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Working Paper

On the Interaction between Minimum Wage Adoption and Fiscal Redistribution: A Theoretical and Empirical Investigation

CESifo Working Paper, No. 8355

Provided in Cooperation with:
Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Economides, George; Kammas, Pantelis; Moutos, Thomas (2020) : On the Interaction between Minimum Wage Adoption and Fiscal Redistribution: A Theoretical and Empirical Investigation, CESifo Working Paper, No. 8355, Center for Economic Studies and Ifo Institute (CESifo), Munich

This Version is available at:
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CESifo WORKING PAPERS

8355
2020

June 2020

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CESifo

Impressum:

CESifo Working Papers
ISSN 2364-1428 (electronic version)
Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH
The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute
Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de
Editor: Clemens Fuest
https://www.cesifo.org/en/wp
An electronic version of the paper may be downloaded
· from the SSRN website: www.SSRN.com
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On the Interaction between Minimum Wage Adoption and Fiscal Redistribution: A Theoretical and Empirical Investigation

Abstract

We explain the public's support for the minimum wage (MW) institution despite economists' warnings that the MW is a "blunt instrument" for redistribution. To do so we build a model in which workers are heterogeneous in ability, and the government engages in redistribution through the public provision of private goods. We show that the MW institution is politically viable only when there is a limited degree of in-kind redistribution. To examine the empirical relevance of our hypothesis we investigate the relationship between the probability of adopting MW legislation and the size of primary government spending by employing a dataset of 38 -developing and developed- countries from 1960 to 2017. Probit model estimations yield support for our theoretical prediction that a decrease in government spending increases the likelihood of a country enacting MW legislation. This negative association remains highly robust under alternative empirical specifications and estimation techniques.

JEL-Codes: E210, E240, H230, J230.

Keywords: minimum wage, redistribution, heterogeneity, unemployment.

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May 25, 2020
We wish to thank Marcel Thum, Tryphon Kollintzas, Udo Kreickemeier, and Theodore Palivos, for many useful comments and discussions.

1. Introduction

In this paper we suggest an explanation regarding the popularity of the minimum wage (MW hereafter) institution even when non-blunt instruments of redistribution are part of the policy landscape[1], and we provide empirical evidence in support of our theoretical hypothesis.

MW legislation is one of the oldest government interventions in the labour market. However, throughout its history it has met with opposition by (many) economists. For example, Webb (1912) with reference to the imposition of a MW in the Australian province of Victoria in 1896, mentions that it was opposed with familiar arguments, i.e. that 'it was "against the laws of Political Economy", that it would cause the most hardly pressed businesses to shut down, that it would restrict employment, that it would drive away Capital, that it would be cruel to the aged worker and the poor widow, that it could not be carried out in practice, and so on and so forth' (p. 973). Yet, Webb concluded, that in a few years the MW institution was receiving such widespread support that '… no statesman, no economist, no political party nor any responsible newspaper of Victoria, however much a critic of details, ever dreams now of undoing the Minimum Wage Law itself' (p. 976).

To many economists the public's support for the MW institution is puzzling,[2] since the MW is considered a "blunt instrument" for redistribution (Card and Krueger, 1995, p.285). The standard argument is that most workers who gain from MW increases do not live in poor households, while some of those who do may lose their job as a result of such increases. Moreover, most people living in poverty do not work, and many of the working poor do not work full-time; or they work at hourly wage rates above the new minimum (Neumark and Wascher, 2008).

To be sure, during the last three decades the opposition of economists to the MW institution has become less vociferous – possibly due to the large number of theoretical and empirical studies which have questioned the standard prediction of competitive models (and earlier empirical consensus[3]) that binding MW result in employment

[1] An often-mentioned example of a less blunt instrument is the Earned Income Tax Credit (EITC) in the US, and similar schemes exist in Canada and the UK. Many continental European countries also operate means-tested social minima schemes.

[2] For example, even among German *managers* there was a 57% majority in favour of a mandatory MW according to a survey conducted for the Handelsblatt business newspaper in July 2013. For more evidence regarding public support for the MW institution see Economides and Moutos (2016).

[3] The consensus was captured by Brown et al. (1982, p. 524), who, on the basis of a six-volume report summarizing evidence for the United States and Canada, concluded that: for teenagers (ages 16-19), a 10 percent increase in the minimum wage reduced teen employment, most plausibly, between 1 and 3

losses. The first dent in the consensus came with Card and Krueger's (1994) study of the impact on fast-food employment of the 1992 increase in the New Jersey state MW. Their finding of "no evidence that the rise in New Jersey's minimum wage reduced employment at fast-food restaurants in the state (p. 796), caused a stir among economists and released a flurry of theoretical and empirical research (see e.g. Card and Krueger, 1995 and 2000; Machin and Manning, 1997; Neumark and Wascher, 2000 and 2008; Manning, 2003; Dickens and Manning, 2004; Dube et al., 2010; Cengiz et al., 2019; Dube 2019) which, to say the least, has not managed to re-establish the previous consensus.[4]

The literature has also expanded to consider the effects/interaction of MW legislation on various economic outcomes such as immigration, and the distribution of income (see e.g. Edo and Rapoport, 2019; Monras, 2019; Neumark and Shupe, 2019), but, to the best of our knowledge little attention has been paid to the interrelation between the public' support for the MW institution and fiscal redistribution. In our effort to study this, we build a model in which workers are heterogeneous in ability, which is in turn reflected in differences in labour income across workers. This assumption allows us to differentiate among high- and low-ability workers, as it will be the former that may gain from the rise in the wage *rate* per efficiency unit of labour - whereas the latter may face unemployment – as a result of the imposition of a MW per unit of labour *time*.[5]

We assume that the government engages in redistribution through the public provision of private goods (in-kind transfers) and enquire whether there can be a majority supporting the introduction of the MW as an additional redistributive tool.[6,7]

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percent; for young adults (ages 20-24), the employment impact is "negative and smaller than that for teenagers"; for adults, the "direction of the effect...is uncertain in the empirical work as it is in the theory."

[4] To understand how strong the earlier consensus was, it is enough to quote Stigler (1976, p. 349): "One evidence of professional integrity of the economist is the fact that it is *not* possible to enlist good economists to defend protectionist interests or minimum wage laws".

[5] We deliberately adopt a perfectly competitive labour market framework in our analysis not because we wish to ignore the various arguments that have been put forward in order to explain the possibly benign influence of MW on employment, growth, or welfare (see, e.g. Card and Krueger, 1995; Manning, 1995 and 2003; Cahuc and Michel, 1996; Askenazy, 2003). We do it because we wish to ensure the dis-employment effects of the MW, since in the opposite case there would be no puzzle regarding the support for the MW institution.

[6] In an earlier version of the paper examined the case in which the government does not engage in any type of redistribution –except the payment of unemployment benefits, and we were able to demonstrate that the MW is always preferred by the majority of workers. These results are available upon request.

[7] Thus, our approach is not normative, and should be contrasted with models which adopt an optimal taxation perspective (see, e.g. Allen, 1987; Guesnerie and Roberts. 1987; Boadway and Cuff 2001; and Lee and Saez, 2012). Note that among the more recent of these papers a MW policy combined with forcing non-working welfare recipients to look for jobs (and accept job offers) can increase the amount of redistribution from those working to those not working, and possibly reduce unemployment (Boadway and Cuff, 2001). Lee and Saez (2012) show that a binding MW enhances the effectiveness of transfers

The government is assumed to use the tax proceeds to finance the public provision of a good which is also provided by the private sector, albeit at different quality levels – a vertically differentiated product (VDP) like health, education, housing, or day care. Households are assumed to derive utility from the consumption of the VDP (either of the variety freely provided by the government or of the variety offered by the private sector) and of a privately produced homogeneous product. We assume this type of in-kind redistribution since we wish the government to already have in use (i.e. before the introduction of a MW) a programme which is well targeted. As noted by Besley and Coate (1991) and Boadway and Marchand (1995), people with different incomes can value publicly provided goods differently, thus public provision can induce self-selection (e.g. only the poor choose to consume the relatively low quality of the good provided by the government - with the better-off preferring to avail themselves of higher quality varieties which are privately supplied) and achieve redistribution with lower efficiency costs than if cash transfers were used.[8]

The introduction of a (binding) MW - which is set per unit of time rather than per effective unit of labour – will drive the lowest ability workers out of private employment, thus raising the marginal product and the wage *rate* (per effective unit of labour) of employed workers.[9] The government is assumed to atone for such an adverse effect on low-ability workers through the payment of unemployment benefits. Even though no analytical results can be derived, we are able to establish the following results. First, the maximum, politically viable, markup of the MW (per unit of time) relative to the perfectly competitive benchmark is lower than in the absence of in-kind redistribution. This implies that –ceteris paribus - countries with non-existent (or meager) in-kind redistributive schemes would tend to have higher MW than countries with extensive in-kind redistribution. Second, the stronger is the extent of in-kind redistribution (measured by the difference between the quality of the VDP provided by

to low-skilled workers as it prevents low-skilled wages from falling through incidence effects, thus MW can be an efficient complement to other transfer programmes.

[8] It bears noting that actual transfer programmes, like the Earned Income Tax Credit (EITC) in the United States, in addition to being less efficient than what lump-sum redistribution can achieve in theoretical models (since, e.g., the implicit marginal tax rates involved in EITC can be higher than 80 percent), are not easy to administer. According to the IRS, for fiscal year 2013, 24.0 percent of EITC payments were made to ineligible recipients – as a comparison of the waste involved, note that only 9.3 percent of the payments made by the unemployment insurance scheme were deemed as improper (for more details, see: https://www.treasury.gov/tigta/press/press_tigta-2014-50.htm).

[9] This feature of our model is akin to the assumption made by Lee and Saez (2012) that the unemployment induced by the minimum wage is efficient, i.e. unemployment hits workers with the lowest surplus first.

the government and the quality provided by the private sector), the smaller will be the proportion of workers supporting the introduction of a MW irrespective of the generosity of the unemployment benefit system.

