnerable workers. Furthermore, a national minimum wage can be set to take account of broad policy objectives such as reducing inequality, and economy-wide effects, rather than only narrow sectoral considerations.

South Africa has the highest level of inequality in the world and dire levels of working poverty. These destroy livelihoods, erode social cohesion, and hamper economic growth and development. Collective bargaining, while crucial to maintain and strengthen, is unable to combat working poverty on its own. Minimum wages set through sectoral determinations have in some sectors increased significantly, but many workers in those and other sectors still earn poverty-wages.

Minimum wages have been successful at raising the wages for low-wage earners in both developed and developing countries. Our statistical modelling has clearly shown that minimum wages are projected to have the same effect in South Africa. This would cause a rise in household income, spurring greater consumer spending and hence increased output and raised levels of growth, together with rising productivity. This projection matches evidence of the effects that minimum wages have had on aggregate demand, productivity, and growth elsewhere in the world. Minimum wages have reduced inequality in the formal and informal sectors in dozens of countries; the South African statistical modelling likewise projects a fall in levels of poverty and inequality. A shift in income from capital to labour has also been shown to be beneficial to the South African economy. These consequences are projected to occur with a minimal effect on employment, in line with the existing local and international evidence on employment effects. Such limited effects on employment are because firms and economies adjust to higher minimum wages in many ways, chief amongst them being productivity gains, wage compression, and rising aggregate demand. The level at which the national minimum wage is set will strongly influence the manner in which firms and the economy adjust.

The purpose of minimum wages, according to the International Labour Organization, is to provide “adequate protection to all workers” (ILO 2015a) and ensure wages are able to cover the basic needs of all workers and their families, while taking into account economic factors. A national minimum wage is, therefore, despite the excited debate, a very modest labour-market intervention, aimed at allowing workers to simply meet their most basic needs. Despite this, given that the relevant international benchmarks cluster between R4 000 and R5 500, a national minimum wage could significantly increase wages for South Africa’s lowest earners, benefiting them and their families. In addition, such national minimum wage levels are predicted to reduce inequality. Our statistical modelling indicates that a national minimum wage beginning between R3 500 and R4 600 and reaching up to between R3 900 and R5 100 after five years is feasible.
This report shows that a national minimum wage in South Africa, if carefully designed and set at a level that is able to meaningfully improve workers’ livelihoods, can achieve its central objectives of reducing working poverty and inequality. Taking account of relevant economic factors is crucial; according to the evidence presented here, a national minimum wage can support economic growth, thus being both sustainable and positive for the economy. Minimum wages do not aim to raise employment levels – for that, other policies are needed – but a national minimum wage can be implemented without significant employment effects. These findings are supported by an extensive international literature and by the statistical modelling undertaken. This report shows that the success this policy intervention has had elsewhere, is possible in South Africa.
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# Appendix A: Summary of employment meta-analyses

## Table 19: Meta-analyses on employment effects: aggregate summary

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<thead>
<tr>
<th>Study details</th>
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<th>Meta-analyses</th>
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<tr>
<td>Boockman (2010)</td>
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<td>439</td>
</tr>
<tr>
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<td>6</td>
<td>9</td>
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<tr>
<td>Broecke et al. (2015)</td>
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<td>741</td>
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*Sign analysis is repeated with larger sample of 9 emerging economies, 57 studies and 1 020 elasticity estimates (including South Africa) with very similar results.
### Table 20: Meta-analyses on employment effects: disaggregated summary

