Racing to the Middle:
Minimum Wage Setting and Standards of Fairness

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April 2006

We examine the setting of minimum wages, arguing that they can best be understood as a reflection of voters' notions of fairness. We pursue this idea by setting out a theoretical model of minimum wage setting in a federation. The key model implications are that minimum wages should track movements in the unskilled wage distribution and movements in minimum wages set in other provinces. The model also has the implication that governments will tend to "race to the middle" of the provincial minimum wage distribution in an attempt not to appear to be unfair. We examine these implications using two types of evidence: interviews with policy makers; and econometric evidence based on minimum wage data from the ten Canadian provinces from 1969 to 2005. Both forms of evidence are strongly supportive of the model. The estimation also indicates a lack of support for models based on the political power of competing, self-interested groups or on the idea that minimum wages are set to meet redistributional goals.

We are grateful to Paul Beaudry, Dwayne Benjamin, Tom Crossley, Fred Cutler, Andrew Green, Morley Gunderson, Richard Johnston, Christopher Kam, Thomas Lemieux, Craig Riddell, Francesco Trebbit, Mike Veall and seminar participants at the University of Western Ontario, McMaster University, the University of Toronto, and the UBC empirical lunch for helpful comments. Pierre Brochu provided excellent research assistance. This research was supported by the Equality, Security and Community project which was funded by the Social Sciences and Humanities Research Council of Canada.

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In a recent review of the literature on redistribution, Boadway and Keen (2000) harken back to Arrow(1951) in arguing that a useful organizing device is to think of people as containing two disjoint decision making personalities, one self interested and the other ethical. Discussions in both the theoretical and empirical political economy literatures on the setting of policy parameters often focus heavily on implications stemming from decisions made by the self-interested selves, with models built on assumptions that both voters and politicians pursue policies according to the direct effects on their own incomes or political power. However, the recent political economy literature contains several attempts to investigate the implications of richer theoretical modeling of the ethical (or ideological) selves in policy-related decisions (e.g. Dixit and Londregan(1998), Roemer (1999)). In this paper, we derive an empirical model of the setting of a policy parameter that incorporates features both of a more "ideological" explanation for the observed parameter values and of the standard, self-interested explanation. We focus on a particularly ideologically contentious policy parameter: the minimum wage.

We argue that minimum wage setting can best be explained as a reflection of voters' notions of fairness. In particular, we set out a model, based to some extent on the models in Dixit and Londregan(1999) and Besley and Case(1995), of inter-jurisdictional interactions in setting a policy parameter that only directly affects a minority of the population and in which the majority of voters decide on their preferred value of the parameter by comparing it to a standard embodying their notions of fairness. We contend that this model forms a reasonable basis for investigation given that surveys repeatedly find that over 70% of respondents indicate support for minimum wages; far more than we would reasonably expect to have a direct, positive self-interest in the minimum wage (Waltman(2000)). We examine the implications from this model - and compare them to implications from competing models - using two types of evidence: the results of a series of interviews with policy makers who were directly involved in setting the minimum wage; and an econometric examination of data on minimum wages in each Canadian province for the period spanning 1969 to 2005. Both sets of evidence strongly support our standard of fairness

model of minimum wage setting.

Our key assumption in this exercise is that the ideological component of opinions on a policy parameter can be represented in terms of perceived "fair" values (or standards) for that parameter and that individuals refer to benchmarks in establishing their own standards of fairness. We focus on two benchmarks. Working from the logic in Kahneman et al(1986) that individuals use reference transactions in deciding on the fairness of a given exchange, our first benchmark is the going wage for other unskilled workers. Our second benchmark is the minimum wage set in other provinces. Notions of fairness are societal constructs and individual voter's fairness ideals are built partly on observing what is deemed fair by her or his fellow citizens. In a federation, one way for voters to get direct evidence on the opinions of others is to look at the policy choices made by other provincial units. Building from these assumptions, we derive the implications that policy parameter setting by sub-national units in a federation will involve a "race to the middle" (trying to stay in the middle of the distribution of these parameters across jurisdictions) and that the parameters also will tend to track parts of the wage or income distribution that might be viewed as providing a fair benchmark for those who receive the benefits of the policy. The implication that policy setting involves a race to the middle is in strong contrast to predictions from self-interest based models that imply that redistributional parameter setting often involves races to the bottom. The implication that movements in the going unskilled wage should cause movements in the minimum wage echoes the results in Moffitt et al.(1998) who find that welfare benefits in the US track low skilled wages. In our empirical work, we also allow for, but reject, a consumption bundle benchmark.

In addition to these relative standards of fairness, we also allow for the possibility that some people are ideologues whose notions of fairness differ systematically from those of other citizens based on their ideology.[1] In our model, we allow for three types of governments (Left, Right and Centre), with the policies of the Left (L) and Right (R) governments reflecting the preferences of left and right wing ideologues, respectively. The race to the middle is violated to some extent when left or right wing parties are in power since they set minimum wages in a way that balances the need not to look unfair by the standards of middle class voters against their own ideological positions. This, in turn, implies that we can get what looks like a race to the bottom if

R parties take power in a set of provinces at the same time since those provinces will adjust their real minimum wages downward and even L governed provinces will be forced to follow suit in order not to appear too out of step with the new national average minimum wage. Thus, there are externalities to parameter setting in terms of shifting the standards of fairness.

The point of setting out the model of fairness standards is to provide guidance for the empirical investigation that follows. It does so in several senses. First, it informed the choice of questions we asked in our interviews of policy makers. Those interviews provided evidence that most policy makers viewed themselves as setting minimum wages to insure that they were not too out of line with other provinces. Some stated explicitly that they set the minimum wage to stay in the middle of the pack. Second, we derive our econometric specification directly from the theoretical model. Third, our estimating equation is in the form of a reaction function relating the minimum wage in one province to the average minimum wage in other provinces (along with other variables). This implies an endogeneity problem of the type seen in the neighbourhood effects literature (Manski(1993), Moffitt(2001)). The model is useful in indicating instruments to address this problem. Specifically, we use the ideology of governments in power in other provinces and values of variables such as inflation in other provinces as instruments.

The model also yields specific implications which allow us to test it versus competing theories. In particular, a direct empirical implication from the claim that we should observe races to the middle is that provincial reaction functions will be symmetric in the sense of embodying equal reactions to movements up or down in other provinces' minimum wages. As Figlio et al (1999) point out, this contrasts with races to the bottom, which imply greater reactions to decreases in the redistributive parameters set in other provinces than to increases. We test this implication in several ways and are never able to reject the symmetry restrictions. The evidence of a race to the middle challenges the assumption implicit in both the economic and political science literatures that governments invariably compete – whether in response to threats of mobility or pressures for emulation of novel policies – either to outdo or undercut each other.

Another key implication is that movements in the median unskilled wage have a positive, causal impact on the minimum wage set in a province. Again, the data bears this out. This is an important finding, in part, because it means that movements in the minimum wage reflect

movements in the broader wage distribution and, thus, treating the minimum wage as purely exogenous when studying its impact on employment is questionable. Perhaps more importantly, to the extent that the relevant comparison group for thinking about the fairness of a policy such as a transfer is taken to be workers who might be viewed as potential candidates to receive the transfer, this has the troubling implication that transfers will be reduced precisely when earnings for those at the bottom end of the distribution are falling. Both this implication and those following from symmetry in response to other provinces hold whether or not our model of fairness is the correct model for explaining minimum wage setting. It is worth noting, though, that we do not find evidence supporting pure self-interest theories. As in other Canadian papers, we find that pure political economy variables intended to reflect the power of groups with competing interests in the minimum wage perform poorly in explaining the minimum wage. In sum, we argue, the evidence points away from models of narrow self-interest and toward a model based on standards of fairness as a means of understanding minimum wage setting. We do not wish to argue that this model will provide a complete explanation in situations where self-interest is more evidently important, but it does seem likely that fairness considerations will play a role in the setting of any redistributive policy parameter and, thus, that key implications of the model, such as tendencies to race to the middle and to set the parameters with reference to the wage or income distribution, should be taken into account in discussions of how those parameters are set.

The paper that is closest to ours is Besley and Case(1995). In their model, politicians choose a tax parameter to meet the costs of providing a public good and, possibly, their own consumption. Voters do not know the cost of the public good and use comparisons with other jurisdictions to try to figure out if their governor is cheating. Our model differs from theirs in that the focus of the comparisons (the cost parameter in their case and the minimum wage in ours) is not observable to voters in their model but is in our case. Moreover, that key parameter is exogenously given in their world but is an endogenous outcome of the interaction of provinces in ours. This has implications for dynamics. Their model predicts races to the bottom since not mimicking tax cuts in other provinces may lead to a government being labeled as a rent grabber. Our model, in contrast, predicts races to the middle.

The paper proceeds in 6 sections, including the introduction. In the second section, we

present our data and the basic patterns we are trying to explain. In the third section, we set out the theoretical model and derive our empirical specification. The fourth section contains evidence from interviews with politicians and bureaucrats who were directly involved in setting minimum wages and with public statements made by governments at the time when minimum wages were set. In the fifth section, we present our econometric results. The sixth section concludes.

2) Data and Basic Patterns

We begin our discussion with an exposition of the basic data patterns we are seeking to explain. The main data we examine are nominal minimum wages for Canadian provinces for the years 1969 through 2005. Minimum wages are set at the provincial level in Canada. There is a federal minimum wage that covers workers moving across provincial borders and employees of the federal government but, unlike in the United States, the federal minimum is relevant only for a small minority of workers. There is not always one minimum wage for each province and time period. At times, provinces maintained separate minima for young workers, students and workers deemed to be training. In the early part of our sample there are even a few cases of separate minima for men and women. Throughout this paper we use the main minimum wage for men. We view this as the relevant parameter, in part, because of evidence that firms do not make substantial use of special sub-minima even when they are available (Card and Krueger(1996)). In order to match our other data, we work at an annual frequency, taking the minimum wage for a province in a given year to be the minimum wage in place on March 1 of a given year. We chose March because it is closest to the time when some of our other data are collected.

As we discuss in the next section, we believe it is relevant to investigate movements of the minimum wage in relation to movements in wages in general. The specific comparison wage we use is the median wage of males with high school or less education in each province. In judgements on fairness, these are the wages that minimum wage workers might reasonably be expected to earn given their levels of investment in human capital. Comparisons to higher skilled workers would involve making judgements about individual responsibility in investing in skills. We obtain the wage data from the Survey of Consumer Finances (SCF) for the years 1969, 1971, 1973, 1975, 1977, 1979, 1981, 1982 and 1984-1997, and from the Labour Force Survey (LFS) for the years 1998-2005. The LFS is a large survey collected to ascertain labour force data such

as unemployment rates. The SCF was an add- on to the LFS. We calculate the median wage by first obtaining weekly earnings for high school or less educated males working full time and dividing those by 40. We have data on earnings from both the LFS and SCF in 1997 and we use the ratio of the median values in those years to adjust the LFS data to make the series smoother. We interpolate values for the years for which there are not surveys using a simple average of the median wages for the province in the years that bracket the gap. Finally, we use the median wage in an attempt to get a measure of the location of the wage distribution that is not affected by the minimum wage. The mean would move around with movements in the left tail caused by movements in the minimum wage even if changes in the minimum wage do not alter above-minimum wages. We investigate whether this median wage can be viewed as exogenous with respect to the minimum wage below.

The patterns we are interested in are captured in figures 1a-c, which portray real minimum wages for (respectively) a set of Atlantic provinces (Newfoundland, Nova Scotia, and New Brunswick), the Central provinces (Ontario and Quebec), and three of the four Western Provinces (Manitoba, Alberta and British Columbia). We omit PEI and Saskatchewan to allow more clarity in the figures but PEI acts just like the other Atlantic provinces and Saskatchewan's minimum wage is typically very similar to that in Manitoba. The minimum wages plotted here are actually the announced minimum wages, which form our dependent variable for reasons described below. Minimum wage changes are sometimes announced at one date to be staged in over a period of months or years. We time the full increase to the time of the announcement. Since most minimum wage changes are either not staged in or are staged in over a brief period, the plot of the actual minima in place at each point of time is very similar to what we present here. We deflate the nominal minima using province specific CPIs.