Thus, the main message of the paper is that the mere presence of more efficient redistributive mechanisms, such as in-kind redistribution, is not enough to render the MW unpopular. These findings imply that if, for exogenous reasons, the political equilibrium shifts from one which involves generous redistribution (high quality of the publicly provided VDP) to one of less generous redistribution (lower quality), then there can now be a majority of workers who are in favour of introducing a (binding) MW. This finding can possibly explain why a well-developed social safety net in Scandinavia tends to co-exist with the absence of a national MW,[10] whereas in Southern Europe nationally binding (and relatively high) minimum wages are usually paired with the absence of a well-developed social safety net. Arguably, it can also have been one of the factors[11] influencing the recent decision in Germany to institute a (national) MW, which followed the previous decade's reductions in the generosity of explicit and implicit welfare support involved in the, so-called, Hartz reforms. In this vein, our finding echoes Acemoglu and Robinson's (2013) recent argument[12] that the politico-economic environment may have features (e.g. an overly generous welfare system) whose removal may ex-ante look efficient if one does not take into account how their removal may affect the future political equilibrium. But, if their removal induces unions

[10] In Scandinavia (and elsewhere) the absence of a statutory MW co-exists with high collective bargaining coverage, which effectively provides a wage floor for up to 90% of employees. However, the fact that coverage is not full implies that wages that are substantially below the minima established by collective bargaining are allowed to exist (see, e.g. Bosch and Kalina, 2010). Moreover, in some of these countries employers are increasingly refusing to apply the extension mechanisms, and are more willing to outsource activities to non-covered companies; see, e.g. the European Court of Justice rulings on the Laval, Viking and Ruffert cases. In particular, the Laval case involved a Latvian construction company, and the ruling held that the firm could not be forced to enter into collective negotiations with a Swedish union on rates of pay for its posted workers, which means that wage floors established through collective bargaining that are not extended nationally are not considered as a wage minimum. These features of actual labour markets imply that statutory MW are not completely functionally equivalent to the wage floors established by collective bargaining.

[11] Other factors, including the decline of trade union coverage, the increasing incidence of low-wage employment, and public opinion strongly in favour of the MW, induced unions to move in favour of a statutory MW. Framing the issue was also important: the principle was that the MW should be set such that single person working full-time would earn enough not to require additional support from social assistance, and thus to regulate the subsidization of low pay by the welfare state. This framing of the MW debate built on opposition to the Hartz reforms and resistance to the emergence of a second-class welfare status for workers who could not establish an insurance record (for more details see, Hassel (2014) and Eichhorst (2015)).

[12] See also Dixit (1997) and Drazen (2002) who made a plea that economists' policy advice should be informed by what is incentive compatible for politicians.

to switch their support in favour of the MW as a "savior of last resort", it can lead to the emergence of policies that generate greater efficiency losses than those entailed by the policies which were removed.

Going beyond the anecdotal evidence presented in the previous paragraph, we also undertake a formal econometric investigation of our theoretical hypothesis. Thus, in the empirical section of the paper we investigate the potential relationship between the probability of adopting MW legislation and the size of primary government spending (as well on government transfers and subsidies) by building on a dataset of 38 -developing and developed- countries from 1960 to 2017. To the best of our knowledge, this is the first empirical study that places the spotlight on this specific issue for a such large set of countries and -more importantly- during such an extended time span. The empirical findings obtained from the Probit model provide evidence in favour of our theoretical priors. Namely, a decrease in government spending increases the likelihood of a government to adopt MW legislation. This negative association remains highly robust under alternative empirical specifications and estimation techniques. In turn, in order to address potential endogeneity concerns -emerging from the fact that government spending might be endogenous to several economic outcomes and institutions- our analysis follows the instrumental variable strategy suggested by Caselli and Reynaud (2020) and employs a *government spending abroad* variable as an instrument for *government spending* in the context of an IV Probit empirical model. Obtained empirical results are -once again- in line with our theoretical priors highlighting the negative and highly significant relationship between government spending and MW legislation.

The remainder of the paper is organized as follows. Section 2 compares our work to the literature. Section 3 presents the PC case, whereas in Section 4 we examine the MW case. In Section 5 we compare how the interplay between the generosity of unemployment insurance and in-kind redistribution shapes political preferences regarding the introduction of a MW. The results of the empirical inestigation are presented in Section 6, whereas Section 7 offers concluding remarks.

2. Related Literature

Our paper is related to the literature on the political economy of the MW and labour market institutions (see, e.g. Cox and Oaxaca, 1982; Sobel, 1999; Saint-Paul, 1996 and 2000; Rodrik, 1999; Adam and Moutos, 2011; Lesica, 2018). In contrast to these papers,

the focus of the present paper is on whether there is a majority among workers in favour of the MW institution when another redistributive device is available. The work closer in spirit to our investigation is by Saint-Paul (2000, chapter 3), who shows that if there are complementarities in production between less skilled workers and more skilled workers, then the existence of a MW, which is binding for the less skilled, may receive the support of the "middle class" despite its adverse effect on the before-tax wages of the more skilled, if the latter group can thus escape with smaller transfers to the rest of the workers. Interestingly, the same pattern of political support emerges in our model despite the lack of complementarity in production (thus before-tax wages increase for all employed workers after the imposition of a binding minimum wage) once the more realistic in-kind redistribution scheme is considered (instead of the lump-sum transfer assumed by Saint-Paul).

Boeri (2012) presents a separate strand of research – but one which is closely related to our own - by relating preferences on the level of the MW to the way in which the MW is set, i.e. whether it is the outcome of a collective bargaining procedure at the national level, or set by the government or an independent authority. To this purpose he develops a theoretical framework to study the interaction between the level of the MW and the fixing regime and derives conditions under which a MW set by government legislation is lower than a MW set through collective bargaining. He also undertakes a detailed empirical investigation of the main features of the process behind MW setting for a set of 68 countries during the period 1981-2005. His main finding is that a government-legislated MW (as a ratio to the average or median wage) is lower than a wage floor set through collective bargaining once controlling for factors like the elasticity of labour demand and the generosity of unemployment benefits.

Two works also related to our paper are those of Aghion et al. (2009), and Algan et al. (2016). In the first of these papers, the existence of state regulation in the form of MW crowds out the possibility for workers and firms to experiment in negotiations and to learn about the benefits of cooperation. Thus, in addition to a "good" equilibrium, a "bad" equilibrium can emerge which is characterized by distrustful labour relations, low union density and strong state regulation of the MW. In the second paper, the authors argue that uncivic individuals support large welfare states because they expect to benefit from them without bearing their costs, whereas civic individuals support generous benefits and high taxes only when they are surrounded by trustworthy individuals. Our paper is complementary to the above papers, in the sense that it can

explain why a well-developed social safety net tends to co-exist with the absence of a national MW, whereas the opposite occurs in the absence of a well-developed social safety net. Therefore, by combining the above, it is possible that the coexistence of a large welfare state and the absence of minimum wages (as in Scandinavian countries) are due to the existence of a high percentage of civic minded individuals.

3. The Perfectly Competitive Case

We consider an economy which produces and consumes two goods (*X* and *Y*). Good *X* is a homogeneous good produced by private-sector firms only, whereas good *Y* is a (vertically) differentiated product which can be produced at different quality levels by private-sector firms and by the public sector.[13]

We assume that all households are endowed with one unit of labour, which they offer inelastically. There are, however, differences in skill between households, which are reflected in differences in the endowment of each household's effective labor supply. This is in turn reflected in differences in income across households. We assume that firms pay the same wage rate per effective unit of labor –thus the distribution of talent across firms does not affect unit production costs.

3.1 Production

We use good *X* as the numeraire, and set its price to one, $P_X = 1$. The technology employed by the firms producing good *X* is:

$$X = \gamma L - \frac{\delta}{2} L^2 \text{ , } \gamma, \delta > 0 \tag{1}$$

where *L* stands for the number of effective units of labour used. Denote by *w* the wage *rate* per effective unit of labour. Profit maximization implies that the demand for effective units of labour is:

$$L = \frac{\gamma - w}{\delta} \tag{2}$$

[13] In both developed and developing countries a significant amount of redistribution occurs in-kind. The fraction of GDP spent on these programs is quite substantial and has ranged between 10 to 15 percent of GDP in OECD countries during the last decade. In contrast, the amount paid through a cash-transfer program like the EITC in the US is substantially smaller (e.g. about 0.5 percent of GDP in 2015).

The profits resulting from the production of the homogeneous good are[14]:

$$\Pi = \frac{\delta}{2}\left(\frac{\gamma - w}{\delta}\right)^2. \tag{3}$$

The vertically differentiated product, *Y*, can be produced at various quality levels in both the private and the public sector. We wish to capture the fact that, for many government-provided goods (or services), some citizens choose not to "consume" them (even though they are eligible for doing so and there is no price-tag attached to them), preferring instead to purchase them from the private sector.[15] Typical examples of such publicly provided goods are health care, child care, old-age care, housing, and education. One reason for this is that these goods may be provided by the government at a lower quality level than the quality level that (high-income) households would like to consume, and there is a large degree of lumpiness associated with their consumption. For example, it is nearly impossible for a student to attend at the same time a public and a private educational institution (or to attend both institutions part-time thus achieving a full-time status), or for a patient to have part of a heart operation at a public hospital and the rest of the operation at a private one. Moreover, in many cases it confers no extra utility (or it is detrimental) to supplement publicly provided goods with privately provided ones (i.e., first having an operation at a public hospital and afterwards supplementing it with another operation at a private hospital). High-income households will often elect to pay in order to avail themselves of the highest quality of these services – rather than be satisfied with the (sometimes) mediocre quality offered by the public sector.

We assume that quality is measured by an index $Q > 0$, and that there is complete information regarding the quality index (see, e.g. Rosen, 1974). We further assume that for private sector firms, average costs depend on quality and that, for any given quality

[14] We are implicitly assuming that production requires the existence of a fixed factor (e.g. entrepreneurship) whose quantity is fixed at 1, and which is provided by the owners of the firms. We also set the number of firms to 1 and assume that the number of firm owners is very small relative to the population of workers so that, for simplicity, and without any loss of generality, their spending patterns can be ignored. Alternatively, we could assume that their income is such that they would always choose to buy the privately provided vertically differentiated product; doing so has no discernible effect on the qualitative nature of our results.

[15] Stiglitz (1974) and Glomm and Ravikumar (1998) provide early analyses of similar cases applied to questions of majority voting equilibria regarding the funding of public goods.

level, the average cost is independent of the number of units produced. These assumptions are captured by the following production function:

$$Y_{Q_P} = \frac{L_Y}{\beta Q_P} \quad , \ \beta \leq 1 \ . \tag{4}$$

In equation (4), Y_{Q_P} denotes the number of units of good Y of quality Q_P provided by the private sector, and L_Y denotes the effective units of labour used. This specification implies that as quality increases more (effective) units of labour are required to produce each unit of the Y good. It also implies that the (average) cost and, under perfect competition, also the price at which each unit of the good of quality Q will be a function of quality – but independent of the level of output[16]:

$$AC_P(Q_P) = P(Q_P) = w\beta Q_P. \tag{5}$$

For simplicity, and without loss of generality, we assume that the public sector uses a similar technology to produce the good, pays the same wage rate (per effective unit of labour), but for various reasons it may be a less efficient producer than private sector firms.[17] We capture this (potential) difference in efficiency between the private and the public sector by assuming that $\beta = 1$ in the public sector. Accordingly, average costs in the public sector are

$$AC_G(Q_G) = wQ_G \tag{6}$$

where the subscript G denotes the public sector, and Q_G is the quality offered to households at no charge by the public sector.