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<tr>
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<td>Reduces chances of finding negative impact</td>
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<td>Leonard <em>et al.</em> (2014)</td>
<td>UK. 16 studies. 236 estimated minimum wage elasticities and 710 partial correlation coefficients.</td>
<td>-- No impact -- -- -- -- -- -- More negative for home care and food industries -- -- -- Reduces chances of finding negative impact</td>
<td>Teenage, youth and young adults tend to show statistically significant negative impacts. More negative for female workers (-0.039) -- -- -- Retail, food and manufacturing tend to show statistically significant negative impacts -- -- -- Reduces chances of finding negative impact</td>
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<td>Chletsos and Giotis (2015)</td>
<td>18 countries. Developed and developing world. 77 studies. 1,521 elasticity estimates.</td>
<td>More negative for female workers (-0.039) -- -- -- Slightly greater negative impact on youth but &quot;effects are really very small&quot;.</td>
<td>Significant but not highly. No impact. Significant but not highly. More negative (-0.071) but very small. More negative (-0.071) but very small. Retail, food and manufacturing tend to show statistically significant negative impacts. Retail, food and manufacturing tend to show statistically significant negative impacts. Slightly greater negative impact but &quot;effects are really very small&quot;. Slightly greater negative impact but &quot;effects are really very small&quot;. Slightly greater negative impact but &quot;effects are really very small&quot;. Slightly greater negative impact but &quot;effects are really very small&quot;. Reduces chances of finding negative impact. Reduces chances of finding negative impact.</td>
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<td>Nataraj <em>et al.</em> (2014)</td>
<td>6 low-income (or recently low-income) countries. 9 studies.</td>
<td>More negative for female workers (-0.12) -- -- -- Slightly greater negative impact but &quot;effects are really very small&quot;.</td>
<td>Slightly greater negative impact, significant but not highly. More negative for female workers (-0.12). More negative for female workers (-0.12). More negative for female workers (-0.12). More negative for female workers (-0.12). More negative for female workers (-0.12). Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Slightly greater negative impact on youth but &quot;effects are really very small&quot;. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. Ambiguous and not meaningful impact on formality. -- -- -- -- -- --</td>
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Appendix B: United Nations Global Policy Model summary

The United Nations Global Policy Model (GPM) (see for example UNCTAD 2014) is a demand-driven, global econometric model that draws on a UN-compiled dataset of consistent macroeconomic data for every major country or economic bloc. It is used by the G20 and the UN as a medium term (15-20 year) forecasting and modelling tool on issues including trade, shifts in the sources of energy usage, and demographic change. The interactions within the model are presented diagrammatically in Figure 31; the model has a number of unique features that make it well suited to assess the complex macroeconomic impacts of a policy change in a country such as South Africa.

First, the behavioural relationships and parameters are informed by data (in fairly open specifications) and estimated econometrically, rather than imposed exogenously using rigid assumptions. The magnitude of the relationship between variables is not fixed and varies based on economic conditions.

Second, aggregate demand is allowed to have a far greater impact on the level of economic activity, without the model being dominated by costs. This is subject to elaborate and sophisticated supply-side constraints including endogenous labour productivity and employment growth, endogenous wage formation and inflation. This means that any stimulus to aggregate demand will affect productivity, jobs, wages, and prices, and through these have an effect on exports, imports, consumption, and investment. Allowing aggregate demand to play a significant role is particularly relevant in the South Africa context. As Kantor (2012) notes:

“[S]ometimes the economic problem becomes one of too little spending rather than of dismal constraints on spending. Too little demand is now the major problem in many of the developed economies and also for us in SA. Given the current availability of labour, plant and equipment in the US, Europe and SA, more goods and services would be produced and more income would be earned in the process of expanded production, if only economic agents would spend more. More spending is thus possible without the usual trade-offs and choices having to be made between one kind of spending or another. There is no opportunity cost to employing more resources when they are standing idle.”

Third, issues of distribution are well accounted-for in the GPM, allowing the level of economic activity to vary depending on the distribution of income. The savings function in the GPM, determined by nine variables including the distribution of income, becomes important. A shift in income away from labour sees the savings rate increase and thus consumption rates fall. This is consistent with the notion that richer deciles have a greater propensity to save (see for example Dynan et al. 2004, OECD 2012). This is particularly relevant for the present context in South Africa and globally.

Fourth, investment is modelled in a realistic manner. Investment is never fixed as a share of GDP nor limited by available savings, as in typical CGE models. Instead it shows an accelerator response to the growth of GDP with some additional influence from growth of profits. In addition, the presence of a financial sector – absent from most CGE models in any meaningful way – allows bank lending to play an important role in co-determining the level of investment.

Fifth, employment and the unemployment rates are impacted by a wide range of variables. These include: urbanisation, GDP per capita, population growth, economic
activity, investment, and global cyclical conditions (measured through world inventory changes). Employment is differentiated by age and gender.