For each province, we plot a square at a point in time if the minimum wage was set by a right wing party and a triangle if the party setting it was left wing. We define all provincial New Democratic Parties (NDP) as left wing along with the Parti Quebecois, which has a history as both a separatist and a social democratic party, in Quebec. The right wing parties are more difficult to identify. The Social Credit in the western provinces, the recent Liberal Party in British Columbia (BC) and the recent Conservatives in Alberta are all clearly right wing. However, other

provincial Conservative parties, particularly in the early part of our period, often seem more centrist than purely right wing. We tried different definitions of right wing but settled on declaring all Liberal governments (with the exception of the most recent BC government) to be Centrist and all Conservative governments to be right wing. This is the most straightforward definition and, thus, less prone to the accusation that the definitions of left and right are being chosen to obtain a particular result.

Five main patterns jump out from these figures. The first is the long swings in the real minimum wage, with the real minimum rising substantially from the start of our sample (1969) through to about 1980 in all provinces then declining strongly until the end of the 1980s. The 1990s is more of a mixed bag but is roughly characterized by a slight positive trend in most provinces plus a break away group consisting of Ontario, Quebec and British Columbia, with some tendency toward convergence between the two groups at the very end of the sample. The second feature is the extent to which the real minima move together, especially within the regions. In Atlantic Canada after 1980, for example, the difference between the maximum and minimum real wage is never more than $1 and is often substantially less. Third, the highest minimum wages tend to be associated with left wing parties. Notice, for example, that the peak in the late 1970s corresponds to a time when left wing parties were setting minimum wages in most Western provinces and Quebec. In contrast, the periods of declining real minimum wages (particularly the 1980s) are associated with right wing parties being in power. However, this is by no means a universal rule. Right wing parties in BC and Alberta implemented substantial increases in their minimum wages in 1988, and a left wing government was behind the decline in the real minimum wage in Quebec in the first half of the 1980s. This leads to our fourth point, that differences between outlier provinces and the rest of the pack tend to be reduced over time. This fits with the second observation that the set of provincial minimum wages move together. Finally, minimum wages tend to be lower in the Atlantic provinces and, to some extent, Manitoba and Saskatchewan. These are poorer provinces where both wages and cost of living tend to be lower. Our goal in this paper is to understand what underlies these patterns. In particular, we are interested in explaining the dynamics of the movements in minimum wages and the role played by interactions among governments.

For readers who have studied low skilled wages in either Canada or the United States, the time pattern in the real minimum wage may seem familiar. In figure 2 we plot the simple average of provincial median weekly real wages for males with a high school or less education along with the simple average of the provincial minimum real wages. We normalize both series to their values in 1969. Both series show substantial increases over the course of the 1970s and declines over the 1980s, though they part company to some extent in the 1990s. The periods when the real minimum wage is persistently high relative to the median wage (the late 1970s and after 1990) correspond to periods either when there are a substantial number of left wing governments in power or when the high minimum wage legacies of former left wing governments have not yet been eroded by inflation. In contrast, the period when the minimum wage is relatively low (the late 1980s) is one with a considerable number of right wing governments in power.

We contend that this set of patterns can be explained by a model which emphasizes voters comparing minimum wages to standards of fairness. In the next section, we set out that model. In subsequent sections, we examine its implications using both an alternative source of evidence (policy maker interviews) and econometric tests of restrictions implied by the model.

3) An Illustrative Model of Interactions in Minimum Wage Setting

In this section we set out a stylized model of the effects of fairness standards on the setting of a policy parameter - the minimum wage – which has direct effects only on a small subset of the population, consisting of a group who believe they fund the transfer and another group who receive it. The rest of the population, who are not directly affected (or at least believe they are not affected), must decide on how to vote by comparing the minimum wage with their own standards of fairness. Our main goal in this exercise is to generate precise implications to guide our empirical investigation of movements in minimum wages. The model builds on the model of redistribution in Dixit and Londregan(1998) and, to some extent, the model of inter-jursidictional yardstick effects in Besley and Case(1995). Like Dixit and Londregan(1998), we assume that ideology enters utility functions directly and affects political outcomes, including governing parties' policy choices. However, we focus less on voter choices and more on the interplay of the policy choices of governments in different states or provinces in the same country. This is similar to Besley and Case(1995). As we stated in the introduction, we differ from the latter paper

primarily in that the focus of comparison across provinces is exogenous in their case but endogenous in ours. As we will see, this leads to quite different dynamics in the interactions among provinces or states.

The basic building block of the model is the specification of individual preferences. In particular, we assume that individual, i, living in province, A, in year, t, has an indirect utility function given by,

$$1) \quad U_{it} = w_{it} - \lambda_1 (m_t^A - \rho_t)^2 + (\lambda_2 m_t^A) - (\lambda_3 m_t^A)$$

where,

$$2) \quad \rho_t = (\theta m_t^B + (1-\theta)\kappa \overline{w_t})$$

In equations 1) and 2), w_{it} is after tax income for person i, ρ_t is the person's notion of a fair minimum wage, m_t^A is the minimum wage in province A, m_t^B is the average minimum wage in all other provinces, $\bar{w}_t$ is the median wage (which, for simplicity, we will assume is the same in all provinces), κ, λ_1, λ_2, and λ_3 are all parameters taking values greater than zero and $0 \leq \theta \leq 1$. We will assume, for the moment, that there is no inflation so the variables can be thought of in either real or nominal terms.

After tax income is determined as follows. Everyone has one unit of labour which they sell in the labour market and there are no labour supply responses in the model. All minimum wage workers (who make up a proportion π_m of the population) have income equal to the minimum wage, m_t^A . All business owners (who make up a proportion π_b of the population) have income equal to ω_{it} - τm_t^A., where ω_{it} is what their income would be in the absence of minimum wages and τ is a parameter capturing the extent to which inefficiencies related to the minimum wage affect their income. Thus, the minimum wage acts as a straight redistribution from business owners to the poor. The middle class (i.e., everyone who does not own a business and does not receive the minimum wage) is not affected by the minimum wage. Dividing the population into groups in this way is reminiscent of the model in Dixit and Londregan(1998). However, while they focus on understanding the conditions under which one group benefits relative to others from the political contest, we will simply assume that the centre group is the largest and most influential.

The assumption that middle class voters do not view themselves as being directly affected by the minimum wage is important, partly because it simplifies our exposition but also because it allows us to isolate the implications of setting policy based on notions of fairness rather than self-interest. The goal of our empirical investigation is then to see whether those implications are borne out in the data. The assumption that the majority of voters do not see the minimum wage as directly affecting their self-interest is not simply a theoretical device, however: there is good reason to believe it might be true. First, fewer than 5% of workers actually receive the minimum wage, suggesting small direct impacts on workers or businesses (Battle (2003)). But our assumption goes further, implying that no one works out the incidence issues, i.e., the middle class does not perceive that the minimum wage is passed on to them through price changes and the business owners think they bear the complete incidence of a minimum wage hike. (Indirect) evidence for this comes from survey responses on support for the minimum wage. For example, an Ipsos-Reid poll from 2000 found that 76% of respondents in British Columbia supported an increase in the minimum wage (Ipsos-Reid(2000)). Interestingly, 87% of respondents felt an increase would be good for low income workers and, at the same time, 60% felt it would be bad for small businesses. Similarly, a 2004 poll conducted by the Pew Research Center found that fully 86% of Americans supported raising the federal minimum wage from $5.15 to $6.45 an hour (Pew Research Center(2005)). Given that only a small proportion directly benefit from the minimum wage, these levels of support would be unlikely if respondents viewed themselves as having a strong self-interest in minimum wage setting that dominated their fairness concerns. Thus, we believe that studying the minimum wage allows us to isolate fairness elements that are likely also present in setting other policy parameters but that may be obscured in those contexts by direct self-interest issues.

The utility specification in 1) incorporates two main elements. The first is own income, w_{it} . Movements in this component can reflect broad changes in the economy and in policies, including but not restricted to the minimum wage, which affect an individual's income. The second main element is the person's ideological stance on the minimum wage. It, in turn, has three components which capture different fairness ideals. The first component is a quadratic term which reflects a common basic fairness standard, with λ_1 capturing disutility from minimum wages that

are felt to be unfair. Our central assumption is that standards of fairness are relative in nature, with individuals referring to benchmarks in establishing their own standards. This is consistent with Mutz and Mondak (1997)'s finding that, quite apart from their own interests, voters' political judgments are heavily influenced by their perceptions of the relative well-being of societal groups. We purposefully model the disutility from "unfair" minimum wages as symmetric: individuals get the same disutility from minimum wages that are too high relative to their standard as from minimum wages that are too low. Behind this is a view that fairness is viewed as a balance between competing claims. If a person worried more about values of m_t^A that fell below ρ_t than those that were above, her standard of fairness should be adjusted upward.

The key question for our purposes is what benchmarks individuals appeal to in forming their standards. We consider a more complete set of possible benchmarks in our empirical specification but here we focus on two key possibilities. Kahneman et al(1986) design and implement a questionnaire on notions of fairness in economic transactions including wage setting. They argue that individuals use a reference transaction, "a relevant precedent that is characterized by a reference price or wage," in evaluating the fairness of specific transactions. Based on these arguments, we employ a specification (given in equation 2) in which individual standards are a weighted average of a proportion of the median wage in the province (with the proportion determined by the fairness parameter, κ) and the average minimum wage paid in other provinces. The use of the median wage is in keeping with Kahneman et al(1986)'s argument that market wages often form a natural reference transaction since they may be perceived to represent a balance between what is owed to workers and permitting firms to earn a fair profit. Indeed, one justification for minimum wages might be the claim that governments should step in to prevent transactions (wage offers) that are well below the "fair" reference transaction (the going wage in the market). More generally, Moffitt et al (1998) argue that preferences over other redistributive parameters (in their case, the welfare benefit rate) will also track the mean or median wage either, again, because of equity concerns or because voters are worried that relatively generous benefits will increase take-up of welfare, forcing a matching increase in taxes. One advantage of studying minimum wages is that the latter, public spending, channel does not exist and, thus, examining minimum wages means we are more likely to be isolating fairness issues.

The minimum wage set in other provinces is also a natural reference in this case. Fairness is at least partly a societal construct, with individual fairness ideals built on observations about what his or her fellow citizens deem fair. One way to get evidence on the opinions of others is to look at the values set for policy parameters in other provinces. The use of other provincial minimum wages to form a fairness benchmark represents what is different about our model compared to earlier models of state or provincial interactions. We do not assume that voters look to other provinces to get information on the true value of a parameter (e.g., the cost of providing services in the Besley-Case model), nor do provincial interactions arise out of concerns about induced mobility of capital or labour. Instead, interactions arise as individuals recognize the inherent trade-offs in policy setting and look to other jurisdictions to help decide on what is fair.

For people who do not have a strong ideological stance on the minimum wage (people in the centre), the quadratic component completely captures their notion of the fairness of the minimum wage. People to the left in the political spectrum (left wing ideologues, for short) combine this relative notion of fairness with a belief that workers deserve a greater share of what is produced and, thus, higher wages. This is captured in the third main term in the utility function, with λ_2 capturing the strength of their ideology. In contrast, right wing ideologues combine relative comparisons with a libertarian notion that higher levels of taxes are bad since they represent something akin to theft by the state. This position is represented in the $-\lambda_3 m_t^A$ term, with the λ_3 parameter potentially being larger the greater the perceived inefficiencies associated with the minimum wage. It is possible that people hold a mixture of these opinions, with their ideology being reflected in the relative size of their personal values for λ_2 and λ_3 (making the specification similar to that used in Dixit and Londregan (1998)). However, we will assume, for simplicity, that there are only three notions of fairness in the population (left, right and centre). This is denoted by the parentheses around the ideological terms in 1): at most one of these terms will actually enter any individual's utility function. Also, note that both left and right wing ideologues only care about the minimum wage in their own province.

3.1) The Political Game

We will begin by assuming that there are only two provinces, A and B. In each province there are three potential parties: L(left), R (right) and C (centre). Each party, when in power, has

a single period value function which is a combination of the utility of the representative politician in the party and a function of the probability of re-election in the next election. Thus, the single period value function for the L party is given by,

3) $$V_{Lt} = w_{Lt} - \lambda_1 (m_t^A - \rho_t)^2 + \lambda_2 m_t^A + \gamma P_{te}$$

where, P_{te} is the probability of re-election in the election period, te. The value functions for the C and R parties are defined analogously, with the $\lambda_2 m_t^A$ term being replaced with $-\lambda_3 m_t^A$ for the R party and being left out altogether for the C party. Essentially, we assume, drawing on political science theories of party positions relative to the median voter (Aldrich(1983), Chappell and Keech(1986), that the L party is controlled by left wing ideologues, the R party is controlled by right wing ideologues and the centre party has no ideologues. Following Dixit and Londregan(1998), all three parties also want to maximize their probability of being re-elected.