In what follows we assume that there is a single quality offered by the private sector (Q_P), and a single quality offered by the public sector (Q_G). As it will turn out, the difference in the quality levels offered by the two sectors will be important for our results. We shall regard this difference as exogenous, possibly determined by factors outside the scope of this paper, e.g. by cultural traits which influence the size of the

[16] Thus, private producers of the vertically differentiated product earn zero profits.

[17] The assumption that the public sector is less efficient than the private sector dates back to Baumol (1967). We note that the qualitative nature of our results would not change if we assumed that the public sector is as efficient as the private sector (i.e. $\beta = 1$).

welfare state as in Algan et al. (2016). Since no household would wish to pay to buy the privately provided quality if $Q_G \geq Q_P$, we assume that $Q_G < Q_P$.

3.2 Households

All households are assumed to have identical preferences, and their mass is set to 1. Following Rosen (1974), we assume that the homogeneous good is divisible, whereas the quality-differentiated product is indivisible and households can consume only one unit of it. For simplicity we write the utility function as[18]

$$U_i = \sqrt{C_i Q_i}$$

where C_i and Q_i stand for the quantity of the homogeneous good and the quality of good Y (either the privately or the publicly provided variety) consumed by household i.

Let e_i stand for household's i endowment of effective number of labour units. We assume that there is a continuum of households, $i \in [0,1]$, with Pareto distributed abilities. The Pareto distribution is defined over the interval $e \geq b$, and its CDF is

$$F(e) = 1 - (b/e)^a, a > 1. \tag{7}$$

Parameter b stands for the lowest ability (i.e. effective labour units) among households, and parameter a determines the shape of the distribution (higher values of a imply greater equality). The Pareto distribution, in addition to being easy to work with, is a good approximation of actual income distributions. Empirical estimates of the value of a range between 1.7 and 3.0 (see, Creedy (1977)). The mean ability of the Pareto distribution is equal to

$$\mu = \alpha b/(\alpha - 1) \tag{8}$$

and the ability of the median household is equal to

[18] The Cobb-Douglas utility function has the advantage that it produces results which are independent of the level of the economy's average income.

$$m = 2^{1/a} b \tag{9}$$

Since good Y is also offered by the public sector, and households can consume either the privately provided variety or the variety provided by the government, households, in effect, face two mutually exclusive budget constraints. The budget constraint of a household deciding to acquire a variety of Y which is offered by the private sector is:

$$e_i w(1-\tau) = C_i + \beta w Q_P.$$

where τ stands for the income tax rate. Given the quality level of the privately provided variety, the household's demand for the homogeneous good is:

$$C_i = e_i w(1-\tau) - \beta w Q_P. \tag{10}$$

If the household chooses to consume the publicly (and freely) provided variety (Q_G) the entire disposable income of the household is spent on the homogeneous good, and the demand for it is:

$$C_i = e_i w(1-\tau). \tag{11}$$

The resulting indirect utility of the household is then,

$V_i^P = \sqrt{w[e_i(1-\tau) - \beta Q_P]Q_P}$, if it chooses to consume a privately offered variety
$V_i^G = \sqrt{w e_i (1-\tau) Q_G}$, if it chooses to consume the publicly offered variety

We note that the difference between V_i^P and V_i^G is increasing in ability (and income). Thus, only households with relative large incomes will be willing to pass by the possibility of consuming for free the publicly provided variety and instead pay to acquire the high quality variety offered by the private sector. Let θ denote the ability of a household that is indifferent between consuming the publicly provided variety and the privately produced variety, i.e., for this household it holds that:

$$\sqrt{w[\theta(1-\tau)-\beta Q_P]Q_P} = \sqrt{w\theta(1-\tau)Q_G}$$

We term θ the *dividing* level of ability. Households with ability greater than θ will prefer to pay in order to acquire the privately offered variety, whereas households with ability smaller than θ will avail themselves of the freely offered public variety. Solving the above equation for θ we find that:

$$\theta = \frac{\beta Q_P^2}{(1-\tau)(Q_P - Q_G)} \tag{12}$$

From equation (12) we note that $d\theta/d\beta>0$, i.e. that – *ceteris paribus* – as the private sector becomes more productive in the provision of the vertically differentiated product (β becomes smaller), the higher will be the number of households who would choose to pay in order to acquire the privately supplied variety. From the same equation we note also that – *ceteris paribus* – the higher is quality provided for free by the public sector (Q_G), the higher will be θ, and the fewer will be the households willing to pay for the private variety.

The Pareto distribution implies that the proportion (and number) of households with ability smaller or equal to θ is

$$F(\theta) = 1 - \left[\frac{b}{\theta}\right]^{\alpha}. \tag{13}$$

Thus, the number of households which choose to consume the publicly provided variety will be equal to $1-(b/\theta)^a$, and this will also be the number of units of quality Q_G produced by the public sector. The corresponding demand, and production, of units of quality Q_P by the private sector will be equal to $(b/\theta)^a$. As a result, the demand for effective units of labour by the public sector will be equal to $\left\{1 - \left[\frac{b}{\theta}\right]^{\alpha}\right\} Q_G$, whereas the corresponding demand by the private producers of the vertically differentiated good will be equal to $\left[\frac{b}{\theta}\right]^{\alpha} \beta Q_P$.

3.3 Labour Market Equilibrium

Aggregate demand for effective units of labour is equal to the sum of labour demand by the producers of the homogeneous good and the demand by private and the public producers of the vertically differentiated product[19], i.e. it is equal to

$$\frac{\gamma-w}{\delta}+\left[\frac{b}{\theta}\right]^{\alpha}\beta Q_P+\left\{1-\left[\frac{b}{\theta}\right]^{\alpha}\right\}Q_G.$$

The aggregate supply of effective labour units is just the mean ability in the population, which is equal to $(\frac{\alpha b}{\alpha-1})$. Thus, the equation describing labour market equilibrium is:

$$\frac{\gamma-w}{\delta}+\left[\frac{b}{\theta}\right]^{\alpha}\beta Q_P+\left\{1-\left[\frac{b}{\theta}\right]^{\alpha}\right\}Q_G=\frac{\alpha b}{\alpha-1}. \tag{14}$$

Another way to write this equation will prove more informative for what follows, i.e.

$$\frac{\gamma-w}{\delta}=\frac{\alpha b}{\alpha-1}-\left[\frac{b}{\theta}\right]^{\alpha}\beta Q_P-\left\{1-\left[\frac{b}{\theta}\right]^{\alpha}\right\}Q_G.$$

This equation states that labour market equilibrium obtains when the *net* supply of labour to the homogeneous sector –i.e. the total supply of labour minus the effective labour units required for the production of the private and public varieties of the VDP – is equal to the demand for labour by the producers of the homogeneous good.

3.4 Government Budget Constraint

The government's revenue consists of taxes on wage income and on profits. We assume that a common, and proportional, tax rate is applied to both wage income and profits. Given that aggregate wage income is equal to $w(\frac{\alpha b}{\alpha-1})$, and aggregate profits from the production of the homogeneous good[20] are equal to $\frac{\delta}{2}(\frac{\gamma-w}{\delta})^2$, the government's budget constraint can be written as:

[19] For completeness, one must add the demand for labour arising from the consumption of the VDP by the fixed number of the owners of the firms which receive the profits from their operation. We assume that the (after-tax) profit income of these individuals is high enough so that they always consume the privately provided variety, thus adding a constant to the aggregate demand for labour – which, for simplicity, we ignore.

[20] See equation (3). Note also that private producers of the VDP make no profits.

$$\tau\left\{w\left(\frac{\alpha b}{\alpha-1}\right)+\frac{\delta}{2}\left(\frac{\gamma-w}{\delta}\right)^2\right\}=w\left\{1-\left[\frac{b}{\theta}\right]^{\alpha}\right\}Q_G \tag{15}$$

The right-hand-side of equation (15) is government spending, which just equals the total cost of producing the required units of the vertically differentiated product (i.e. the units demanded by households with ability less or equal to θ).[21]

We assume that the tax rate adjusts to keep the government's budget in balance.

3.5 General Equilibrium

Since all private budget constraints are satisfied, general equilibrium in this economy obtains when the labour market is in equilibrium, and the government budget in balance.

Equations (12), (14), and (15) can be solved to determine the values of θ, w, and τ, and then the rest of the endogenous variables can be determined. Although the system is block-recursive, it is non-linear, and no analytic solution can be derived. Moreover, due to the nonlinearity of the system, it is not possible to exclude theoretically the possibility of multiple equilibria. Nevertheless, we can report that after extensive numerical simulations with a wide range of plausible parameter values we have not found a single case of multiple equilibria. These numerical simulations are available upon request.

4. Minimum Wage Case

We now assume the existence of a government-imposed MW per unit of labour *time* (e.g. per hour) equal to y, which is the minimum amount that an employer must pay in order to employ one person. This MW per unit of time must be distinguished from the wage *rate* per *effective* unit of labour, which will be market-determined (i.e. as in the previous section). Since, preferences, technology, and the distribution of ability remain as in the case with a perfectly competitive labour market, the *dividing* level of ability, θ, is still determined by equation (12).

[21] In principle, the government could, instead of providing for free the VDP, charge a price lower than the cost of producing it.

4.1 Labour Market

The MW constraint implies that firms will not be willing to employ workers whose level of ability (i.e. number of efficient units of labour per unit of time) is such that $y > e_i\varpi$, where ϖ stands for the market-determined wage rate per effective unit of labour in the presence of the MW (per unit of time) constraint. If ε denotes the level of ability for which it holds that $y = \varepsilon\,\varpi$, the total number of effective units of labour supplied by individuals with $e_i \geq \varepsilon$ is equal to $\frac{\varepsilon\alpha}{\alpha-1}\left\{\frac{b}{\varepsilon}\right\}^{\alpha}$.