Sixth, changes in productivity are made endogenous to the model and respond not only to supply side forces. Increases in output (via increases in aggregate demand) improve productivity growth – the so-called ‘Kaldor-Verdoon’ effects; in the model these play an important role for South Africa. A growing body of literature has shown that wage growth can reinforce productivity growth and hence “international competitiveness” (Storm and Naastepad 2007, 2009, Vergeer and Kleinknecht 2014).

Seventh, the GPM model is globally consistent, so that the benefits (or costs) of a policy to a single country always take into account its effect on other countries and the resulting feedback effects. As a result, the GPM allows us to assess whether a given policy strategy is globally sustainable.

The model does not assume, a priori, that an increase in the labour share leads to an economic expansion in any single economy (crudely put, whether it is ‘profit led’ or ‘wage led’). Each country’s behavioural specification is determined endogenously and uniquely adjusted through the inclusion of additional ‘state’ variables based on the specificities of that economy. The positive effect of higher wages and greater consumption is balanced against how this may lower investment through decreased profits or falling exports. This is done through detailed and sophisticated export and import equations; hence the model is capable of drawing out, in a very robust manner, how changes in domestic wages and prices will spill over into external trade and (foreign) capital flows. It is important for South Africa to take note of global feedback effects of its domestic policy.

The GPM is programmed so that a larger share of the necessary adjustments occur in the initial years; this is done to avoid another adaptation when the policy stops, as is common in econometric modelling. The model is also constrained in that variables cannot fluctuate more than 10% from their historic path even if this means failing to complete the specified adjustment. The model is estimated using annual data from 1970 to 2013 for South Africa and all other major countries and blocs (with 2014 being a forecast in this version of the model). It is estimated using a panel structure with fixed effects (T=43; N=190). The data for South Africa include Swaziland, which is unfortunate but has a negligible influence on the data. The data come from national accounts submitted to the United Nations. Employment data are from the International Labour Organisation (via Statistics South Africa household survey data, the OHS/LFS/QLFS). Data are in US$ PPP unless stated otherwise.
Figure 31: Main modules and linkages in GPM

Source: Cripps and Izurieta (2014).
Appendix C: ADRS’ Dynamically Integrated Macro-Micro Economic Simulation Model (DIMMSIM) summary

The ADRS DIMMSIM comprises a highly disaggregate non-linear macro-econometric model – the Macroeconomic Model of South Africa (or MEMSA) – and a micro-simulation module – the South African Tax and Transfer Simulation Model (SATTSIM). DIMMSIM has a number of features that make it highly appropriate for modelling the impact of minimum wages. MEMSA is built on the basis of a detailed study of the South African economy, rather than the model design being imposed based on narrow neoclassical theory. Its disaggregated nature is a significant strength, with 45 economic sectors (see Figure 32) and nine main ‘blocks’ as shown in Figure 33. The blocks each pertain to different areas of the economy and can be summarised as (Adelzadeh and Alvillar 2016, pp. 8–9):

• Final demand block: “captures behaviours of the private sector as they relate to 45 sector level investments, exports, and imports; households in terms of expenditure on 27 categories of consumption goods and services; and the public sector in terms of final consumption expenditure and investment.”

• The production block: “produce[s] projections of sector outputs, potential outputs, capital stock, and capital productivity, all in nominal and real terms. Private sector decisions on how much to produce in various sectors of the economy are captured through 40 estimated equations that link the decisions to various demand, supply and price factors in the economy.”

• Price and wage block: “behavioural equations for sector output prices (45), consumer prices (30), and investment prices (45)” and “equations for sector import and export prices, sector and economy-wide inflation rates, and 45 estimated equations for the sector level real wage rate (i.e., average remuneration rates) and 45 calculated sectoral level nominal wage rates”.

• Labour market block: “186 equations that include 40 estimated equations that capture factors that determine short and long term demand for sector level employment”.

• Income expenditure and savings block: “569 equations that capture a detailed breakdown of income, expenditure, and saving of households, incorporated business and government, in both nominal and real terms”.

• Financial block: “88 equations for indicators related to the financial and monetary side of the economy, such as the interest rate, exchange rates, money supply, credit extensions, households financial assets and liabilities, and foreign direct and portfolio investments”.