Notice that we described 3) as the value function when the party is in power. Since we want to focus on interactions among provincial governments, we assume that non-incumbents are passive players in an election, getting a proportion, $(1 - P_{te})$ of the vote on election day. We will also assume that $w_{Lt} = w_{Rt} = w_{Ct}$. That is, politicians in all the parties make the same income (the income of a member of parliament) and none are directly affected by the minimum wage.

The probability of re-election in province A in period t is given by,

4) $$P_t = \Phi(x_t \alpha - \xi_1 (m_t^A - \rho_t)^2 + \xi_2 (\pi_m - \pi_B) m_t^A)$$

where, Φ is a cumulative distribution function, x_t is a vector of provincial variables, α is a parameter vector, and ξ_1 and ξ_2 are parameters. Equation 4) says that the probability of re-election depends on the minimum wage but also depends on other factors reflected in the index $x_t\alpha$. These factors could include policies other than the minimum wage and factors affecting how voters feel about the incumbent party such as political scandals and the state of the economy. Roemer(2001) argues that this type of specification, with parties caring about the probability of re-election and factors other than the direct policy of interest affecting that probability, allows an equilibrium in a model with competition among parties in which parties adopt genuinely different policy stances. The minimum wage impact on re-election has two components. The first is how far the relative minimum wage is from the fair level as seen by centrist voters. This assumes that centrist voters

are the "swing" votes in an election. The last term reflects the fact that minimum wage workers directly benefit from and business owners directly pay for the minimum wage. Thus, a higher minimum wage increases the probability of re-election if there are more minimum wage earners than business owner voters.

In each province, we will assume there are C, R and L parties. However, we will also assume that the incumbent is only concerned with one of the other two parties in the period from just after an election to just after the ensuing election. That party will be the official opposition during the incumbent's term and the party that will win the next election if the incumbent loses. This simplifies our analysis of elections and fits with reality in the sense that all provinces have parties from each part of the ideological spectrum but only very rarely do all three have realistic chances of forming the next government.[2] Finally, notice that the C party might be slightly left or right of centre but, for simplicity, we define it as exactly in the middle. It is the position relative to the other parties that matters in what follows.

3.2) Model Without Elections

We can learn quite a bit about minimum wage setting in this model by considering the simplest version: one where neither of the parties in power in provinces A or B are concerned with re-election. This could be seen as the equivalent of the lame duck period in the Besley and Case model. There are no term limits and hence no real lame ducks in Canadian politics, but acting as if there are simplifies the model, making it easier to see some of the main insights.

To begin, assume that the C party holds power in both provinces. We assume that both governments set their minimum wages simultaneously, which is a natural assumption given that one period will correspond to a year in our data. Thus, their policies can be summarized with their reaction functions, which for province A is:

$$5) \qquad m_t^A = (1-\theta)\kappa\,\overline{w_t} + \theta\, m_t^B$$

with the reaction function for the C government in province B being directly analogous. With the two C governments implementing these reaction functions, we get an equilibrium:

$$6) \qquad m_t^{Ae} = m_t^{Be} = \kappa\overline{w_t}$$

where the e superscript denotes an equilibrium value.

Suppose, instead, that there is a C government in place in province A and an R government in province B. It is simple to show that province A's reaction function is still given by 5). On the other hand, the reaction function for B's government is now:

$$7) \qquad m_t^B = (1-\theta)\kappa\overline{w_t} + \theta m_t^A - \frac{\lambda_3}{2\lambda_1}$$

where the last term captures the trade-off between the right wing ideologues' preference for lower minimum wages, λ_3 , and their concerns about being too far out of line relative to other provinces, λ_1 . The equilibrium wages in the two provinces are now given by,

$$8a) \qquad m_t^{Ae} = \kappa\overline{w_t} - \frac{\theta}{(1-\theta^2)}\frac{\lambda_3}{2\lambda_1},$$

and,

$$8b) \qquad m_t^{Be} = \kappa\overline{w_t} - \frac{1}{(1-\theta^2)}\frac{\lambda_3}{2\lambda_1},$$

Several interesting conclusions arise even from this simple model. First, reaction functions do not change according to who is in power in other provinces but equilibrium solutions do. This is potentially important for empirical work. Econometrically, identifying the effects of group characteristics on members of a group is complex. Manski(1993) and Moffitt(2001), among others, discuss this problem in relation to measuring the impact of neighbourhood characteristics on individual outcomes. In that problem, one has to worry about selection into the neighbourhood, which is not an issue in our case since the "neighbourhood" is effectively all the provinces in Canada, and though some in Quebec have tried to select out, they have not succeeded yet. On the other hand, the issue that actions by the individual can affect the equilibrium "neighbourhood" values does arise in our context. This is a standard endogeneity problem. In addition, common factors could affect minimum wage setting in all provinces, resulting in a significant coefficient on other provinces' minima that does not reflect a causal effect. Moffitt(2001) argues that identification would be achieved in this situation if there were exogenous changes in neighbourhood composition. In our case, such a change corresponds to a change in government in another province to one with a different political orientation. This can be

seen in equations 6) and 8a), where the equilibrium minimum wage decreases in province A because the government in B changes from C to R. This suggests using the political orientation of governments in other provinces as an instrument in estimation of the reaction functions.

The second conclusion from this exercise is that interactions with other provinces generate a convergence in minimum wages, with the extent and nature of the convergence depending on differences in political orientation between governments in different provinces. Thus, when two C governments are in power, there is complete convergence of minimum wages. Switching the B government to the R party generates a decline in the equilibrium wage in A as A's government adapts to the lower wage it knows that the R party in province B wants to choose. The R government in B sets an equilibrium value such that it essentially accepts some penalty for being out of line with province A in order to be closer to its desired, lower level. However, it still compromises. It turns out that, in this simple set up, the reduction in A's equilibrium minimum wage from the one that would hold if two C governments were playing to the one in 8a) is equal to the increase in the equilibrium minimum wage we would observe in B moving from a situation where two R governments were playing to the one in 8b). Thus, C governments follow right (left) wing governments up (down) in their minimum wage setting but they also act to mediate the extent of the cuts (increases) that those governments make. This means that one would obtain dynamics in this model from two sources: 1) movements in $\bar{w}_t$; and 2) changes in the set of political orientations of provincial governments. A period in which R governments are elected in many provinces (such as the late 1980s) would be one in which the minimum wage would fall relative to movements in $\bar{w}_t$, even in provinces where C and L parties are in power. Thus, one can generate dynamics that look like races to the bottom even though the underlying reaction functions are symmetric. One of our questions will be whether we can describe the dynamics of minimum wage setting in Canada just with this simple model.

3.3) Introducing Other Forms of Dynamics

3.3.1) Dynamic Norms

Since we are ultimately interested in the patterns of minimum wage setting over time, we turn next to introducing additional, plausible forms of dynamics into the model. The first of these is to allow dynamics in the setting of norms. The idea is that when an institution such as a

minimum wage is in place for a while, social norms may start to adjust to it. Inhabitants of provinces with habitually high minimum wages may come to define themselves as inherently "socially conscious", for example. To capture this, we replace 2) with the following:

$$2') \quad \rho_t = (\theta(\delta m_t^B + (1-\delta) m_{t-1}^A) \quad + \quad (1-\theta)\kappa \overline{w_t})$$

Consider a three period model with a C government in province A and an R government in province B. The R government's reaction function in the second period is given by:

$$9) \quad m_2^B = [(1-\theta)\kappa \overline{w_2} + \theta m_2^A - \frac{\lambda_3}{2\lambda_1}] \quad - \theta(1-\delta) m_2^A + \theta(1-\delta) m_1^B - \theta(1-\delta)\frac{\lambda_3}{2\lambda_1}$$

Note that the term in square brackets on the right hand side is 7), the reaction function when the lagged minimum is not taken into account. Added to this are three other terms. The first corresponds to the reduction in the reaction of B's government to the minimum in the other province as it places more weight on its own past value instead. The second shows that the reaction function now also includes the lagged value of B's minimum wage. The last term reflects the fact that in a world where fairness ideals are updated, an R government will implement a larger minimum wage cut in order to push future equilibria toward the lower values it prefers. L governments will do the same but in terms of additional increases in the minimum wage. Thus, ideologues from both sides set policy parameters both to satisfy their short term goals and to influence social norms.

3.3.2) Nominal Rigidities

Another important source of dynamics arises from the fact that nominal minimum wages are rigid downward. For Canada, there are no cuts to nominal minimum wages in any province in the period we examined (1969 to 2005). There are a number of papers on the social norm that nominal wages are rarely cut (e.g., Kahneman et al(1986)). Rather than try to model the source of the norm here, we take it as given and ask about its implications for the observed patterns in minimum wages.

The stricture not to cut the nominal minimum wage might initially seem most relevant for R parties since they are the ones who want lower minimum wages. However, the problem they face in this regard is simple. When they inherit a nominal minimum wage that is above their

preferred value, their best response is to hold that wage constant until increases in $\bar{w}_t$, caused either by inflation or productivity increases, bring their preferences and the actual minimum wage back into line. The nominal minimum wage restriction plays a more active role in decision making for L governments which know they are going to be succeeded by either C or R governments. The L government may want to set a particularly high minimum wage, knowing that this would tie the hands of the government that follows. Doing this, though, is costly in terms of votes in the current period. Thus, L governments would likely only to set minima to tie the hands of future governments if they knew they were going to lose the next election. Since this is likely to be rare, we expect "tying the hands of future governments" behaviour to be rare.[3]

3.4) Model With Elections

The effects on our predictions when we make the model more realistic by including the effects of an upcoming election are straightforward. For simplicity, we do not include the derivations and just state the main conclusions from the exercise. First, both types of ideological parties will tone down their extremism in a pre-election period in order to increase their chances of winning the election by looking less extreme and, thus, getting a chance to set the minimum wage in the post-election period. Second, the size of this election effect changes depending on the nature of the official opposition. An R government, for example, is less concerned about losing to a C party than an L party because the minimum wage that is set by the former will not cause the R party's ideologues as much disutility. As a result, the R government will not temper its minimum wage setting in order to get re-elected as much when it faces a C opposition as when it faces an L opposition. Empirically, the implication is that minimum wages set by both L and R governments should be affected by the ideological nature of the main opposition party in their province. Finally, the relative importance of minimum wage earners versus business owners affects the minimum wage level. This is a standard political economy type effect.

3.5) Empirical Specification

The model to this point has emphasized a standard of fairness based on comparisons with other wages and minimum wages. However, Sobel(1999) identifies a consumption standard related to poverty lines as one of the main targets specified by politicians justifying minimum wage increases in the US. This can be introduced to the model by adding a consumption standard term

to equation 2) or 2'). In particular, we can define a variable, d_t , as a value of the minimum wage that would allow a minimum wage worker employed full year, full time to attain the poverty line and add that variable (multiplied by an impact parameter) to 2) or 2'). Doing this does not change the main conclusions derived above (apart from adding the d_t term to the reaction function) but complicates the exposition, so we have omitted it so far. We do, however, include a d_t variable in the estimation to allow for the possibility that consumption standards are important.