The wage *rate* per effective unit of labour paid by private sector firms is determined by equating the demand for effective units of labour (which is equal to the sum of labour demand by the producers of the homogeneous good and the demand by private and the public producers of the vertically differentiated product) with the supply of effective labour units possessed by individuals with $e_i \geq \varepsilon$:

$$\frac{\gamma-\varpi}{\delta} + \left[\frac{b}{\theta}\right]^{\alpha}\beta Q_P + \left\{1 - \left[\frac{b}{\theta}\right]^{\alpha}\right\} Q_G = \frac{\varepsilon\alpha}{\alpha-1}\left\{\frac{b}{\varepsilon}\right\}^{\alpha} \tag{16}$$

4.2 Government

As before, we assume that the government runs a balanced budget. Its revenue arises from taxing the aggregate wage income in the private sector - which is equal to the wage rate (ϖ) times the effective labour units supplied to the private sector ($\frac{\varepsilon\alpha}{\alpha-1}\left\{\frac{b}{\varepsilon}\right\}^{\alpha}$), plus the taxation of profits. Its expenditure is the net (i.e. after tax) payments of the minimum wage to each of the public sector employees, plus the payment of benefits to the unemployed (whose number is equal to $1 - \left\{\frac{b}{\varepsilon}\right\}^{\alpha}$). We assume that the government pays the same wage rate per effective unit of labour as private sector firms, and that it is meritocratic in the sense that it hires only those with ability $e_i \geq \varepsilon$.[22]

The government is assumed to set the level of the unemployment benefit as a fixed proportion of the MW, i.e. it sets it equal to φy $(0 \leq \varphi < 1)$. Parameter ϕ describes the generosity of the unemployment benefit system. We note that in this model the granting of these benefits has an indefinite duration since the lowest-ability workers are permanently excluded from employment. In this sense, the income support provided to the unemployed is comparable to the real-world welfare payments (e.g. social

[22] Assuming that the government may hire less able workers and thus increase the cost of providing Q_G may be an interesting extension of our analysis.

assistance) provided to individuals whose eligibility for unemployment benefits has expired, or those who have never fulfilled the eligibility criteria for receiving them. Thus, the government budget constraint is:

$$\tau\left\{\varpi\frac{\varepsilon\alpha}{\alpha-1}\left\{\frac{b}{\varepsilon}\right\}^{\alpha}+\frac{\delta}{2}\left(\frac{\gamma-\varpi}{\delta}\right)^{2}\right\}=\varpi\left\{1-\left[\frac{b}{\theta}\right]^{\alpha}\right\}Q_G+\left(1-\left\{\frac{b}{\varepsilon}\right\}^{\alpha}\right)\varphi y \tag{17}$$

4.3 General Equilibrium

Equations (12), (16), (17) and $y=\varepsilon\,\varpi$ can be solved to determine the values of $\theta,\varepsilon,\varpi,,$ and τ, and then the rest of the endogenous variables can be determined. We again note that although the system is block-recursive, it is non-linear, and no analytic solution can be derived. Nevertheless, we can draw some useful results by comparing the perfectly competitive (PC) with the minimum wage (MW) case.

5. Comparison

We now proceed to compare the equilibrium outcomes in the MW and PC cases. Since it is impossible to derive closed-form solutions, we resort to numerical calculations.

5.1 Parameter values

Table 1 reports the baseline parameter values for policy, technology and preferences used to obtain the values of the endogenous variables.

[Table 1]

In accordance with the relevant empirical studies we set the baseline value of parameter a, which determines the shape of the Pareto distribution and is a measure of income inequality among workers, equal to 2, and its "extreme" values to 1.5 and 2.5. We note that for $a=2$, the Gini coefficient, whose value for the Pareto distribution is $G=\frac{1}{2\alpha-1}$, is equal to 0.33, which is very close to the average estimates for the values of labour income inequality among full-time workers observed in OECD economies (see, e.g., Koske et al., 2012).[23] Parameter b, which stands for the lowest ability among

[23] The "extreme" values for a (i.e. 1.5 and 2.5) correspond also to the lowest and highest estimates among OECD countries for the Gini coefficient of labour income inequality among full-time workers in this study.

households, can be chosen arbitrarily so that the model's equilibrium values of the endogenous variables match well with actual economies; we set it to 1.[24]

Among the rest of the parameter values, of particular importance is the difference between the values of Q_P and Q_G. Since both of these values are indices of how consumers perceive the quality inherent in the privately and publicly provided varieties of the VDP, one way to get a handle on a meaningful difference between them is to choose them in such a way so as to have the percentage of the population opting out of the consumption of the freely provided public variety being close to what we observe in many countries. For example, the percentage of the population among OECD countries choosing to pay in order to avail themselves of the privately provided variety is often below 10 percent.[25] With this in mind, we initially set $Q_P = 3$, and $Q_G = 0.5$, so that at the initial constellation of parameter values the percentage of workers consuming the privately provided variety of the VDP is 6.4 percent.[26] Regarding parameters γ and δ, and given that α=2 and b=*1*, a wage elasticity of labour demand equal to -0.5 requires $\gamma = 3\delta$;[27] we normalize them to $\delta = 1$, and $\gamma = 3$. Parameter φ is set at 0.5 – implying a moderately generous social welfare support for the unemployed. Finally, we initially consider a minimum wage (per unit of time) that is a moderate 10 percent above what the minimum ability worker would earn in the PC case (i.e. $y = \lambda(bw) = \lambda w = 1.1w$).

5.2 Results

5.2.1 Baseline Case

The consequences resulting from adopting a "moderately" binding MW which is (per unit of time) 10 percent higher than what the worker with the lowest ability would earn in the PC case, are shown in the first line of Table 2.

[24] This is just a normalization; different values of *b* would not affect the qualitative nature of the results.
[25] The percentage of students in privately *managed* elementary and secondary schools is in many OECD countries below 10 percent (e.g. 10 percent in Sweden,9 percent in the United States, 6 percent in the United Kingdom, 5 percent in Germany – see, http://www.oecd.org/pisa/50110750.pdf). Note that this figure includes schools managed by religious organizations which are sometimes funded by the government and do not charge substantial or any fees. Regarding health care no easily comparable data are available, as some patients may use public hospitals for some operations and go private in other cases.
[26] Note that if we assume that firm owners are included in our calculations, the share of the population consuming the privately provided variety would possibly be about 10 percent.
[27] Allowing for other plausible values for the wage elasticity of labour demand does not influence the qualitative nature of our findings.

[Table 2]

With $Q_G = 0.5$, the introduction of the MW results in a rise in the pre-tax wage *rate* (per effective unit of labour) from 1.64 to 1.7207 (a rise by about 5 percent), which in turn prices the least able workers out of employment, generating an unemployment rate equal to 9.02 percent. (We note that the unemployment rate is the percentage of persons/workers that are unemployed, and this must be distinguished from the percentage of *effective* labour units which are priced out of employment; given that the persons with the lowest endowment of effective labour units are unemployed, the percentage of effective labour units which are priced out of employment would be about 4.6 percent.) Given that the generosity of the unemployment benefits parameter φ is set at 0.5, all unemployed workers will have an after-tax income and utility which will be lower than in the PC case. Among the workers at the top of the ability distribution only 6.36 percent (=1-0.9364) would choose to buy the privately supplied variety of the VDP (whose quality index is: $Q_P = 3$) in the PC case; this proportion drops to 5.83 percent in the MW case. This is a consequence of two forces: first, the emergence of unemployment requires a rise in the tax rate from 18.26 percent in the PC case to 21.74 percent in the MW case, thus reversing much of the rise in the pre-tax wage *rate* (per effective unit of labour) from 1.64 to 1.7207, which is generated by the imposition of the minimum wage; the after-tax wage *rate* rises by from 1.3405 to 1.3466 (a rise by about 0.5 percent), and second, the rise in the cost of producing (and the price of) Q_P due to the rise in the wage *rate*.[28]

Among the workers that remain employed (the 90.98 percent), some workers will be better off under the MW regime, while some others will be worse off. To understand how workers of different ability will fare after the introduction of the MW, we start by dividing the employed workers in three distinct groups.

The first group contains those workers (of moderate-to-high ability) that remain employed after the introduction of the MW, and continue to consume the freely provided Q_G. These workers, provided that the after-tax wage *rate* rises,[29] will clearly be better off with the MW since their consumption of the homogeneous good rises and

[28] Note that the cost of producing the public variety will also rise after the introduction of the MW due to the rise in the wage rate, thus the tax rate will increase for this reason as well.
[29] Although we cannot establish this analytically, we have not been able to find a single case under plausible parameter values for which this is not true.

continue to consume the freely provided Q_G. This group represents 84.62 percent of all workers, and its size is equal to the difference between the percentage of workers that were consuming Q_G in the PC case (93.64) and the percentage that become unemployed in the MW case (9.02). We note that this group always[30]contains the worker with median ability, and that all members of this group will always be unanimous in their preferences regarding the introduction of the MW. Given that the preferences of this group (due to its size) are pivotal for the political viability of the MW, in what follows we shall call this group the *median-ability* group. Thus, examining the utility of the worker with median ability in the PC and MW cases will be sufficient to determine the preferences of the median-ability group, and to infer whether there is a majority among workers in favour of the MW regime.

The second group contains the workers of very high ability that purchase the private variety of the VDP before and after the introduction of the MW (i.e. these are the workers whose ability is at least 4.1401 in Table 2). For these workers, their utility will be:

$V_{PC} = \sqrt{w[e\ (1-\tau_{PC}) - \beta Q_P]Q_P}$, in the PC regime, and,

$V_{MW} = \sqrt{\varpi[e(1-\tau_{MW}) - \beta Q_P]Q_P}$, in the MW regime.

Whether V_{MW} is larger or smaller than V_{PC} it depends only on the income that is left after purchasing Q_P. Thus, it depends on the sign of the expression Δ, defined as $\Delta = \varpi[e(1-\tau_{MW}) - \beta Q_P] - w[e\ (1-\tau_{PC}) - \beta Q_P]$. This expression can be re-written as $[\varpi(1-\tau_{MW}) - (1-\tau_{PC})w]e + \beta Q_P(w - \varpi)$, which can be either positive or negative. Assuming that the after-tax wage *rate* in the MW case is higher than in the PC case, the value of Δ is increasing in e. Thus, it is possible that among workers of very high ability (i.e. those choosing to consume Q_P under both cases), only those of exceptionally high ability will prefer the imposition of a MW. This is understandable since the imposition of the MW raises the cost of acquiring Q_P by the same amount for all workers (i.e. by $\beta Q_P(\varpi - w)$), but the total increase in nominal wage income due to the higher wage *rate* will be higher for higher ability workers. Thus, among the 5.83 percent of workers which choose to buy the privately supplied variety of the VDP in

[30] This is because the percentage of workers purchasing the privately produced variety of the VDP (Q_P) is a small percentage of all workers.

the MW case, 5.82 percent (among all workers) will be against introducing the MW, and only the remaining 0.01 percent will be in favour of the MW. We note that it is possible for a worker to be against the introduction of the MW even when her after-tax nominal wage income rises.