• National account block: “responsible for ensuring consistency and enforcing national income and product account relationships within the economic system captured by the model”.

• Long-term blocks: include estimated long-run relationships of the model’s co-integration equations.
• Exogenous and parameter block: exogenous domestic and international variables.

Within these blocks there are more than 3,200 equations capturing the accounting and behavioural relationships within the economy in real and nominal terms. The model includes approximately 400 ‘estimated’ or ‘behavioural’ equations that determine how, and by what magnitude, changes in particular variables affect other variables. These are derived on the basis of a pluralist approach to economy theory – for instance, allowing both demand- and supply-side effects to play important roles – with the magnitude of the relationships determined by detailed econometric testing using time-series data beginning in 1970. The model therefore avoids the “a priori imposition of one theoretical stand on the determination of a given sector level variable” (Adelzadeh and Alvillar 2016, p. 11).

A useful way of illustrating this is to look at a specific equation; Adelzadeh and Alvillar (2016) give the example of employment. The specification of determinants of sector level employment includes: the real wage rate; the capital-labour ratio (the extent to which capital goods are used per unit of labour in that sector); labour productivity; exports and imports; investment; gross domestic expenditure; gross domestic product; the real effective exchange rate; expectations of output in the sector; and the economy-wide price index. We see in this list both neoclassical supply-side determinants of employment, such as the real wage rate, the Keynesian consideration of the relationship between employment and domestic demand, and the Phillips curve trade-off between inflation and unemployment. A series of econometric estimations (using the Autoregressive Distributed Lag (ARDL) co-integration approach) is used to determine, based on the historical data, the specifics of the short- and long-run relationships between sector level employment and the above variables. Further tests are then undertaken to check the stability and robustness of the results (confirming the co-integration between variables and testing for stability, normality, auto-correlation and so on).60 Quoting from Adelzadeh and Alvillar (2016, p. 19) regarding the example of the metal products subsector:

“The estimated ARDL equation for the Metal Product sector shows that employment in this sector is determined by several demand and supply factors. For example, ceteris paribus, one percent increase in the sector real wage rate is expected to reduce sector employment by 0.6 percent. And, one percent increase in the Gross Domestic Expenditure (GDE) is expected to lead to an increase in employment in the Metal Products sector of 0.16 percent in the short run and 0.24 percent in the long run. Moreover, a one percent increase in the real imports of Metal Products is expected to reduce the sector employment by 0.08 percent in the short run and 0.12 percent in the long run.”

The real wage rate is therefore only one factor determining levels of employment in a given sector. In 36 of the 40 sectors the direct relationship between wages and employment was statistically significant and negative, with short-term wage elasticities in the various sectors ranging from -0.11 to -0.85. However, in the model, the eventual level of sector employment is determined by changes in all the factors that were found to affect the sector, not just the real wage rate; this is why a change in wages may cause

60 The estimation is done outside of the model and the output used to build the equations and estimate the coefficient. The data used for the estimations and the data within the model is the same.
the employment to go up in some sectors and down in others. Despite how intuitive such a method appears, this is not how CGE models work: the employment equation is narrowly specified and the coefficients of the relationship are not estimated using historical data.

Based on diverse theoretical viewpoints and empirical studies, variables in the DIMMSIM (for example, sector level employment, investment, output, wage rate, price, exports and imports) are therefore allowed to be affected both by supply-side factors, for instance the direct relationship between wages and employment, and by specific demand variables. As a result, some relationships in the economy are more supply-driven, while others are more demand-driven. Not all sectors are affected by all factors, nor are they affected equally. Finally, the macroeconomic component of DIMMSIM captures the necessary intertemporal consistency between the production, income, and expenditure sides of the economy in nominal and real terms and at aggregate and sector level.

The microsimulation component of the model uses weighted data for individuals and households from official StatsSA household survey datasets (the IES, QLFS, Census etc.). The model’s database is prepared in terms of family units, because it relates closely to the definition of the financial unit used by many of the government tax and transfer programmes. The model’s database includes 125 830 individuals, making up 61 684 families or 29 800 households. The model’s output focuses on the effect on three government taxation policies (personal income tax, excise tax, and value added tax), six transfer programmes (old age grant, child support, disability grant, care dependency grant, care-giver support, and basic income grant; the last two are dormant), and measures of poverty and inequality.