The complete derivation of our main estimating equation is given in Appendix A. We begin with the optimization function from a world with elections, using the dynamic norm specification given by 2') with the d_t variable added and allowing for different median wages in each province. Further, we add an error term ϵ_{it}, where i indexes province and t indexes year, to 2' to capture the notion that tastes in redistribution may vary over time, perhaps as the minister in charge of the minimum wage changes. Finally, we use a linear approximation to the derivative of Φ with respect to m^B. The resulting regression determining the preferred minimum wage for province i in period t is then given by,

$$10) \quad m_{it}^{*} = \beta_0 + \beta_1 m_{-it} + \beta_2 m_{it-1} + \beta_3 DR_{it} + \beta_4 DL_{it} + \beta_5 \overline{w_{it}} + \beta_6 d_{it}$$

$$+ \beta_7 PP_{it} + \beta_8 PB_{it} + x_{it}\zeta + u_{it}$$

where, the * denotes the government's preferred minimum wage, the -i index refers to the average for all provinces other than i, DR_{it} is a dummy variable equaling 1 if the governing party is right wing, DL_{it} is a dummy variable equaling 1 if the governing party is left wing, PP_{it} is a measure of the political power of those who support higher minimum wages (e.g., unions), PB_{it} is a measure of the political power of the small business community, x_{it} is a vector of factors affecting the probability of re-election, such as the unemployment rate, u_{it} is an error term, the β's are parameters and ζ is a parameter vector. It is important to point out that it is the observed minimum wage in other provinces that is relevant in this specification, not the desired levels, since voters will use what they actually observe to set their fairness standards. The same argument holds for the lagged minimum wage. This makes the estimation much simpler than it would be if desired values were relevant.

Equation 10) corresponds to the reaction function for province i without taking account of the restriction that nominal minimum wages cannot be cut. To account for that restriction, we will approach the estimation of 10) using Tobit estimators in which we treat observations where the nominal minimum wage in a province takes the same value as in the preceding year as potentially censored. If we do not do this then we risk attributing slow movements in minimum wages to low reaction function elasticities when in fact they are due to the societal constraint that nominal minimum wages cannot fall. The specific form for the estimator is,

$$11) \quad I_{it} = z_{it}\chi + \eta_{it}$$

$$12) \quad m_{it} = m_{it}^{*}, \quad if \quad I_{it} > 0,$$
$$m_{it} = m_{it-1}, \quad if \quad I_{it} <= 0$$

and we treat m_{it} as left censored at its observed value if the nominal minimum wage does not change between periods t and t-1. Equation 11) corresponds to the decision of whether to raise the minimum wage in period t based, potentially, on a comparison of the utility benefits and costs from changing the minimum. Thus, if the desired minimum is below last period's actual value plus a perceived political cost of adjusting then the minimum wage is left at last period's value. Given this logic, the z vector will include changes in the right hand side variables in 10).[4] We also implement a simper Tobit in which the censoring point is taken to be exogenous in order to show the basic patterns in the data. Note, though, that since the censoring point is actually the previous period's minimum wage, treating it as exogenous is inappropriate. The estimator is implemented using standard maximum likelihood techniques under the assumption that u_{it} and η_{it} are jointly normally distributed.

It is worth pausing to compare the key empirical implications arising from our model to those from competing models of minimum wage setting. Those competing models include: a simple political economy model in which minimum wages are set based on the relative power of groups with a self-interest in raising or lowering the minimum wage; a races to the bottom model in which concern over the mobility of capital causes provinces to try to undercut one another's minimum wages; and a pure redistributive model in which provinces set the minimum wage to optimally redistribute income toward low skilled workers. One central assertion in our model is

that minimum wages are set as a positive function of characteristics of the wage distribution such as the median. Assuming that the political power of the low skilled does not increase with their wage, neither the simple political economy model nor the races to the bottom model has such an implication. Further, as Moffitt et al (1998) point out, in a pure redistributive model based on the altruism of middle class voters, the minimum wage should be negatively related to the low skilled wage since those voters would want an increase in the minimum wage to improve the lot of the low skilled when the latter's wages are falling. Thus, tests establishing a positive causal impact of median unskilled wages on the minimum wage would give precedence to the fairness based model over the others.

A second key feature of our model is that governments will want to set their minimum wages to stay in the middle of the pack of provincial minimum wages across the country: there will be a race to the middle. As a direct result of this, provincial reaction functions will be symmetric in the sense of showing equal reactions to movements up or down in other provinces' minimum wages. As Bailey and Rom (2004) and Figlio et al (1999) point out, race to the bottom models imply greater reactions to decreases in redistributive parameters set in other provinces than to increases. Thus, symmetry of response is a key feature of our model that differentiates it from models of provincial interactions based on factor mobility, and testing for symmetry is an important part of establishing the plausibility of a fairness based model.[5] Interestingly, our model predicts that one can witness what look like races to the bottom even when symmetry exists. Specifically, the race to the middle will be violated to some extent when L or R parties are in power since they balance the tendency toward the middle with their ideological positions, and are thus willing to diverge to a greater degree from the provincial norm. As a result, if R parties take power in a set of provinces at the same time, the standard of fairness used in other provinces will be lowered and even L governed provinces will be forced to adjust their minimum wages downward in order not to appear too out of step.

Finally, our empirical specification allows for direct tests of the strengths of competing explanations. If the pure political economy model is accurate then the variables in the x vector should explain much more of the variation in observed minimum wages than the other variables in the specification. Also, if pure redistribution is the main concern, then one would expect

movements in minimum wages to track a cost of living index more than either the median wage or wages in other provinces. Lastly, our model provides a direct rationale for the inclusion of political orientation that would be at most an add-on in the other models

4) Qualitative Evidence: What Policymakers Say

We employ two complementary research strategies to examine both the assumptions and the implications of the model from section 3). In the next sections, we examine provincial minimum wage data over roughly four decades. In this section, we consider qualitative evidence drawn from documentary reviews and confidential interviews with provincial policymakers. In late 2003, we attempted to interview the Minister responsible for the last minimum wage increase in each province. In addition, since it had been many years and multiple elections since the last minimum wage increase in the provinces of Ontario and Alberta, we sought to speak to the current Minister in those provinces. We were not successful in all cases, most often due to pending or recent elections, and in others we were referred by the Minister to a Cabinet colleague or a senior bureaucrat responsible for minimum wage policy. In all, we conducted confidential interviews with five public servants and four Cabinet Ministers from seven of Canada's ten provinces (British Columbia, Alberta, Manitoba, Ontario, New Brunswick, Nova Scotia, PEI).

The model constructed in the previous section focuses on voters and politicians comparing minimum wages to their notions of fairness. A competing model could emphasize fears over mobility of capital as a key reason for provinces reacting to one another's policies. Groups representing small businesses, particularly provincial Chambers of Commerce and the Canadian Federation of Independent Business, routinely argue that increases in minimum wages will hurt business and result in job losses to minimum wage workers. However, a review of Canadian small business groups' websites and position statements does not reveal any reliance on the argument that minimum wage jobs will relocate to jurisdictions with lower wages.[6] Nor is there any evidence that provincial governments fear migration of jobs to jurisdictions with lower minimum wages. A former British Columbia Minister interviewed for this paper explained, "not too many workers are going to drive across the border to earn the minimum wage. And not too many companies will relocate to Alberta over the minimum wage," while his Cabinet colleague bluntly stated, "Minimum wage jobs are not mobile." The BC government's regulatory impact statement

in support of a minimum wage increase in 2000 stated that "Competitiveness concerns industries that compete in foreign or inter-provincial markets. Industries that provide a domestic service, such as fast food restaurants, would be less affected because they do not export their product or compete with imports. Any minimum wage increase would be applied to all employers in the domestic market, and therefore puts no single business at a disadvantage" (Province of British Columbia 2000).[7] We believe these statements are strong evidence against race to the bottom type models based on fears of capital mobility. Our test of symmetry of response in our econometric specification will provide further evidence on these models versus a standards of fairness model.

Although we found no evidence of concern for capital mobility, there is ample evidence that interest groups, the media, and, in response, politicians are attentive to interprovincial comparisons. Employer organizations in provinces with relatively high minimum wages cite the example of provinces with lower minimum wages to reinforce their argument that those standards are unreasonable (Canadian Press(2000b)). In turn, those seeking higher minimum wages seek to publicly shame their governments into raising the minimum wage by drawing comparisons with more generous provinces (Workman and Jacobs(2002), Jacobs and Hunter (2003), Locherty and Harrington(1988)). Opposition parties to the left of the governing party follow a similar strategy. For instance, the leader of the Alberta NDP complained that, "It is pretty embarrassing that rich Alberta has a minimum wage the same (or near) that of Atlantic Canada where the cost of living is so much less."(Canadian Press (2000a))[8] Reflecting comparisons from both sides, press coverage of minimum wage increases routinely offers comparisons among the provinces, even on occasion providing tables (e.g., Stinson(1990)). Provinces ranking either first or last can pretty much count on that fact making the headline in any news coverage (e.g., McInnes(1994), Johnsrude(1998)).

Provincial governments also routinely draw comparisons between their minimum wages and those of other provinces. It is striking that Saskatchewan and Manitoba, whose minimum wages continually rank in the middle of the provincial pack, actually post comparisons of their own and other provinces' minimum wages on their websites.[9] Announcing its minimum wage increase in 2003, the Manitoba government stressed that, "The increase [would] retain Manitoba's ranking in the middle of rates among Canadian jurisdictions." Manitoba(2003) Similarly, the Saskatchewan government appended a table summarizing other provincial and territorial minimum

wages to its press release in March 2002.

Interviews were unstructured and confidential, but in all cases subjects were first asked an open-ended question about what factors are taken into account in setting minimum wages in their province. Respondents were given no advance indication that the project was interested in provincial interactions, yet, in 5 of 9 cases, subjects volunteered that other provinces' minimum wages were a consideration. Of the other four, one subsequently indicated when asked explicitly about comparisons to other provinces that it was a "prime concern." The other three were from NDP or Conservative governments that, as discussed below, were defiant in their decisions not to be tied to other provinces' minimum wages. One of the six who listed comparisons as important, a former senior official with the Manitoba government, explained, "We always looked at what other provinces were doing with respect to the minimum wage. You wanted to understand where you were." Atlantic provinces appear to be most preoccupied with interprovincial comparisons, though with particular attention to their region. Newfoundland, Nova Scotia, and Prince Edward Island all explicitly stressed in their most recent minimum wage announcements that they were in line with other Atlantic provinces.[10] A senior public servant in the New Brunswick government explained "whenever we go to Cabinet, one of the first questions we're asked is where we stand [relative to other provinces]." Similarly, a Nova Scotia public servant stated, "there's sort of an unwritten policy to try to achieve uniform minimum wages in the region. We like to look at other Atlantic provinces to see where we're at ... We don't want to be the lowest or the last to announce." His colleague in Prince Edward Island concurred: "the [Atlantic] Ministers get together annually and one of the items discussed is always minimum wages. There's a concerted effort to stay within $0.25 to $0.30 of each other." Nor are the larger provinces immune to this dynamic. It is noteworthy that for a period of four years in the late 1980s Ontario and Quebec moved in lockstep, as illustrated in Figure 1b. The fact that identical minimum wage increases not only took effect on the same date, but were also announced months earlier on the same day, suggests a conscious effort to harmonize minimum wages.

While most provinces seem intent on staying in the middle of the pack, New Democratic governments appear more willing to diverge. Indeed, early in the BC NDP's first term in the early 1990s, the Labour Minister boasted to organized labour that his government would make BC's

minimum wage "the highest in the country" (Hunter(1993). However, even NDP governments are only willing to get so far ahead of their neighbours. Three years after the Labour Minister's boast, by which time BC did have the highest minimum wage in the country, the NDP Premier stated, "I think we have to be careful to make sure [our minimum wage] isn't a lot higher than everywhere else in the country" (Barrett(1996)).

At the other end of the political spectrum, neo-conservative governments have been willing to diverge from other provinces at the low end of the distribution. A Minister in the Alberta government, which as of 2004 had not increased its minimum wage in six years, during that time falling $1 to $2/hour behind its neighbours, insisted that the comparison to other provinces, "is not a factor [in our deliberations]. That just becomes a popularity contest or horse race." Alberta's ideological sibling, the Conservative government in Ontario in the 1990s, also held the line on minimum wages, resisting an increase for almost a decade until it was defeated in the fall of 2003. That government had inherited the highest provincial minimum wage in Canada from their immediate predecessors, a left-wing NDP government. In response, they used divergence from provincial norms as a rationale to forgo further increases. One Cabinet Minister announced that, "We are committed to [freezing the minimum wage] for a period of time or at least until other minimum wages across Canada reach where we are"(Toronto Star(1995)).

Although several of the politicians and government officials interviewed noted that only a small fraction of workers earn the minimum wage, they did not dismiss its significance. A public servant in the Manitoba government explained, "The minimum wage is mostly symbolic," a sentiment echoed with almost identical language by an Ontario official. In support of our model that minimum wages are perceived as a question of fairness, provincial governments go to some lengths to make the case that they are treating both minimum wage workers and their employers fairly. Indeed, of the six most recent provincial government press releases announcing minimum wage increases that we were able to locate, four explicitly used the word "balance" in referring to business and workers, while two others used other terms to convey the same sentiment.