The third group of workers contains those with high ability that switch from consuming Q_P to consuming Q_G after the introduction of the MW. (In the baseline case with $Q_G = 0.5$, these are the workers with ability (e) between 3.9638 and 4.1401.) The reason that the *dividing* level of ability θ (i.e. the ability level above which workers/households will prefer to pay in order to acquire Q_P, whereas households with ability smaller than θ will avail themselves of the freely offered Q_G) rises after the MW is imposed, is that the rise in the (price, and) cost of producing Q_P rises in proportion to the rise in the (gross) wage *rate*, whereas the after-tax nominal wage income rises by a smaller proportion due to the rise in the tax rate. Thus, the worker who was previously indifferent between purchasing Q_P and using Q_G, will now be induced to switch to consuming the freely available Q_G, since, as argued in the previous paragraph, if the level of ability is not very high, the rise in after-tax income will be smaller than the rise in the cost of Q_P. As a result, this group of workers will also be against the introduction of the MW; its size is equal to 0.53 percent of all workers (i.e. the difference between the percentage that were using Q_G before (93.64) and after the introduction of the MW (94.17)).

In aggregate, the workers which are against the MW are equal to the sum of unemployed (9.02 percent), the 5.82 percent among the second group, and the third group (0.53 percent), i.e. it is equal to 15.37 percent. Those being in favour of introducing the MW are the sum of the median-ability group (84.62 percent) and the 0.01 percent among the second group (those of exceptionally high ability), i.e. it is equal to 84.63 percent. If citizens express their policy preferences on the basis of their personal welfare alone, the MW would garner a winning coalition comprising the moderate- to high-ability workers, and the exceptionally high-ability workers. This non-monotonic relationship between worker ability and policy preferences regarding MW can partly match with what Stigler (1970) termed Director's Law – according to

which public interventions are made for the primary benefit of the middle classes, and financed with taxes which are borne in considerable part by the rich and the poor.[31]

Block A of Table 2 examines whether the political viability of the MW depends on how large it is relative to the PC benchmark. The baseline result assumed the imposition of a MW (per unit of time) that is a moderate 10 percent above what the minimum ability worker would earn in the PC case (i.e. $y = \lambda(bw) = \lambda w = 1.1w$). As the (gross) markup (λ) of the minimum wage (per unit of time) over what the minimum ability worker would earn in the PC case increases, the popularity of the MW decreases, and eventually receives no political support when λ=1.20. This is a consequence of the progressively higher unemployment rate that a higher λ generates, implying larger increases in the tax rate and a drop in the after-tax wage rate. The rise in the tax rate is due to three factors. First, to the rise in unemployment and the need to finance the provision of unemployment benefits, second, to the assumed proportionality between the level of the MW and the unemployment benefit, and, third, to the rise in the cost of producing Q_G since the wage rate increases.[32] Although not shown in Table 2, we have also verified that the politically viable markup of the MW relative to the PC benchmark is decreasing in the extent in-kind redistribution.[33]

Block B portrays how the generosity of the unemployment benefit system – as captured by parameter φ - affects the desirability of the MW (baseline: $\varphi = 0.5$). The political support for the MW increases when the unemployed receive less support, since this allows for a smaller increase in the tax rate relative to the PC case. However, the MW would receive no political support if the unemployment benefit system became mildly generous ($\varphi = 0.6$).

Finally, the influence of (in)equality in the distribution of ability – as captured by parameter α – is portrayed in Block C (baseline: $\alpha = 2, b = 1$). Since changing α affects the mean ability in the economy ($\mu = \alpha b/(\alpha - 1)$) if b remains unchanged, in order to isolate the effects of changes in the distribution of ability we allow b to adjust

[31] The matching is imperfect since in our model the exceptionally able workers (the top 0.01 percent) would be better-off with the MW.

[32] We note that although the political popularity (i.e. the share workers that prefer the MW regime over the PC one) of the MW drops as λ increases from 1 to 1.2, the utility of the median-ability worker initially rises as λ increases from 1 to 1.1, and then declines. The two effects are compatible with each other, since the drop in political popularity is (mainly) driven by the reduction in the size of the median-ability group due to the transfer of the lowest ability members of this group to the rank of unemployed as λ increases.

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

whenever α changes so as to keep mean ability constant. We observe that the degree of inequality in the distribution of ability has no appreciable influence on the desirability of the MW.

5.2.2 The influence of in-kind redistribution

Table 3 reveals how the extent of in-kind redistribution – as measured by the quality of the publicly provided variety – affects the political viability of the MW institution.

[Table 3]

For ease of comparison we include the baseline case with $Q_G = 0.5$. We first note that as Q_G rises from 0.1 to 0.5, there is large majority of workers (about 84 percent) in favour of introducing the MW. However, when Q_G rises to 0.6 (and above)[34] there will be no worker that will be better-off with the MW. Naturally, as Q_G rises, the proportion of workers choosing to avail themselves of the (free) publicly provided variety rises from about 88 percent when $Q_G = 0.1$ (in both the PC and MW cases) to about 98 percent when $Q_G = 1$ (in both cases). As expected, the tax rate needed to finance this rise in the quality of the publicly provided variety rises sharply from less than 5 percent (in both cases) to over 40 percent (in both cases), with the tax rate being higher in the MW case.

In addition to its effect on the tax rate, a higher Q_G implies an increased demand for effective units of labour by the government, reducing the effective units of labour available for hiring by private sector firms (both homogeneous good- and VDP-producers), thus resulting in a positive relationship between Q_G and the wage rate (this holds in both the PC and the MW case). However, the rise in the wage rate is more than fully offset by the rise in the tax rate, thus resulting in a negative relationship between Q_G and the after-tax wage rate (in both cases). This is a desirable feature of our model since otherwise the government could make most of the workers better-off by engaging in ever higher, and higher, doses of redistribution through further rises in Q_G . (In such a case, employed workers belonging to the median-ability group would be better-off since they would be able to consume higher quantities of the homogeneous good and to avail themselves of the higher quality of the publicly provided VDP.)

[34] In fact, the crucial value of Q_G above which the MW receives no support from any worker is 0.55.

However, it is still possible for utility to increase as Q_G increases up to some point, since the decline in the after-tax wage income can be offset (in utility terms) by the rise in Q_G. Indeed, Table 3 reveals that utility of the median-ability[35] worker (i.e. a worker who is always employed and consumes the government-provided variety of the VDP) keeps rising until Q_G rises above 1 (maximum utility is reached when Q_G =1.15 in the PC case, and when $Q_G = 1.2$ in the MW case).

Figure 1 (based on Table 3) reveals that once the level of Q_G is not far too small relative to the level which maximizes the utility of the median-ability agent under PC, the median-ability worker (as well as all workers belonging to the median-ability group which comprises far more than 50 percent of all workers) would experience a reduction in her utility from the introduction of the MW. This implies that when an adequate amount of politically viable redistribution is undertaken via the public provision of private goods, adding a less efficient redistributive device (like the MW) to the policy arsenal can be welfare reducing. In contrast, when, the initial equilibrium involves too little, or no, in-kind redistribution, the introduction of the MW can be a useful antidote to the lack of adequate redistribution (from the point of view of the majority of employed workers).[36]

6. Empirical Analysis

In this section we investigate whether the probability of adopting minimum wage legislation is influenced by the extent of fiscal redistribution in a sample of 38 – developing and developed- countries from 1960 to 2017.[37] To this end, we proceed by estimating the econometric model described in subsection 6.1 by employing the data described in details in subsection 6.2.

[35] The median-ability worker should not be interpreted as the *median-voter* in our model.

[36] However, as argued by Economides and Moutos (2016) in a different setting, this argument may not hold if we allow for capital accumulation and take into account the detrimental effects of higher taxation on capital accumulation – and thus on the position of the static labour demand curve.

[37] Our sample includes the following countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Cyprus, Colombia, Costa Rica, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, South Korea, Luxembourg, Malta, The Netherlands, New Zealand, Norway, Philippines, Portugal, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, USA.

6.1 Empirical Model

We approximate the extent of redistribution by two variables, namely, the size of primary government spending, and the size of transfers and subsidies (both as percentage of GDP). Although the first variable includes non-redistributive types of government spending (e.g., spending on defence, and on law and order), it does also include types of government spending (e.g. infrastructure) which although one may not think of as being redistributive, may nonetheless be highly redistributive (e.g. spending on mass transportation is of a far greater benefit to low-income individuals lacking means of private-transport). Moreover, our use of an aggregate government spending variable instead of sub-categories is due to the lack of detailed data for many years and countries in our sample. This is also true of the directly redistributive transfers and subsidies variable (see below), but the data constraints are not very restrictive in this case.

The empirical model used to study the relationship between the probability of adopting minimum wage legislation and the size of government spending (or transfers and subsidies) is as follows:

$$\Pr(Minimum\ Wage_{it} = 1 \mid GovSpend_{it}, X_{it}) = \Phi(\beta_o + \beta_1 GovSpend_{it} + \beta X_{it}) \qquad (18)$$

where *Minimum Wage* is a dummy variable that equals to one if there exists statutory MW at least in some sectors (occupations, regions/states) in country *i* at year *t* and equals to zero otherwise. The probability of adopting MW legislation is expressed as a function of the level of government spending and a set of control variables. Φ is the cumulative distribution function of the standard normal distribution. We cluster the standard errors at country level. The dependent variable and the covariates are discussed below in details. Explicit definitions, descriptive statistics and sources for the variables employed are provided in Table 4.

[Table 4]

6.2 Data

We construct our dependent variable (denoted as *Minimum Wage*) by exploiting the primary data provided by the *Institutional Characteristics of Trade Unions, Wage*

Setting, State Intervention and Social Pacts database (ICTWSS) which has been developed by Visser (2019).[38] More precisely, our analysis builds on the *National Minimum Wage* variable of ICTWSS and develops a dummy variable (denoted as *Minimum Wage*) that equals to one if there exists statutory minimum wage at least in some sectors (occupations, regions/states) in country *i* at year *t* and equals to zero otherwise. Moreover, in a number of empirical specifications we have experimented by employing an alternative dummy variable that equals to one if there exists national statutory (cross-sectional or inter-occupational) MW in country *i* at year *t* and equals to zero otherwise (denoted as *Minimum Wage2*).[39]

In order to investigate the potential association between the imposition of MW and the level of government spending during the period 1960-2017, we need a proxy for the level of government spending (as a % of GDP) that goes back at least to the early 60's. To this end, our empirical analysis employs the primary expenditure data (denoted as *Primary Expenditures*) from the historical fiscal database developed by Mauro et al., (2015).[40] Moreover, in order to capture in a more direct way the extent of fiscal redistribution, we also employ: the Transfers and Subsidies (as a % of GDP) variable provided by the *Economic Freedom* database of the Frazer Institute (denoted as *Transfers*). Unfortunately, data on Transfers and Subsidies (as a % of GDP) are not available till the mid 70's. So, when we employ as key explanatory variable *Transfers* our sample is, unavoidably, substantially restricted (actually, we miss on average 10-15 years).