The model establishes two-way interactions between its macro and micro components such that (a) changes in macroeconomic variables (for example, changes in prices, employment, wage rates) influence welfare of individuals and families, and (b) changes in household level economic conditions (for example, poverty, inequality, consumption, taxes, eligibility for social grant, etc.) influence macroeconomic outcomes. The Gauss-Seidel iterative method is used to solve the overall system. Once a variable is ‘shocked’ the model allows a series of interactions between the two components before it converges and generates the final results for each year of the forecast period. This ensures that each period’s results reflect convergence of the macroeconomic variables and household level variables at the aggregate level.
**Figure 32: MEMSA sectors**

```
Model's Economic Sectors
with 7 variables for each sector
(output, employment, investment, exports, imports, prices, wage rates)
```

- **Primary**
  1. Agriculture, Forestry and Fishing
  2. Coal Mining
  3. Gold, uranium and ore mining
  4. Other mining

- **Manufacturing**
  5. Food
  6. Beverage
  7. Tobacco
  8. Textiles
  9. Wearing Apparel
  10. Leather and Leather products
  11. Footwear
  12. Wood and wood products
  13. Paper and paper products
  14. Printing, publishing & recorded media
  15. Coke & refined petroleum products
  16. Basic chemicals
  17. Other chemicals & man made fibres
  18. Rubber products
  19. Plastics products
  20. Glass and glass products
  21. Non-metallic minerals
  22. Basic iron & steel
  23. Basic non-ferrous metals
  24. Metal products excl. machinery
  25. Machinery and equipment
  26. Electrical equipment
  27. Tv, radio & communication equipment
  28. Professional & scientific equipment
  29. Motor vehicles, parts & accessories
  30. Other transport equipment
  31. Furniture
  32. Other industries

- **Services**
  33. Electricity, Gas and water
  34. Building construction and engineering
  35. Wholesale, retail trade, catering & accommodation services
  36. Transport, storage, and communication
  37. Financial services, business intermediation, insurance & real estate
  38. Community, social & personal services
  39. Other services
  40. Households
  41. General government

**Aggregate Sectors**

- 42. Total primary (sum of sectors 1 to 4)
- 43. Total manufacturing (sum of sectors 5 to 32)
- 44. Total services (sum of sectors 33 to 41)
- 45. Total economy (sum of sectors 1 to 41)

Source: Adelzadeh and Alvillar (2016)

**Figure 33: DIMMSIM general architecture**

```
Final Demand Blocks (769 equations)
- Consumption
- Investment
- Government
- Exports
- Imports
- Inventory

Output Blocks (712 equations)
- GVA at basic prices
- GVA at Market Prices
- GDP at Factor Cost

Labour Market Block (186 equations)
- Primary sector
- Secondary sector
- Tertiary sector

Prices/Wages Blocks (413 equations)
- Wage rates
- Sector prices
- Consumption-deflators
- Investment-deflators
- GDP-deflator
- Consumer Price Index
- Producer Price Index

Income/Expend/Savings Blocks (569 equations)
- Household
- Business
- Government

Long Term Blocks
- Output
- Investment
- Consumption
- Employment

Exogenous and Parameter Block
- Population
- Oil price
- GDP growth
- Sub-Saharan Growth Rate
- U.S. Interest Rate
- Import prices
- Policy variables
- Policy parameters
- Other variables

Accounting Consistency Blocks (479 equations)
- Macroeconomic
- Microeconomic
- Linked Macro-Micro

Microsimulation Modules
- Income Tax and Indirect Taxes
- Old Age Pension
- Child Support Grant
- Disability Grant
- Care Dependency Grant
- Care Giver Grant
- Basic Income Grant
- Income/Expenditure/Saving
- Poverty
- Income Distribution

Financial Block Monetary Policy (58 equations)
- Interest rates
- Exchange rates
- Money supply
- Credit, Wealth, Debt
- Financial account
```

Source: Adelzadeh and Alvillar (2016)
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