The message from this qualitative analysis is that while business groups predictably oppose minimum wage increases, they do not predicate their arguments on the threat of capital mobility. However, both pro- and anti-minimum wage increase groups, opposition parties, and the media

draw comparisons among provinces' minimum wages. In response, even though policymakers are unconcerned by the prospect of capital mobility, they are nonetheless keenly aware of and sensitive to the minimum wages of other jurisdictions. While NDP and Conservative governments seem more willing to get "out of line" with their neighbours' minimum wages, it appears that other provinces deliberately stay in the middle of the pack.

5) Empirical Results

5.1) Basic Specification

We turn now to implementing our empirical specification, given in equation 10). We present results from variants on this model in Table 1. In all our specifications, we include a full set of provincial dummy variables because we are concerned that, without them, persistent ideological differences across provinces will confuse our interpretations. Thus, Alberta's more free enterprise ideology may lead to both lower minimum wages and lower unionization rates and without provincial fixed effects, we would tend to interpret a resulting positive coefficient on a union variable as a causal impact of union strength on a minimum wage setting. We prefer to identify such effects using time variation. We have also consciously chosen not to include year effects in any of the specifications. We are attempting to explain the long swing pattern in minimum wages and, hence, do not want it absorbed by year dummies.

Typically, fixed effect Tobit estimators are deemed to be inconsistent because of nuisance parameter arguments based on the fact that the number of fixed effects grows at the same rate as the cross-sectional dimension of the data. This creates a problem because the asymptotics are discussed in terms of N (the cross-sectional dimension) going to infinity. However, in our case there are a fixed number of provinces and consistency issues are based on T (the time dimension) going to infinity. In that situation, and in particular in our case where we do not include time effects, there are no nuisance parameter problems and estimating the Tobit specification with provincial fixed effects provides consistent estimates of the parameters of interest. Finally, in all our reported results the reported standard errors are based on a variance covariance matrix that is robust to unspecified time dependence u_{it}.

While in Figure 1 we plot the real minimum wage, in the regressions we use log nominal minimum wages in order to highlight different potential effects from different deflators

(specifically, the median unskilled wage versus the CPI). As discussed earlier, minimum wage increases are sometimes phased in, with governments announcing an overall increase along with a series of steps with associated enactment dates to reaching that overall increase. Empirically, this creates a challenge in matching minimum wage increases to the events that generated them. Our approach is to use the full announced increases in the minimum wage and assign their timing according to the announcement date. Thus, if a minimum wage increase of $1 is announced in 1998 but is to be phased in using 25 cent steps over the ensuing 4 years, we record this as a $1 increase in 1998. This insures that it is the events at the time that the actual decision is made that are related to the minimum wage increment. Importantly, there are no examples in our data of governments turning back pre-announced increments, even in cases where new right wing governments inherited those increments from a previous government.[11]

In our tables, we follow common parlance and call the simple Tobit with the censoring treated as exogenous a Type 1 Tobit and the Tobit with endogenous censoring a Type 2 Tobit. We start with results from the Type 1 Tobit because it is closer to demonstrating the basic patterns in the data. In the first specification, presented in column 1 of Table 1, we use the Type 1 Tobit with the proportion of workers who are unionized, the proportion of workers employed in the retail sector, and the growth rate of provincial GDP over the previous year as regressors. All variables vary by province and year. Unions are often vocal supporters of minimum wage increases. The proportion unionized variable is meant to represent the political power of such support and, thus, is expected to have a positive sign. On the other side, a larger retail sector will correspond to a larger group of affected employers, and thus we interpret the retail sector as capturing the size of political opposition to the minimum wage, with an associated negative sign. Of course, it also implies a larger set of affected workers, which could imply the opposite effect. The GDP growth rate variable is intended to capture the notion that in good economic times, job loss effects associated with the minimum wage would be perceived as lower and, as a result, more generous minimum wage increases would be observed. In the actual estimates, the union and retail variables are strongly significant and of the predicted sign. The GDP growth rate variable, on the other hand, has a significantly negative effect, suggesting that minimum wages are set lower in good times. Notice from the bottom of the table that over half the dependent variable

observations are censored (i.e., involve a nominal minimum wage value that has not changed from the previous year), indicating the need for the Tobit estimators.

The first specification is intended to correspond to what has been done in the existing empirical literature on minimum wage setting. That literature tends to emphasize interest group based models (Becker(1983)), with minimum wages regressed on variables taken to represent the relative political power of groups with competing interests in the minimum wage. For example, Sobel(1999) examines the setting of the US minimum wage and shows a significant positive relationship between a measure of the relative influence of unions and business and a measure of the long run growth of the minimum wage. Similarly, Silberman and Durden (1976) find a significant relationship between campaign contributions from both small businesses and unions and Members of Congress' voting patterns on increases of the US national minimum wage. In Canada, however, there are mixed results across studies using these types of political power variables. Blais et al. (1989) find a negative correlation between the share of employment accounted for by firms with less than 20 employees (which they argue to represent the strength of opposition to minimum wages) and a province's minimum wage but also an (insignificant) negative correlation between the fraction of a province's workforce that is unionized and its minimum wage. Dickson and Myatt (2002) find the opposite: a negative effect from an importance of small business variable and an (insignificant) positive effect of the unionization rate. Both papers find a strong negative correlation between the minimum wage and the provincial unemployment rate, but there are clear potential endogeneity problems with such a specification. The results in column 1 fit broadly with papers emphasizing interest group power as an explanation for minimum wage setting.

In column 2, we expand the specification to include the key variables suggested by our model. The median unskilled wage and the Left and Right dummy variables are defined in section 2. The province specific CPI is included as a proxy for d_t, and is intended to capture the notion that under anti-poverty rationales the minimum wage should track the cost of living. The CPI values only show variation in cost of living over time within provinces, not across provinces. Cross-province differences will be soaked up in the provincial fixed effects. We also include our variable corresponding to the minimum wage in other provinces. For province A in region j in

year t, this equals the simple average of minimum wages in all provinces other than A in region j in year t. We use three regions: Atlantic (Newfoundland, PEI, Nova Scotia and New Brunswick), Central (Ontario and Quebec), and West (Manitoba, Saskatchewan, Alberta and British Columbia). We use the regional average as our comparison because of evidence from the interviews that policy setters often used a regional comparator, particularly in Atlantic Canada. We also implemented all of our specifications using the national average in place of the regional average and obtained very similar results. The regional average minimum wage, the median unskilled wage and the CPI variables are all entered in log form.

One noteworthy result from the specification in column 2 is that the proportion union, the proportion retail, and the GDP growth variables become much smaller and very insignificant in this specification. In contrast, the median wage, the regional average minimum wage, and the Left wing dummy variable all take the expected sign and are strongly significant. The regional average appears to play a particularly strong role in determining minimum wages. Both the Right wing dummy and the CPI variable take the expected sign but are small relative to their standard errors. The value of the log likelihood function increases dramatically between the first and second specification, indicating that while the political interest groups have individually significant effects when entered on their own, they leave much of the variation in the minimum wage unexplained.

In the third column, we add a lagged minimum wage variable to our specification.[12] Because we are trying to capture the idea of a slow moving adjustment of norms, we use the average of the log of the minimum wage in the preceding three years. The lagged variable has a similar sized effect to that of the median unskilled wage and is statistically significant at the 10% level but its introduction has little impact on the estimates of the other variables.

In the column entitled "Type 2, Tobit Full" in Table 1 we recreate our main results with the Type 2 Tobit.[13] Once again, the union, retail and GDP variables are not statistically significant and are not large (a .1 increase in the proportion unionized implies only a 1% increase in the minimum wage). The effects of the other variables are also similar in size and significance to those obtained with the simpler Tobit in column 2. In contrast, when we introduce the lagged minimum wage variable in the Type 2 Tobit, it has a much larger and more statistically significant effect than in the Type 1 Tobit. Its introduction also leads to sharp reductions in the estimated

effects of the Left wing dummy and the regional average variable. Nonetheless, apart from the Right wing dummy, the variables from the model are all statistically significant and enter with the expected sign.

In Table 2, we present the coefficients from the censoring process (11). We originally included differences and levels in all the variables from equation (10) but tested down to the main variables plus the Right and Left wing variables. The estimates suggest that provinces are more likely to increase their minimum wage when a Left wing government is first elected and when either the regional mean or inflation increases. Interestingly, the estimates indicate that right wing governments are more likely to keep the nominal minimum wage unchanged and, in contrast to the Right wing effects in the desired minimum wage equation, the effect is statistically significant. Finally, the correlation between u_{it} and η_{it}, reported at the bottom of each column is above .9, which may explain why the Type 1 and 2 Tobits generate similar results.

5.2) Instrumental Variables Estimation

The theoretical model presented earlier in the paper is clear in its implication that the wage ratio in other provinces is an endogenous variable: other provinces are setting their minimum wages relative to province j at the same time province j is setting its minimum wage relative to theirs. To address this, we employ an instrumental variables strategy. Based on the discussion in the model, we can identify the reaction function of one province if we have variables that shift the reaction functions of other provinces. We argue in that discussion that the prime candidates for such variables are changes in the ideological positions of governments in other provinces (which lead to parallel shifts in the reaction functions in those provinces). The model also suggests that inflation rates in other provinces can act as good instruments. What provincial governments care about are the actual minimum wages in other provinces since those are what their constituents observe and use as a benchmark. However, those observed minimum wages will reflect both the desires of the other governments and the restrictions imposed by the stricture against cutting nominal minimum wages. Thus, in low inflation times we should observe less movement in the average minimum wage in other provinces.

We implement instrumental variables (IV) estimators of our model using the control function approach of Smith and Blundell(1986). This is a two step procedure in which the first

step consists of regressing the right hand side potentially endogenous variable on covariates and instruments. In our case, this consists of regressing the average of the minimum wages in other provinces in the region on the own province GDP growth rate, unionization rate, proportion retail, CPI, median unskilled wage, provincial dummies, and left and right wing variables plus the average values for the instruments listed above across all other provinces in the region in a year. We run this as a pooled regression, stacking the "other province" averages for each of the ten provinces. In the second stage, we run our Tobit specifications including the residual from the first stage regression. Assuming the instruments are valid and enter the first stage significantly, this yields both consistent estimates of the coefficients in our minimum wage determination equation and a test of the exogeneity of the average minimum wage ratio regressor. If the coefficient on the constructed residual variable is statistically significantly different from zero in the second stage regression then exogeneity is rejected.

Our first stage regression implies a very good fit, with an adjusted R^2 of .98. More importantly, the instruments all enter statistically significantly at the 5% significance level and the F-statistic associated with the joint probability that the three instruments (the average left and right wing variables, and the inflation rate) have zero effects is 22.0 which, given it is distributed as F(3,350), far exceeds any standard critical value. Thus, the instruments suggested by our theory perform well, lending credence to our second stage testing and estimation results.

The first column of Table 2 contains second stage estimates from a Type 1 Tobit using the full specification but not including the lagged dependent variable. The residual term from the first stage estimation is significantly different from zero at the 5% level, implying that the mean minimum wage ratio in other provinces is an endogenous regressor. Following Smith and Blundell(1986), we present standard errors corrected for the fact that we are using an estimate of the first stage error.[14] The endogeneity-corrected results are similar to the Type 1 Tobit results in column 2 of Table 1 except that the CPI effect is now much larger and statistically significant, the median unskilled wage effect is larger, and the regional average effect is smaller.

In the second column of the table, we bring in the lagged minimum wage. Given our discussion in the theoretical model, we are concerned that forward looking behaviour on the part of governments implies that this, also, may be an endogenous variable. As instruments, we use

lagged values on the average value instruments used in the first stage for the regional average minimum wage under the assumption that average inflation and the political stance of governments in other provinces are strictly exogenous variables (i.e., innovations in the province A's minimum wage are independent of both past and future values of, for example, inflation in other provinces). We once again use these instruments in a control function specification, regressing the lagged dependent variable on these province specific lagged covariates. Note that since we assumed that the lagged dependent variable enters the reaction functions because of updating of notions of fairness, it is the actual lagged minimum wage rather than some desired value of the government's that is relevant. This means that the first stage can be specified as a simple regression and does not require the use of Tobit techniques. Again, the instruments are strongly significant in the first stage. In a second stage in which we include both the first stage residual corresponding to the regional average and the residual for the lagged minimum wage, we find that the latter residual never enters significantly.[15] In Table 3, we present results not including that residual. Those results are much like the ones in the first column except that the CPI effect is now somewhat smaller and insignificant. The lagged minimum wage variable itself has an effect that is very similar in size and significance to the corresponding estimate from Table 1.