To ensure robust econometric identification, our analysis also employs a standard set of covariates. First, in order to control for the overall level of economic development within an economy, we use the log of real GDP per capita (denoted as *GDP per capita*) taken from the Penn World Tables (PWT) v.9.1 (see Feenstra et al., 2015). In addition, we control for gross income inequality (denoted as *Inequality*) and ratio of economically dependent population to total population (denoted as *Age Dependency*). Similarly, *Age Dependency* is expected to be associated with the probability of adopting MW, as the cost of financing unemployment payments borne by each worker can be

[38] The ICTWSS database covers key elements of modern political economies (e.g. wage setting, state intervention, trade unionism) for 54 countries from 1960 to 2018.
[39] See below for more details on this.
[40] The database developed by Mauro et al. (2015) draws on historical records for 55 countries over the past two centuries and to the best of our knowledge consists one the most reliable and comprehensive database available on fiscal flows and stocks.

influenced by it. Data for *Age Dependency* are obtained from the World Bank Development Indicators (2016) whereas data on *Inequality* are taken from Texas University Inequality Project (2015).

In a number of specifications our analysis takes also into account the potential economies of scale in the provision of public goods at the country level, by employing data on population density (which is measured by the number of people per square km and denoted as *Population Density*) and it also accounts for basic economic characteristics such as openness to international trade (denoted as *Openness*). Data for *Population Density* and *Openness* are obtained from the World Bank Development Indicators (2016). Finally, we control for the quality of the publicly provided good by employing data on public sector corrupt exchanges (denoted as *Public Sector Corruption*) obtained from the *Varieties of Democracy* (V-Dem) Database developed by Coppedge et al., (2019) and for the right of collective bargaining in both the public and private sectors by employing data from the ICTWSS database developed by Visser (2019).[41] The relevant variables (denoted as *Right Collective Bargaining (Government Sector)* and *Right Collective Bargaining (Market)*) locate the right of collective bargaining on a min-max range with higher values denoting bargaining with less institutional restrictions (such as monopoly union, government authorization etc).

6.3 Results

In this sub-section we discuss the results obtained by working as above. We start by estimating Equation (1) presented in section 6.1, using the data and the empirical methodology outlined in the previous section. In particular, given that the coefficient estimates from a Probit model are meaningless for quantitative interpretation, Table 5 reports Probit marginal effects evaluated at the mean.[42]

[Table 5]

Column (1) of Table 5, reports the empirical results obtained from an empirical specification that uses as covariate solely *Primary Expenditures* variable provided by Mauro et al., (2015) whereas in Columns (2) and (3) we add gradually GDP per capita

[41] *Sector Corruption* is a scale variable that locates corrupt exchange on a min-max range with higher values denoting less corruption (see Coppedge et al., 2020 for more details on this)
[42] Obtained results for the coefficients are available upon request.

and a set of legal origin dummies.[43] In Column (4) we add *Age Dependency* and *Inequality* and we conclude to our core set of controls.[44] Then, in Columns (5) and (6) we extend our set of controls by including gradually *Openness, Population Density* and in turn the *Public Sector Corruption* and the *Right Collective Bargaining* (both in the Government Sector and Market). Finally, in Columns (7) to (9) we examine the robustness of our empirical findings by investigating whether obtained empirical findings survive when we introduce year dummies in our analysis (see Column (7)), when we employ as dependent variable the *Minimum Wage2* (see Column(8)) and when we rely on alternative estimation techniques (see Column (9)). More precisely, in Column (9) instead of employing a Probit model with clustered standard errors by countries, we build our analysis on a population averaged Probit model which is also widely employed in cases of panel with bivariate dependent variable.

Empirical findings presented in Column (1) of Table 5, suggest that a decrease in *Primary Expenditure* by one percent of GDP increases the likelihood of a government to adopt MW legislation (at least in some sectors, occupations, regions/states) by 1.3%. In Columns (2) to (7) where we extend our set of controls by including additional covariates, we get a similar message. As can be easily verified, our empirical findings remain qualitatively intact also in Column (8) where we investigate the probability of adopting national MW legislation (i.e. cross-sectional or inter-occupational), as well as in Column (9) where our analysis employs a population averaged Probit model.

With respect to the rest of the covariates, we note that *Age Dependency* is associated negatively with the probability of enacting MW legislation in many specifications. A potential explanation for this finding is that a higher ratio of economically dependent population makes the cost of supporting the unemployed – which a MW would generate – even higher, as fewer employed workers must support not only the unemployed, but the pensioners as well. We note also that our measure of gross income inequality is positively associated with the probability of MW adoption; however, this result does not survive under alternative measures. Concerning the rest of the covariates, although most of the variables bear coefficients which are not in contrast with theoretical priors, obtained empirical findings fail to establish any robust relationship.

[43] The set of legal origins dummies a fixed effect for British legal origin, French origin, German origin, Scandinavian origin.

[44] This set of controls includes all variables that appear to be statistically significant in most of the specifications and at the same time ensures the maximum number of observations.

[Table 6]

Table 6 reports the Probit marginal effects evaluated at the mean when we employ as a key explanatory variable the Transfers and Subsidies (% of GDP) provided by the *Economic Freedom* database of the Frazer Institute (denoted as *Transfers*). We note that each Column in Table 5 includes the same set of controls with the corresponding Column of Table1. As before, in all alternative specifications we cluster standard errors at the country level.

As can be easily verified, our findings concerning government spending, remain qualitatively identical whereas quantitatively they provide an even stronger message. More precisely, a decrease in *Transfers* by one percent of GDP increases the probability of a government to adopt MW legislation at least 1.7% (in the benchmark specifications). We note that this probability increases substantially compared to Table 5 since it ranges from 1.7% to 2.2% in all benchmark specifications of Table 6. Concerning the rest of the covariates, empirical findings are also in line to those presented in Table 5. Finally, in Tables 8 and 9 where we employ a Logit empirical model -instead of Probit- we observe that empirical results remain robust and qualitatively in line to those presented in Tables 5 and 6.

The alternative estimation techniques employed in our analysis (i.e. Probit clustered by countries, Population average Probit etc) rule out certain types of contaminating factors. However, since government spending might be endogenous to economic outcomes and institutions (see Persson and Tabellini, 2000) one could still argue that our empirical findings could be affected by potential omitted variable bias or even reverse causality running from MW legislation to government spending rather than the other way round. To deal with these endogeneity concerns, in Table 7 we present the empirical results that we obtain by following an IV Probit estimation technique. The challenge in this case is to find an instrument that is adequately correlated with government spending within the country, while it remains uncorrelated with any unobserved time-varying component that affects the probability of adopting MW legislation. In other words, we need a variable that affects the probability of a government to adopt MW only through its effect on the government spending within the country.

We follow a similar instrumental variable strategy to that suggested by Caselli and Reynaud (2020) which assumes that government spending abroad (i.e. in other

countries) can be an attractive source of exogenous variation in the determination of domestic government spending.[45] To this end, we employ as instrument- a variable of *Government Spending abroad* for country *i* in year *t* which is constructed as follows:

$$Z_{it} = \sum_{i \neq j}^{n-1} \frac{1}{n-1} * GovSpend_{jt} \tag{19}$$

where *n* is the number of countries in our sample and *GovSpend* is: (i) the *Primary Expenditures* (% of GDP) from Mauro et al., (2015) -when we want to instrument *Primary Expenditures*- and (ii) the *Transfers* (% of GDP) from the *Economic Freedom* database of the Frazer Institute -when we instrument *Transfers*.

[Table 7]

Panel A, in Table 7 reports the results obtained at the second stage of an IV Probit where the dependent variable is *Minimum Wage* and the key explanatory variable are: (i) *Primary Expenditures* [Columns (1)-(4)] and (ii) *Transfers* [Columns (5)-(8)]. As can be seen, in Columns (1) and (5), we employ as covariates (in the second stage) solely *Primary Expenditures* and *Transfers* correspondingly, whereas in the rest columns we introduce gradually our core set of controls (i.e. *GDP Per capita*, *Inequality*, *Age Dependence* and the *Legal Origin* dummies). Panel B, in Table 7 presents the results obtained at the first stage. We note that in the First Stage, our analysis employs as instrument for *Primary Expenditures* (corr. *Transfers*) the variable *Primary Expenditures Abroad* (corr. *Transfers Abroad*) constructed as described above.

As can be seen, the positive effect of *Primary Expenditures* [Columns (1)-(4)] and *Transfers* [Columns (5)-(8)] on the probability of adopting minimum wages continues to hold in all alternative specifications presented in Panel A [Second Stage]. As far as the rest of the covariates in Panel A are concerned, obtained empirical findings remain qualitatively in line to those presented in Tables 5 and 6 although their statistical

[45] The identification strategy suggested by Caselli and Reynaud (2020) builds upon the assumption that fiscal rules' adoption in neighboring countries may induce the domestic country to introduce a rule as well. The rationale is that reforms in neighboring countries may affect the adoption of domestic reforms through peer pressure and imitational effects (Buera et al., 2011; Giuliano et al., 2013). In a similar context Persson and Tabellini (2009) and Acemoglu et al., (2019) use democracy abroad as an instrument for domestic democratic capital building on the idea that transitions to democracy often take place in regional waves.

significance appears to be mitigated in some empirical specifications. Moreover, *Primary Expenditures Abroad* and *Transfers Abroad* enter always with positive and significant coefficients in Panel B (where we report the results obtained at the First Stage). The positive association between the domestic government spending variables and the government spending abroad variables highlights the peer pressure and imitational effects on government spending suggested by the relevant literature (see e.g. Buera et al., 2011; Giuliano et al., 2013) and ensures a high level of credibility on the instrumental variable strategy suggested by Caselli and Reynaud (2020).

7. Conclusion

The paper has argued that the absence of efficient redistribution mechanisms from the policy landscape increases the political support for the MW institution, whereas their strong presence renders the MW institution politically non-viable. This hypothesis matches well not only with anecdotal evidence across European countries, but it is also supported by Probit model estimations on a dataset of 38 -developing and developed-countries from 1960 to 2017.

Among possible empirical extensions of the paper we note one that could combine the insights of the literature on MW setting (e.g. Boeri, 2012) with the hypothesis developed in this paper, i.e. that the smaller is the presence of efficient redistribution mechanisms, the higher is the politically viable level of the MW (relative to the average wage).