In columns 3 and 4, we move to the Type 2 Tobit results. Here, the first stage residual for the regional mean is significant when the lagged minimum wage is included but insignificant when it is excluded. The specification without the lagged minimum wage yields estimates that are very similar in magnitude to those from the Type 1 Tobit. However, as in Table 1, including the lagged minimum wage variable in the Type 2 Tobit yields quite different results relative to either the Type 1 Tobit or the Type 2 Tobit without the lagged variable results: the estimated CPI effect is now very small and insignificant; the Left wing variable has a much smaller (though still statistically significant) effect; and the regional average effect becomes smaller. The lagged variable also now has a strong positive effect. In the end, given theoretical arguments and the significance of both the regional mean residual term and the lagged minimum wage variable, our preferred specification is the one given in the last column of Table 3.

5.3) Examining the Implications of the Model

Having established our preferred specification, we turn to discussing the results in light of

the fairness standards model and competing models. As discussed above, a key competing model is one based on political competition among self-interested groups. In our specification, this is represented by the proportions union and retail variables. In our preferred specifications these variables are neither individually nor jointly significant at any conventional level (the p-value for the joint test in our preferred specification is .31). Further, they do not have economically substantial effects. Thus, once variables such as the median wage and the average minimum wage in other provinces are introduced, the political competition explanation appears to lose support in the data. As discussed earlier, this is similar to some results in the existing Canadian literature but appears to be in contrast to results in the US literature, where variables measuring union and business strength often enter significantly. An interesting paper from this perspective, though, is Kau and Rubin(1978), who study minimum wage support in the US Congress and do not find a significant relationship between unionization and support for the minimum wage. In contrast to other US studies, they include the average manufacturing wage as a regressor in their specification. As we show in Table 1, our estimated union effect drops dramatically when we include the median unskilled wage. This may mean that positive unionization impacts observed in other studies are really picking up a relative wage effect rather than a union power effect. This could also help reconcile the different results on union power in the US and the Canadian studies that find no effect since the latter control for relative wage effects by deflating the dependent variable (the minimum wage) by the average manufacturing wage.

A second competing explanation is that minimum wages are set to address poverty targets for the working poor. Sobel(1999), in an examination of the rhetoric surrounding minimum wage setting in the U.S., argues that keeping the working poor above the poverty line is a key stated policy goal. In our specification, this goal is represented by the province specific CPI since the nominal minimum wage should track the cost of living if governments are trying to set the minima in relation to that cost for the poor. However, in our preferred specification, the CPI variable is neither economically substantial nor statistically significant, matching Sobel's finding that US minimum wage setting is not related to this target, regardless of the rhetoric. Interestingly, in the context of our model, this means that when thinking about the minimum wage, voters care about fairness in the sense of setting the minimum wage to match other wages in the economy but not

about fairness in the sense of using the minimum wage to redistribute income.

The key variables according to our model are the political orientation variables, the median unskilled wage, and the average minimum wage in other provinces in the region. The left wing dummy variable enters positively, as predicted, and is statistically significant. The estimated effect implies that left wing governments set minimum wages roughly 6% above the level chosen by centrist governments. Right wing governments set minimum wages that are lower than those set by centrist governments but the estimated effect is small and nowhere close to statistically significant. The smallness of the right wing effect may reflect an imperfect definition of what constitutes a right wing party, but it might also imply that right wing governments view minimum wages as a low cost sop to workers. Recall that Mike Harris (whose Ontario conservative government was counted by most observers as very right wing by Canadian standards) did not say that he wanted to slash the minimum wage, only that he wanted to let Ontario's real minimum wage fall until it was in line with other provinces. This also fits with the finding from the estimated censoring process that Right wing governments are less likely to change minimum wages from one year to the next.

The estimates in the preferred specifications also imply that the minimum wage tends to track the median unskilled wage. The estimated median wage effect implies that a 10% increase in the unskilled wage is associated with approximately a 2.9% increase in the minimum wage in a province. In section 5.3.3, we investigate whether this association can truly be seen as a causal effect of movements in the unskilled wage on the minimum wage. The estimates imply that the level of minimum wages in other provinces also has a strong effect. Thus, a 10% increase in the average minimum wage in other provinces in the region implies a 1.6% increase in the own-province minimum wage according to the preferred specification. This effect is much smaller than we obtain in Table 1, where we do not address potential endogeneity concerns. We contend that shifts in the political orientation and the inflation rate in other provinces are sound instruments for the regional average minimum wage and that, given that those instruments have strongly significant effects in the first stage, the estimated regional average effect in Table 3 can be taken as causal. Finally, the lagged minimum wage variable also has economically strong and statistically significant effects. In our model, this effect picks up dynamic adjustments of fairness norms. If

that is true, then if a set of left wing governments in different provinces raise their minimum wages at the same time they could both pull up minimum wages in other provinces and serve to establish a new, higher norm in the longer term. However, lagged dependent variables can cover a myriad of sins and so we do not want to put excess emphasis on that interpretation. In the same vein, we are encouraged that our main conclusions (though with somewhat different magnitudes in terms of estimated effects) stand up when we exclude the lagged minimum wage variable. Overall, we argue that the estimation results provide strong support for the standard of fairness model and against two common competing models. However, our model has more stringent implications for the estimated effects and we turn to testing those next.

5.3.1) Symmetry Tests

One key implication of our model is that provinces are racing to the middle of the distribution of minimum wages rather than either the top or the bottom. In terms of our empirical specification, this implies that provinces should respond with equal strength to movements up and down in the minimum wages of other provinces. This contrasts with races to the bottom and the top in policy parameter setting. Both Figlio et al (1999) and Bailey and Rom(2004) argue that in races to the bottom the provincial reaction functions should show stronger responses to downward than upward movements in other provinces' parameters. Indeed, in a strict race to the bottom, the response to upward movements in other provinces' parameters should be zero.

We investigate whether minimum wage setting satisfies the symmetry restrictions from our model in two ways. First, we interact the average wage ratio in other provinces variable with a dummy variable equaling one if the province was below the average in the previous period. In a race to the bottom, provinces which are below the average should respond less to movements in other province minimum wages than provinces with an above average minimum wage. The opposite would be the case for a race to the top. The specification including this interaction term is reported in the first column of Table 4. We estimate using the Type 2 Tobit but do not report the censoring process estimates since they are of little interest. The specification includes the same variables as in the third column of Table 3 but we only report a subset of the variables for parsimony. We also include a dummy variable equaling one if the province's minimum wage was below average in the previous year to make sure the key interaction variable is not just picking up

persistently below average provinces. Notice that we do not include the lagged minimum wage in this specification. The concept of a below average province conditioning on its minimum wage makes little sense. The coefficient on the variable of interest (the interaction of the average in the other provinces with the dummy for being below average last period) is both economically insubstantial and not statistically significant at any conventional significance level. Thus, according to this first test of symmetry there is no evidence that provinces above or below the average are more sensitive to movements in minimum wages in other provinces. It is worth re-iterating that a finding of symmetry fits with our claim, based on our interviews, that provincial governments were not concerned about factor mobility and, hence, were not engaged in a race to the bottom.

We are also interested in whether the apparent symmetry just indicates that provinces move in a pack or whether it reflects a race to the middle. By a race to the middle we mean that provinces that find themselves on the extreme of the minimum wage distribution tend to change their minimum wages in order to move to the middle of the pack. Earlier, we provided quotes from policy makers that suggested the latter is true: that governments do not want to just move with the pack but actually try to stay in the middle of it. To check out whether there is such a race, we regress the first difference of our nominal minimum wage variable on changes in the other provinces' average, changes in the median unskilled wage, and the left and right wing dummy variables. We also introduce a variable equaling the difference between the log of the province's minimum wage and the log of the regional average minimum wage in the previous period and the interaction of that variable with a dummy variable equaling one if the province was below average in the previous period. The difference from the mean variable takes positive values for above average provinces and negative values for below average provinces. Its estimated effect is negative and highly significant, indicating that the farther a province was away from the mean in the previous period, the larger the change in the minimum wage it institutes. Further, the change is in the direction of a movement toward the mean. The relatively small size and lack of statistical significance of the interaction term indicates that below average provinces are no more or less responsive to their distance from the mean than above average provinces. This supports the findings of symmetry in response depicted in the previous two columns. The results in the third column indicate, further, that provinces actually race to the middle in minimum wage setting.

While the strong symmetry prediction of the model is borne out in the data, other predictions are not. In particular, there is no evidence that ideological parties moderate their minimum wage setting when faced with an ideological (as opposed to centrist) opposition. We do find some evidence that left wing governments are more likely to post higher minima just before their term ends but this result is specification specific and only marginally significant when it does enter. Nonetheless, the main predictions of the model fit the data and it appears to provide a useful tool for organizing thoughts about minimum wage setting.

It is also worth pointing out that while these symmetry results fit with our fairness based model, other models may also predict this pattern. Specifically, we cannot identify against a model in which voters punish ideological extremists at the ballot box and measure extremism, in part, by comparing policies in their own province to those in other provinces. Similar to the arguments in Besley and Case (1995), they may care about extremism because they see it as a signal of a government that may operate inefficiently in order to pursue their ideology (though, to repeat, our model differs from Besley and Case's in that the standard of comparison is endogenous). This may be a plausible dynamic in any situation where governments are unsure about the best value for a policy parameter. In that case, politicians may prefer to stay in the middle of the pack. The reason we emphasize the fairness interpretation of the empirical results is that it provides a simple way to unite the result on the race to the middle with the result that minimum wages track the unskilled wage. The latter seems to us to be clearly related to perceptions of fairness.

5.3.2) The Role of the Median Unskilled Wage

We assume in our model that the median unskilled wage is an exogenous factor driving minimum wage setting through concerns about fairness. We investigate this assumption in two ways. First, we conduct simple Granger causality tests of whether the (log of) minimum wages Granger causes the (log of) median unskilled wages and the reverse. We test down to the appropriate lag structure and end up with models using three lags of both variables. We also condition on lags of the left and right wing variables because Figure 2 suggests ideological concentrations among the provincial governments may obscure the relationship between median and minimum wages. Based on this, the F-statistic associated with the first test has a p-value of .27 and, thus, we cannot reject the null hypothesis that the minimum wage does not Granger

cause the median wage. On the other, the F-statistic associated with the test of whether median wage Granger causes the minimum wage has an associated p-value of .024, indicating that the median unskilled wage does Granger cause the minimum wage.

We also investigate whether the minimum wage has a causal on the unskilled wage by regressing changes in the median unskilled wage on changes in the minimum wage, instrumenting for the latter using changes in the left and right wing variables. We first run a regression of changes in the minimum wage on changes in the unskilled wage. The coefficient on the latter is .24 with a standard error of .05, indicating that innovations in the two variables are related. We rerun this regression dropping the median wage variable but including changes in the Left and Right variables and save the residual. The change in the left wing variable enters this regression with a t-stat 2.71, implying that the data variation we will use in our instrumental variables estimator is the increases in the minimum wage instituted by new left wing governments. Finally, we run a regression of changes in the median unskilled wage on changes in the minimum wage, including the first stage residual. In this second stage regression, the coefficient on the changes in the minimum wage becomes -.18 with a standard error of (.31). Thus, the statistical conclusion is that the minimum wage does not drive the median wage. This is a reasonable conclusion given other evidence in the literature. Green and Paarsch(1997) examine the Canadian wage distribution for spillover effects of the minimum wage on above-minimum wages and conclude that there are impacts on wages up to $3 above the minimum wage but not beyond that point. This is well below the median unskilled wage. Other papers find even less evidence of spill-over effects (see, for example, Card and Krueger(1995)). Finally, it is worth re-iterating that we chose to work with the median wage to make sure that tail truncation effects induced by minimum wage changes did not affect our unskilled wage measure as they would if we had used average wages. Overall, we conclude that the relationship between minimum wages and median unskilled wages reflects a causal impact of movements in the central tendency of the unskilled wage distribution on minimum wage setting.