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Appendix

Table 1: Baseline parameterization

Parameters	Description	Value
β	Measure of relative efficiency in the private sector	0.9
b	Lowest ability among households	1
a	Shape parameter of the Pareto distribution	2
γ	Technology parameter in the production function of the homogeneous good	3
δ	Technology parameter in the production function of the homogeneous good	1
λ	Measures the gross markup (i.e. the percentage by which the income of the lowest-ability worker would increase if he remained in employment after the introduction of the minimum wage)	1.1
φ	Measure of the generosity of the social welfare support for the unemployed	0.5
Q_p	Quality of the VDP good provided by the private sector	3

Table 2: Comparison of PC and MW

Comparative static results with respect to					Θ		τ		Labour Market				% of workers that use the public good		% of workers which are better off under MW
					PC	MW	PC	MW	w	$\bar{w}$	ε	u (%)	PC	MW	
A	λ		1.05		3.9638	4.0488	0.1826	0.1998	1.64	1.6814	1.0242	4.66	93.64	93.90	89.18
			1.10		3.9638	4.1401	0.1826	0.2174	1.64	1.7207	1.0484	9.02	93.64	94.17	84.71
			1.15		3.9638	4.2383	0.1826	0.2355	1.64	1.7581	1.0727	13.10	93.64	94.43	80.54
			1.20		3.9638	4.3440	0.1826	0.2541	1.64	1.7937	1.0972	16.93	93.64	94.70	0
B	φ		0.4		3.9638	4.1178	0.1826	0.2132	1.64	1.7214	1.0480	8.95	93.64	94.10	85.01
			0.5		3.9638	4.1401	0.1826	0.2174	1.64	1.7207	1.0484	9.02	93.64	94.17	84.71
			0.6		3.9638	4.1630	0.1826	0.2217	1.64	1.72	1.0488	9.09	93.64	94.23	0
C	a	b	1.5	0.67	3.9635	4.0773	0.1825	0.2054	1.6518	1.7070	0.7096	8.94	93.10	93.39	84.62
			2	1	3.9638	4.1401	0.1826	0.2174	1.64	1.7207	1.0484	9.02	93.64	94.17	84.71
			2.5	1.2	3.9642	4.1761	0.1827	0.2242	1.6109	1.7068	1.2459	8.95	94.96	95.57	86.04

Table 3: The influence of in-kind redistribution

Q_g	Θ		τ		Labour market				% of workers that use the public good		Utility of the median-ability agent		% of workers which are better off under MW
	PC	MW	PC	MW	w	$\bar{w}$	ε	u (%)	PC	MW	PC	MW	
0.1	2.8808	2.9383	0.0304	0.0494	1.4133	1.4875	1.0451	8.45	87.95	88.42	0.4402	0.4472	84.28
0.2	3.0898	3.1661	0.0637	0.0863	1.4619	1.5374	1.0460	8.60	89.53	90.02	0.6222	0.6303	84.07
0.3	3.3338	3.4345	0.1001	0.1265	1.5159	1.5929	1.0468	8.75	91	91.52	0.7608	0.7683	84
0.4	3.6215	3.7545	0.1397	0.1702	1.5754	1.6541	1.0476	8.89	92.38	92.91	0.8756	0.8812	84.17
0.5	3.9638	4.1401	0.1826	0.2174	1.64	1.7207	1.0484	9.02	93.64	94.17	0.9736	0.9758	84.71
0.6	4.3755	4.6104	0.2287	0.2680	1.7097	1.7925	1.0492	9.15	94.78	95.30	1.0578	1.0552	0
1	7.2296	8.0598	0.4398	0.4975	2.0325	2.1251	1.0521	9.65	98.09	98.46	1.2689	1.2289	0
1.5	20.0084	27.9928	0.7301	0.8071	2.5030	2.6075	1.0559	10.31	99.75	99.87	1.1971	1.0330	10.31

Table 4: Summary statistics and description of the variables.

Variable	Description	Obs.	Mean	Std.Dev	Min	Max	Sources
Minimum Wage	Dummy variable that takes the value of one if there exists statutory minimum wage at least in some sectors (occupations, regions/ states) in country *i* at year *t* and equals zero otherwise	2.532	0.73	0.44	0.00	1.00	1
Minimum Wage2	Dummy variable that takes the value of one if there exists national statutory (cross-sectional or inter-occupational) minimum wage in country *i* at year *t* and equals zero otherwise.	2.532	0.58	0.49	0.00	1.00	1
Primary Expenditures	Non-interest government expenditures (% GDP)	1.787	30.18	12.85	5.00	71.84	2
Transfers	Transfers and Subsidies (% GDP)	2.031	15.47	10.34	0.20	93.8	3
GDP per capita	Log of GDP per capita						4
Income Inequality	Gini coefficient, Gross Income Inequality (i.e. before taxes and transfers)	2142	38.54	6.24	20.57	59.95	7
Age Dependency	Ratio of economically dependent population to total population	2.527	56.78	12.30	36.21	84.58	6
Openness	Ratio of Imports plus Exports (%GDP)						6
Population Density	Number of people per square km	2.417	134.96	191.81	1.36	1511.03	6
Public Sector Corruption	Scale variable that locates corrupt exchanges of public officials on a min-max range with higher values denote less corruption.	2.527	2.69	0.78	0.45	3.81	5
Right Collective Bargaining (Government Sector)	Scale variable that locates the right of collective bargaining (Government Sector) on a min-max range with higher values denoting bargaining with less institutional restrictions.	2.400	2.57	0.65	0.00	3.00	1
Right Collective Bargaining (Market)	Scale variable that locates the right of collective bargaining (Market) on a min-max range with higher values denoting bargaining with less institutional restrictions.	2.400	1.61	0.09	0.00	4.00	1

Sources

1. *Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts* (ICTWSS) database (Visser, 2019)
2. Mauro et al., (2015)
3. *Economic Freedom* database [Frazer Institute]
4. *Penn World Tables (PWT) v.9.1* (Feenstra et al., 2015)
5. *Varieties of Democracy (V-Dem)* database (Coppedge et al., 2019)
6. *World Bank Development Indicators* (WBDI) (2016)
7. *University of Texas, Inequality Project* (2015)

Table 5: Probit estimates of the likelihood to adopt minimum wage legislation [Marginal effects evaluated at the mean]

Dependent Variable: Minimum Wage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Primary Expenditures	-0.013***	-0.019***	-0.012***	-0.010***	-0.010***	-0.010***	-0.010***	-0.012***	-0.003***
	(-4.012)	(-4.155)	(-3.302)	(-3.570)	(-3.235)	(-3.275)	(-3.109)	(-2.689)	(-3.14)
GDP per capita		0.099**	0.090***	0.048**	0.057**	0.062**	0.081*	0.174***	0.043***
		(2.175)	(3.416)	(2.128)	(2.324)	(2.552)	(1.883)	(3.668)	(3.70)
Age Dependency				-0.005**	-0.004**	-0.005**	-0.004***	-0.005	-0.003***
				(-2.365)	(-2.433)	(-2.516)	(-2.617)	(-0.985)	(-3.64)
Inequality				0.012**	0.008*	0.010*	0.012*	0.001	0.005**
				(2.290)	(1.757)	(1.658)	(1.850)	(0.036)	(1.99)
Openness					-0.001	-0.001	-0.001	-0.002	
					(-1.256)	(-1.523)	(-1.161)	(-1.315)	
Population Density					0.000	0.000	0.000	0.000	
					(0.969)	(1.073)	(1.053)	(0.144)	
Public Sector Corruption						0.040			
						(0.874)			
Right Collective Bargaining (Gov. Sector)						-0.026			
						(-0.412)			
Right Collective Bargaining (Market)						-0.037			
						(-1.462)			
Legal Origins	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No	Yes	No	No
Pseudo R^2	0.12	0.15	0.53	0.59	0.63	0.64	0.65	0.45	
Number of Countries	35	35	35	35	35	35	35	35	35
Observations	1705	1702	1702	1386	1348	1272	1348	1348	1368
Estimation Technique	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	GEE Popul. Averaged

Notes: Table 5 reports the Probit results (marginal effects evaluated at the mean) of the likelihood of adopting minimum wage legislation. Standard errors are clustered at the country level. Constant terms are not shown. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively. We note that on columns (1)-(6) and (8)-(9) the dependent variable is *Minimum Wage* whereas in column (7) the dependent variable is *Minimum Wage 2*. The set of legal origins dummies in columns (3) to (9) includes a fixed effect for British legal origin, French origin, German origin, Scandinavian origin.

Table 6: Probit estimates of the likelihood to adopt minimum wage legislation [Marginal effects evaluated at the mean]

Dependent Variable: Minimum Wage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Transfers	-0.019***	-0.020***	-0.018***	-0.017***	-0.017***	-0.019***	-0.017***	-0.022***	-0.048***
	(-3.084)	(-2.643)	(-3.522)	(-3.744)	(-3.543)	(-3.909)	(-3.573)	(-3.008)	(-5.30)
GDP per capita		0.001	0.082***	0.053**	0.062**	0.078***	0.063	0.206***	0.274***
		(0.016)	(3.247)	(2.428)	(2.512)	(3.170)	(1.397)	(3.880)	(4.44)
Age Dependency				-0.007***	-0.006***	-0.006***	-0.006***	-0.004	-0.028***
				(-3.999)	(-3.738)	(-3.125)	(-3.400)	(-0.766)	(-5.24)
Inequality				0.010**	0.009**	0.011**	0.010	-0.005	0.023*
				(2.511)	(2.205)	(2.045)	(1.499)	(-0.525)	(1.80)
Openness					-0.000	-0.001	-0.000	-0.002*	
					(-0.450)	(-0.770)	(-0.450)	(-1.647)	
Population Density					0.000	0.000	0.000	0.000	
					(1.055)	(1.406)	(1.093)	(1.560)	
Public Sector Corruption						0.053			
						(1.052)			
Right Collective Bargaining (Gov. Sector)						0.011			
						(0.211)			
Right Collective Bargaining (Market)						-0.056**			
						(-2.385)			
Legal Origins	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No	Yes	No	No
Pseudo R^2	0.12	0.13	0.56	0.63	0.62	0.63	0.64	0.44	
Number of Countries	38	38	38	38	38	38	38	38	38
Observations	1730	1495	1495	1305	1267	1206	1267	1267	1287
Estimation Technique	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	Probit clust. by countries	GEE Popul. Averaged

Notes: Table 6 reports the Probit results (marginal effects evaluated at the mean) of the likelihood of adopting minimum wage legislation. Standard errors are clustered at the country level. Constant terms are not shown. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively. We note that on columns (1)-(6) and (8)-(9) the dependent variable is *Minimum Wage* whereas in column (7) the dependent variable is *Minimum Wage 2*. The set of legal origins dummies in columns (3) to (9) includes a fixed effect for British legal origin, French origin, German origin, Scandinavian origin.