5.4) Comparison to the United States

It is interesting to consider these results in comparison to the minimum wage pattern for the United States. In the U.S., in contrast to Canada, the federal government has a sizeable

presence in minimum wage setting. In particular, workers covered by the Fair Labor Standards Act are covered by either the federal minimum wage or the relevant state minimum wage, whichever is higher. This means that, in practice, workers in the great majority of states face the federal minimum wage since only a minority of states (14 in 2005) set their own minima above the federal level. This makes our exercise of studying interactions among states difficult, though it is worth noting that the states with above-federal level minima tend to be clustered, with the main clusters on the west coast and in New England. In terms of our model, the fact that so many states choose to accept the federal minimum could be explained as arising from states choosing to co-ordinate on the federal standard as the national standard of fairness.

The result that the minimum wage tends to move with the going low skilled wage is also true in the United States. In figure 3, we recreate figure 2 for the United States. In particular, we plot the log of the real minimum wage (averaged across states in each year) and the log of the real median wage for men with 12 or fewer years of education for the years 1973 to 2005. Both series are normalized to 0 in 1979. The two series move very strongly together, with a correlation of .89, and the pattern broadly fits with a story of the minimum wage tracking the median unskilled wage but falling significantly below it in times of right wing political dominance. In contrast, the real average wage for university educated men and the real minimum wage have a correlation of -.60.[16] We argue that these patterns fit with the minimum wage being set to a standard of fairness (the wage of unskilled workers) rather than being set to meet redistributive goals (i.e., making sure the wages of low skilled workers keep up with those of high skilled workers).

The pattern in figure 3 might arise from changes in the minimum wage causing changes in the low skilled wage measure. Indeed, Lee(1993) argues that movements in the minimum wage can explain movements in the lower tail of the US wage distribution in this period. However, his results do not imply spill-over effects from the minimum wage on above-minimum wages that extend nearly far enough up the distribution to affect wages in the range of our median unskilled wage measure (which is .7 log points above the minimum wage in 1979, for example). Thus, we again view it as likely that any causality inherent in the relationship in figure 3 runs from the unskilled wage to the minimum wage. Further, Lee finds evidence that the upper tail of the wage distribution (represented, for example, by the 80-50 differential) tends to spread out when the

differential between the median and the 50th percentile of the wage distribution becomes smaller, particularly for males and when using within state variation. This, as Lee acknowledges, may point to an endogeneity issue in the relationship between the wage distribution and the minimum wage. Our model provides a possible source for such endogeneity.

6) Conclusions

In this paper, we examine the setting of minimum wages, arguing that they can best be understood as a reflection of voters' notions of fairness. We pursue this idea by setting out a simple theoretical model of minimum wage setting by sub-units in a federation. The key implications from that model are that minimum wages should tend to track movements in the unskilled wage distribution and movements in minimum wages set in other provinces. We argue that both of these are plausible standards against which voters could compare the minimum wage in their own province. The model also has the implication that governments will tend to "race to the middle" of the provincial minimum wage distribution in an attempt not to appear to be unfair. We examine these implications using two types of evidence: interviews with those responsible for setting minimum wages in various provinces; and econometric evidence based on minimum wage data from the ten Canadian provinces over the period 1969-2005. Many of the policy makers state that they use other provincial minimum wages as a benchmark in setting their own minimum wage. The main exception to this is ministers from ideologically extreme governments who are willing to move to the edges of the provincial minimum wage distribution, something we allow for in our model. The econometric evidence is also supportive of our model. In particular, both the median unskilled wage and the average minimum wage in other provinces are revealed as key driving forces in our estimates of a model of minimum wage determination. Further, we find strong evidence that provinces race to the middle in the sense that their reactions to movements in other provincial minimum wages are the same whether they themselves are above or below the mean of those other wages. This is strong evidence against a races to the bottom model of provincial interactions on minimum wages. The estimation also indicates a lack of support for models based on the political power of competing, self-interested groups or on the idea that minimum wages are set to meet redistributional goals.

The results in the paper point to two main conclusions. First, policy parameter setting in a

federation can involve a race to the middle. In our model, this occurs because standards of fairness are set in part by comparing to what is being done in other jurisdictions. However, one could also imagine this dynamic arising in situations where governments are unsure about the appropriate value of a policy parameter and seek only not to appear too extreme. In this sense, it is plausible that the tendency to move in a pack that we see in minimum wage setting could be part of the determination of other policy parameters. It is, in fact, possible to get what appears to be a race to the bottom in our model even though provinces are not over-reacting to downward movements in parameter setting in other provinces. This arises because even left-wing governments are forced to follow groups of right wing governments in their parameter setting if they do not want to appear out of step with a perceived fair standard. The implication is that we could observe long swings in values of policy parameters set in all jurisdictions as the ideological positions of subsets of the jurisdictions change.

The second main conclusion is that voters may look to the wage or income distribution to help in determining fair values for policy parameters. This is an argument raised by Moffitt et al (1998) in the context of welfare benefit setting in the US and fits with Kahneman et al(1986)'s arguments that people set their notions of fairness in exchange in relation to observed market prices since the latter are assumed to incorporate a myriad of relevant information. This has potentially important methodological implications since minimum wages are often used as exogenous driving forces determining unemployment or the shape of the income distribution. Our results suggest minimum wages may be partly capturing general movements in the unskilled wage distribution, complicating interpretations of their estimated impacts.[17] It also has the potentially disturbing implication that parameters like the minimum wage or transfers may be cut precisely when real incomes or wages for the less well-off are falling. Thus, policy setting based on this standard may ultimately exacerbate movements in inequality.

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Table 1
Basic Tobit Results
Dependent Variable: Log of (Minimum Wage)

Variable	Type 1 Tobit, # 1	Type 1 Tobit, Full	Type 1 Tobit, Full with Lag	Type 2 Tobit, Full	Type 2 Tobit, Full With Lag
Constant	1.30(.66)**	-.25 (.33)	.023 (.33)	-.40 (.24)	-.31 (.19)
Proportion Union	4.42 (.87)***	-.040 (.14)	-.050 (.14)	.14 (.14)	.017 (.11)
Proportion Retail	- 9.09 (.3.08)***	-.45 (.72)	-.25 (.60)	-.14 (.69)	.49 (.43)
GDP Growth Rate	-1.96 (.98)**	.030 (.19)	.019 (.19)	-.10 (.13)	-.14 (.11)
Provincial CPI	-	.052 (.11)	-.026 (.10)	.054 (.089)	-.16 (.070)**
Median Unsk. Wage	-	.22 .093)**	.18 (.075)**	.30 (.084)***	.21 (.057)***
Left	-	.14(.044)***	.12 (.043)***	.11 (.025)***	.054 (.023)**
Right	-	-.0044 (.025)	-.0089 (.025)	-.010 (.019)	-.024 (.019)
Regional Avg Min Wage	-	.69(.084)***	.62 (.11)**	.60 (.099)***	.43 (.10)***
Lagged Min. Wage	-	-	.18 (.095)*	-	.46 (.057)***
Provincial Dummies	Yes	Yes	Yes	Yes	Yes
No. of Obs	370	370	370	360	360
# Censored Obs	200	200	200	194	194
Log Likelihood	-194.86	45.9	47.95	20.06	42.45

Standard errors in parentheses. Standard errors based on a time-dependence robust variance covariance matrix. *** significantly different from zero at 1% level of significance. ** significantly different from zero at 5% level of significance, * significantly different from zero at 10% level of significance.

Table 2
Coefficients from Censoring Process, Type 2 Tobits

Variable	Table 1, Full	Table 1, Full With Lag	Table 3, Full	Table 3, Full With Lag
Change in Left	1.33 (.50)**	.92 (.44)**	1.18 (.59)**	.64 (.68)
Change in Right	.73 (.51)	.38 (.57)	.70 (.47)	.24 (.77)
Change in Median Unskilled Wage	.69 (1.05)	1.00 (.91)	.80 (1.14)	.99 (1.20)
Change in Regional Mean	4.69 (1.19)***	5.11 (1.32)***	4.48 (1.11)***	4.82 (1.81)**
Change in CPI	4.42 (2.38)*	3.69 (2.34)	4.46 (2.10)**	4.00 (2.28)*
Left	.12 (.26)	.12 (.24)	.16 (.29)	.17 (.31)
Right	-.48 (.26)*	-.44 (.27)*	-.47 (.26)*	-.44 (.28)
Constant	-.35 (.21)	-.36 (.22)	-.36 (.22)	-.37 (.21)*
Error Correlation	.93 (.067)***	.95 (.050)***	.95 (.064)	.98 (.070)

Standard errors in parentheses. Standard errors based on a time-dependence robust variance covariance matrix. *** significantly different from zero at 1% level of significance. ** significantly different from zero at 5% level of significance, * significantly different from zero at 10% level of significance.

Table 3
Instrumental Variables Results
Dependent Variable: Log of (Minimum Wage)

Variable	Type 1 Tobit, Full	Type 1 Tobit, Full with Lag	Type 2 Tobit, Full	Type 2 Tobit, Full With Lag
Constant	-.97 (.46)**	-.68 (.49)	-.89 (.37)***	-.29 (.22)
Proportion Union	-.13 (.14)	-.15 (.14)	.10 (.15)	-.032 (.12)
Proportion Retail	-.18 (.78)	.0081 (.66)	.071 (.65)	.73 (.50)
GDP Growth Rate	.20 (.18)	.18 (.18)	.029 (.17)	.029 (.12)
Provincial CPI	.26 (.12)**	.17 (.13)	.19 (.12)	.017 (.088)
Median Unsk. Wage	.34(.12)***	.29 (.10)***	.37(.11)***	.29 (.11)***
Left	.15 (.045)***	.14(.045)***	.12 (.024)***	.059 (.029)**
Right	.0031 (.027)	-.0013 (.026)	-.0072 (.021)	-.021 (.020)
Regional Avg Min Wage	.38 (.17)**	.31(.18)*	.41 (.15)***	.16 (.080)**
Lagged Min. Wage	-	.18 (.099)*	-	.49 (.097)***
Residual: Regional Avg.	.37 (.18)**	.36 (.18)**	.26 (.19)	.36 (.14)***
Provincial Dummies	Yes	Yes	Yes	Yes
No. of Obs	370	370	360	360
# Censored Obs	200	200	194	194
Log Likelihood	47.45	49.60	21.86	46.69

Standard errors in parentheses. Standard errors based on a time-dependence robust variance covariance matrix. *** significantly different from zero at 1% level of significance. ** significantly different from zero at 5% level of significance, * significantly different from zero at 10% level of significance.

Table 4
Specifications for Testing Symmetry

Variable	Type 2 Tobit: Dep. Var: Nominal Minimum Wage	Type 1 Tobit: Dep. Var: First Diff. Of Nominal Minimum
Constant	-.42 (.56)	-.070 (.027)***
Left	.078 (.013)***	.076 (.051)
Right	-.0039 (.026)	-.030 (.019)
Avg of Other Provs	.70 (.26)***	-
Median Unskilled Wage	.20 (.11)**	-
Change in Avg of Other Provinces	-	.73 (.21)***
Change in Median Unskilled Wage	-	.071 (.086)
(Avg of Other Provs) *(Below Avg Last Period)	-.016 (.023)	-
Below Average Last Period	-.039 (.034)	
(Avg of Other Provs) *(Drop in Avg Last Per.)	-	-
(Min Wage) - (Regional Avg.), Last Period	-	-.69 (.16)***
[(Min Wage) - (Regaional Avg.), Last Period] *(Below Avg Last Period)	-	-.030 (.19)
Provincial Dummies	Yes	Yes
No. of Obs	360	360
No. of Censored Obs	194	194
Log Likelihood	42.68	43.71

All estimates based on Tobit specification. Standard errors in parentheses. ** significantly different from zero at 5% level of significance, * significantly different from zero at 10% level of significance.