Table 7: IV Probit estimates of the likelihood to adopt minimum wage legislation

PANELA: Second Stage Results **Dependent Variable**: Minimum Wage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Primary Expenditures	-0.067***	-0.124***	-0.123***	-0.130***				
	(-5.53)	(-8.39)	(-8.36)	(-4.16)				
Transfers					-0.117***	-0.154***	-0.150***	-0.129***
					(-3.66)	(-4.78)	(-4.25)	(-2.51)
GDP per capita		0.840***	0.838***	0.941***		0.501**	0.482**	0.280
		(6.67)	(6.64)	(4.21)		(2.53)	(2.24)	(0.67)
Age Dependency				0.011				-0.055**
				(0.54)				(-2.25)
Inequality				0.039				0.121
				(0.97)				(1.62)
PANEL B: First Stage Results								
	Instrumented Variable: Primary Expenditures				**Instrumented Variable:** Transfers			
Primary Expenditures Abroad	0.723***	0.725***	0.729***	0.982***				
	(8.17)	(2.76)	(2.75)	(4.06)				
Transfers Abroad					0.642***	0.913***	0.970***	1.322***
					(2.61)	(4.54)	(4.56)	(5.86)
Legal Origins	No	No	Yes	Yes	No	No	Yes	Yes
Number of Countries	35	35	35	35	35	35	35	35
Observations	1705	1702	1681	1368	1527	1311	1290	1140
Estimation Technique	IV Probit clustered by countries	IV Probit clustered by countries	IV Probit clustered by countries	IV Probit clustered by countries	IV Probit clustered by countries	IV Probit clustered by countries	IV Probit clustered by countries	IV Probit clustered by countries

Notes: Table 7, PANEL A reports the results of the second stage of an IV Probit (marginal effects evaluated at the mean). The dependent variable is *Minimum Wage*. In columns (1) to (4) the instrumented variable is *Primary Expenditures* and the instrument is *Primary Expenditures Abroad* whereas in columns (5) to (8) the instrumented variable is *Transfers* and the instrument is *Transfers Abroad*. Table 2, PANEL B reports the results obtained at the first stage. The set of legal origins dummies in columns (3) to (4) and (7) to (8) includes a fixed effect for British legal origin, French origin, German origin, Scandinavian origin. Standard errors are clustered at the country level. Constant terms are not shown. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 8: Logit estimates of the likelihood to adopt minimum wage legislation [Marginal effects evaluated at the mean]

Dependent Variable: Minimum Wage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Primary Expenditures	-0.013***	-0.019***	-0.012***	-0.010***	-0.009**	-0.009***	-0.009**	-0.011**
	(-4.042)	(-4.168)	(-3.179)	(-3.567)	(-2.548)	(-2.728)	(-2.366)	(-2.357)
GDP per capita		0.100**	0.089***	0.044*	0.054**	0.059**	0.074*	0.169***
		(2.260)	(3.232)	(1.834)	(2.151)	(2.313)	(1.834)	(3.433)
Age Dependency				-0.006***	-0.004***	-0.005***	-0.005***	-0.004
				(-2.644)	(-2.814)	(-2.826)	(-2.666)	(-0.893)
Inequality				0.012**	0.007	0.009	0.011*	0.000
				(2.100)	(1.568)	(1.371)	(1.775)	(0.010)
Openness					-0.001	-0.001	-0.001	-0.002
					(-1.289)	(-1.508)	(-1.318)	(-1.423)
Population Density					0.000	0.000	0.000	0.000
					(1.057)	(1.077)	(1.173)	(0.211)
Public Sector Corruption						0.034		
						(0.662)		
Right Collective Bargaining (Gov. Sector)						-0.022		
						(-0.304)		
Right Collective Bargaining (Market)						-0.034		
						(-1.186)		
Legal Origins	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No	Yes	No
Pseudo R^2	0.12	0.15	0.53	0.59	0.63	0.64	0.65	0.45
Number of Countries	35	35	35	35	35	35	35	35
Observations	1705	1702	1702	1386	1348	1272	1348	1348
Estimation Technique	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries

Notes: Table 8 reports the Logit results (marginal effects evaluated at the mean) of the likelihood of adopting minimum wage legislation. Standard errors are clustered at the country level. Constant terms are not shown. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively. We note that on columns (1)-(6) and (8) the dependent variable is *Minimum Wage* whereas in column (7) the dependent variable is *Minimum Wage 2*. The set of legal origins dummies in columns (3) to (8) includes a fixed effect for British legal origin, French origin, German origin, Scandinavian origin.

Table 9: Logit estimates of the likelihood to adopt minimum wage legislation [Marginal effects evaluated at the mean]

Dependent Variable: Minimum Wage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Transfers	-0.019***	-0.020**	-0.018***	-0.016***	-0.017***	-0.019***	-0.017***	-0.020**
	(-3.009)	(-2.559)	(-3.379)	(-3.410)	(-3.006)	(-3.378)	(-3.202)	(-2.505)
GDP per capita		-0.003	0.083***	0.054**	0.064**	0.081***	0.057	0.202***
		(-0.060)	-3.25	-2.346	-2.442	-3.074	-1.313	-3.565
Age Dependency				-0.007***	-0.006***	-0.006***	-0.006***	-0.003
				(-4.381)	(-4.065)	(-3.313)	(-3.475)	(-0.608)
Inequality				0.010**	0.008**	0.010*	0.007	-0.005
				(2.444)	(1.982)	(1.754)	(1.079)	(-0.552)
Openness					-0.000	-0.001	-0.001	-0.002*
					(-0.524)	(-0.785)	(-0.563)	(-1.797)
Population Density					0.000	0.000	0.000	0.000
					(0.980)	(1.229)	(1.107)	(1.573)
Public Sector Corruption						0.048		
						(0.842)		
Right Collective Bargaining (Gov. Sector)						0.009		
						(0.149)		
Right Collective Bargaining (Market)						-0.054**		
						(-2.079)		
Legal Origins	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No	Yes	No
Pseudo R^2	0.12	0.15	0.53	0.59	0.63	0.64	0.65	0.45
Number of Countries	38	38	38	38	38	38	38	38
Observations	1730	1495	1495	1305	1267	1206	1267	1267
Estimation Technique	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries	Logit clust. by countries

Notes: Table 9 reports the Logit results (marginal effects evaluated at the mean) of the likelihood of adopting minimum wage legislation. Standard errors are clustered at the country level. Constant terms are not shown. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively. We note that on columns (1)-(6) and (8) the dependent variable is *Minimum Wage* whereas in column (7) the dependent variable is *Minimum Wage 2*. The set of legal origins dummies in columns (3) to (8) includes a fixed effect for British legal origin, French origin, German origin, Scandinavian origin.
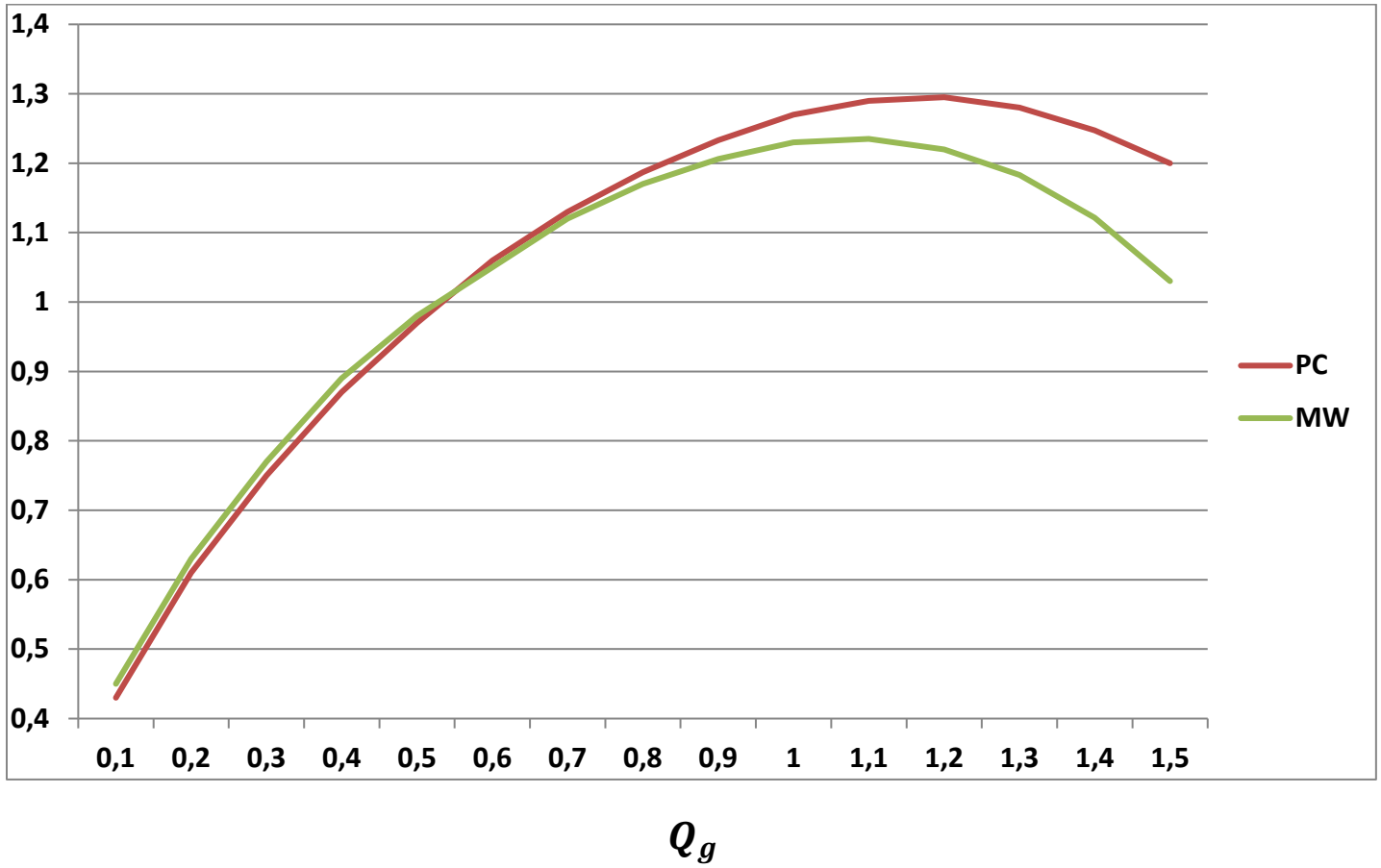
Figure 1: Utility of the median-ability agent as a function of Q_G