Appendix A
Derivation of Estimating Equation

In this appendix, we derive the basic estimating equation (19) from the model discussed in the text. In particular, we take the case of an R government in province B facing an election with an L party official opposition and a C government in province A. Consider a 2 period version of the model. We are interested in deriving the period 1 reaction function for the R government. That government selects a minimum wage in the first (pre-election period) to maximize:

$$A1) \quad V_{R1} = w_1 - \lambda_1 (m_1^B - \rho_t)^2 - \lambda_3 m_1^B + \gamma P + P V_{R2,R} + (1 - P) V_{R2,L}$$

where $V_{R2,j}$, j=L,R is the ideologues in the R party's value function next period if party j wins the election and, hence, gets to set the minimum wage. We have again assumed no discounting of the future for simplicity. We will consider the case with dynamic norms and include the possibility that the norms relate to poverty standards rather than just relative wage comparisons. As a result,

$$A2) \quad \rho_t = (\theta(\delta m_t^B + (1-\delta) m_{t-1}^A) + (1 - \theta) \kappa \overline{w_t^B}) + \mu d_t + \varepsilon_t^B$$

where, μ is a parameter and ϵ_t^B is an error term. The error term introduces potential taste differences in notions of fairness. Thus, the target minimum wage could change if, for example, a different minister with somewhat different fairness ideals took over the portfolio that included the minimum wage. Note, also, that we allow for differences in the median wage across provinces and over time.

The first order condition related to optimizing A1) through the choice of m_1^B is given by,,

$$A3) \quad - 2\lambda_1 (m_1^B - \rho_1) - \lambda_3 + \frac{\partial \Phi}{\partial m_1^B} \psi + \frac{\theta(1-\delta)}{1-(\theta\delta)^2} = 0$$

where the last term is the derivative of $V_{R2,L}$ with respect to m_1^B and

$$A4) \quad \psi = \gamma + \frac{\lambda_3(\lambda_3 + \lambda_3)}{2\lambda_1(1-(\theta\delta)^2)}$$

Recall that γ is the impact of the probability of re-election on the party's value function. The second term in A4) corresponds to the difference, ($V_{R2,R}$ - $V_{R2,L}$), assuming that $\lambda_2 = \lambda_3$ (i.e., ideologues have equivalent strengths of their convictions).To get a closed form solution, we will use the following linear approximation:

$$A5) \quad \frac{\partial \Phi}{\partial (m_1^B)} \approx \phi_0 + \phi_1 m_1^B + \phi_2 m_1^A + \phi_3 (\pi_P - \pi_B) + \phi_4 (x_1 \alpha) + \phi_5 \overline{w_1^B} + \phi_6 d_1$$

Rearranging A3), using A5), leads to:

$$A6) m_1^B = \omega (\frac{\theta(1-\delta)}{1-(\theta\delta)^2} + \psi\phi_0) + \omega (2\lambda_1\theta\delta + \psi\phi_2) m_1^A + \omega 2\lambda_1\theta(1-\delta) m_0^B - \omega\lambda_3$$

$$+ \omega (2\lambda_1(1-\theta) + \psi\phi_5) \kappa \overline{w_1^B} + \omega (2\lambda_1\mu + \psi\phi_6) d_1 + \omega\psi\phi_2 (\pi_m - \pi_b) + \omega\psi\phi_4 x_1\alpha + \varepsilon_1^B$$

where $\omega = (1/(2\lambda_1 - \psi\phi_1))$. Note that the last term on the first line of A6) is specific to an R government. An L government would have a similar term but with λ_2 replacing $-\lambda_3$, while a C government would have no such term. Thus, in the empirical specification, we capture these terms using dummy variables corresponding to right and left wing governments. The structural parameters in A4) are not identified from estimating equation 19) in the text without imposing extra restrictions. We are not ultimately interested in the structural parameters themselves and so will not search for such restrictions.

Endnotes

1. See Dixit and Londregan(1998) and Roemer(1998, 1999) for models that explicitly build ideology into political decision making.

2. Of 108 provincial elections between 1962 and 2004, third parties won more than 10% of the seats in a given legislature in only 18 cases and more than 20% of the seats only 6 times.

3. Derivation of results in a two period model in which an L government knows it will be replaced by a C government make this behaviour seem even less likely. Based on that derivation, the larger the increase in the median wage the L government expects between the first and second periods, the higher it will have to set the minimum wage in the first period to actually tie the hands of the C government. For high nominal wage growth (e.g., due to inflation), the utility benefit the L government gets from forcing a higher second period minimum pales beside the disutility they get from the fact that the minimum wage will be seen as unfairly high relative to that in other provinces in period 1. Thus, L governments would only set the minimum wage abnormally high if they expect to lose the next election and they only expect moderate increases in the median wage.

4. We also implemented a version of the model in which the I function was just the difference between the desired minimum wages in period t and period t-1. A likelihood ratio test rejected the restrictions implicit in this specification relative to the more general one in 11) and 12).

5. Our model also differs from (though it is related to) Besley and Case(1995). Their model also predicts an asymmetric response to policy changes in other provinces since not mimicking tax cuts in other provinces may lead to a government being labeled as a rent grabber. Again, this would imply that symmetric responses would differentiate our model from theirs. However, their model is not easily applied to minimum wage setting where there is not a clear optimal value for the policy parameter.

6.See, for instance, reports of a study of the impact of an increase in BC's minimum wage commissioned by the Canadian Restaurant and Foodservices Association (Bramham(1995)) and CFIB's position on a proposed minimum wage increase in Manitoba (Canadian Federation of Independent Business (1998).

7.See also similar statements by BC Finance Minister, Dan Miller, reported in Canadian Press, "BC minimum wage rises by 50 cents on October 1," Sept 21, 1995.

8. During a recent election campaign, the Nova Scotia NDP was critical that their province's minimum wage was the lowest in Canada outside Newfoundland (NDP Nova Scotia(2000)). Similarly, the Ontario Liberals made hay of comparisons between Ontario's minimum wage and those of other jurisdictions during the 2003 election campaign in that province (Ottawa Citizen(2003)).

9.See www.labour.gov.sk.ca/MINWAGE.HTM and www.gov.mb.ca/labour/labmgt/resbr/wages/minwage.html

10. The province of Newfoundland and Labrador stated that their increase brought "Newfoundland and Labrador's rate in line with other Atlantic provinces" (19 Nov 2001). Nova Scotia stressed that their announcement kept "the minimum wage competitive with those of other Atlantic provinces" (10 April 2003). PEI claimed their increase "protects low income workers while advancing the PEI economy in comparison to other Atlantic provinces" (21 Sept 1999).

11.This potentially raises issues about relating movements in covariates to movements in the dependent variable since actions during the implementation periods seem to be essentially frozen: governments who want lower real minimum wages cannot even move in that direction by leaving the nominal minimum wage unchanged because they are committed to increments in the minimum wage. We estimated specifications including controls for the implementation periods. The results from those specifications are extremely similar to those presented here and are omitted from this paper for brevity.

12. Note that we do not need to drop observations when we introduce lags because we have minimum wage data before our sample start date for the other variables.

13.Note that when we switch to the Type 2 Tobit, we need to drop the first year of data because the z vector includes first differences in several variables.

14. Our variance-covariance matrix estimator also includes a correction for potentially arbitrary dependence. Specifically, Smith and Blundell(1986) show that the variance-covariance matrix can be written as the sum of the standard Tobit variance-covariance matrix (the negative of the inverse of the expected value of the second partial matrix) plus a matrix that is a function of that matrix, the variance-covariance matrix of the first stage coefficient estimates, and $(\partial^2 \ln L)/(\partial\lambda\partial\pi)$ where λ is the vector of parameters from the Tobit likelihood function and π is the vector of parameters from the first stage regression. In this equation, we replaced the first term (the standard variance-covariance matrix) with the time dependence robust matrix. For the Type 2 Tobit, we also calculated the relevant $(\partial^2 \ln L)/(\partial\lambda\partial\pi)$ matrix.

15. In the Type 2 Tobit, its coefficient takes a value of -.11 with a standard error of .61.

16. The median low skilled wage is calculated from the CPS May supplement for the years 1973 to 1978 and from the MORG for the remaining years. Imputed observations are dropped where imputation is observed. We are grateful to Thomas Lemieux for providing us with this data. The average wage for the university educated comes from the Economic Policy Institute web site and refers to average wages for males with exactly a college education.

17. This echoes arguments made in Besley and Case(2000) concerning the need to take the source of policy parameter variation seriously. Lemos(2005) uses political variables for examining the impact of minimum wages on employment in Brazil.

Figure 1a
Real Minimum Wages, 1966 – 2005
Atlantic Provinces

Figure 1b

Real Minimum Wage,

1966 – 2005, Ontario and Quebec

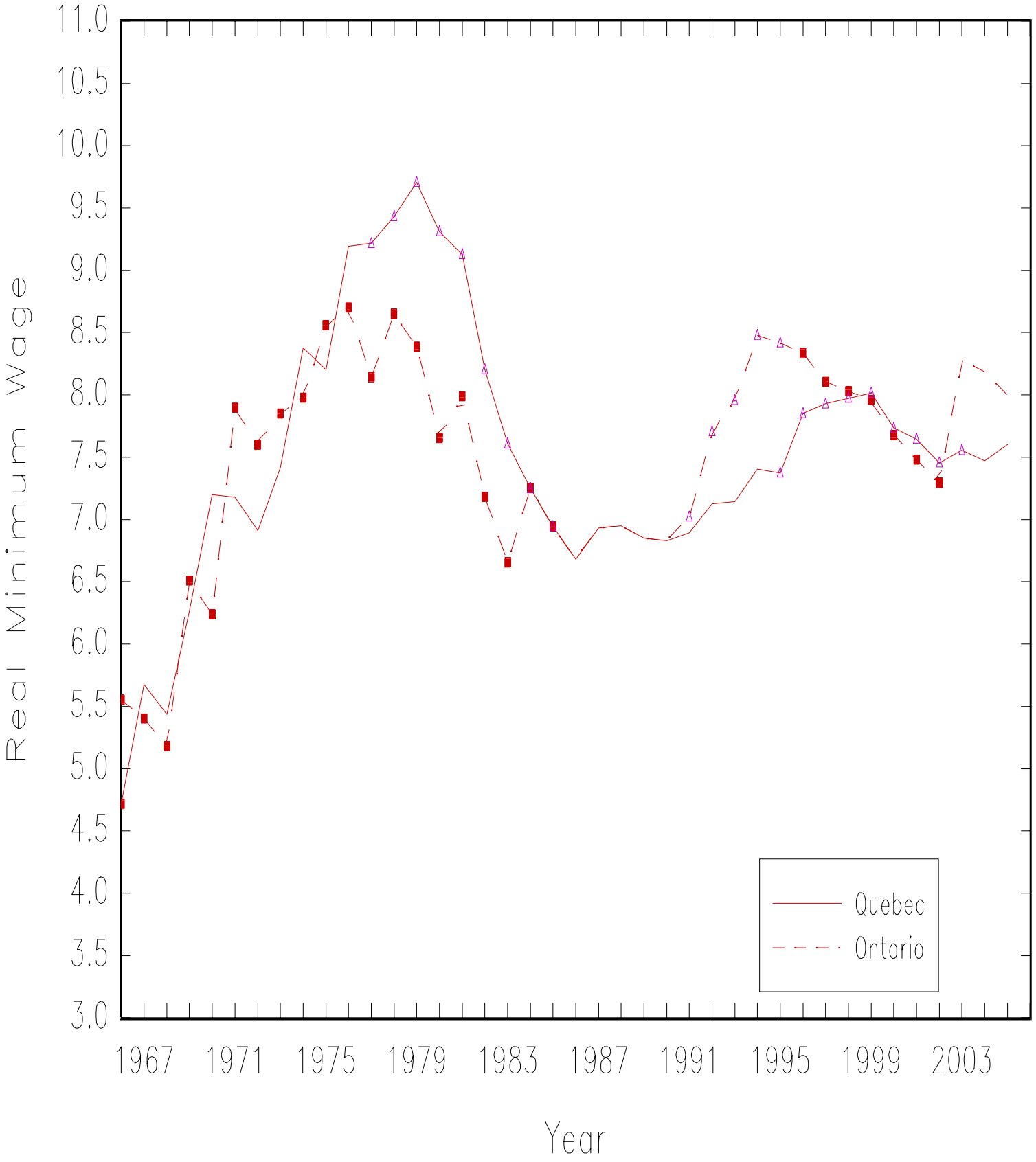

Figure 1c

Real Minimum Wage

1966 – 2005, Western Provinces

Figure 2

Real Minimum and Median Wages, 1969 – 2005

All Provinces

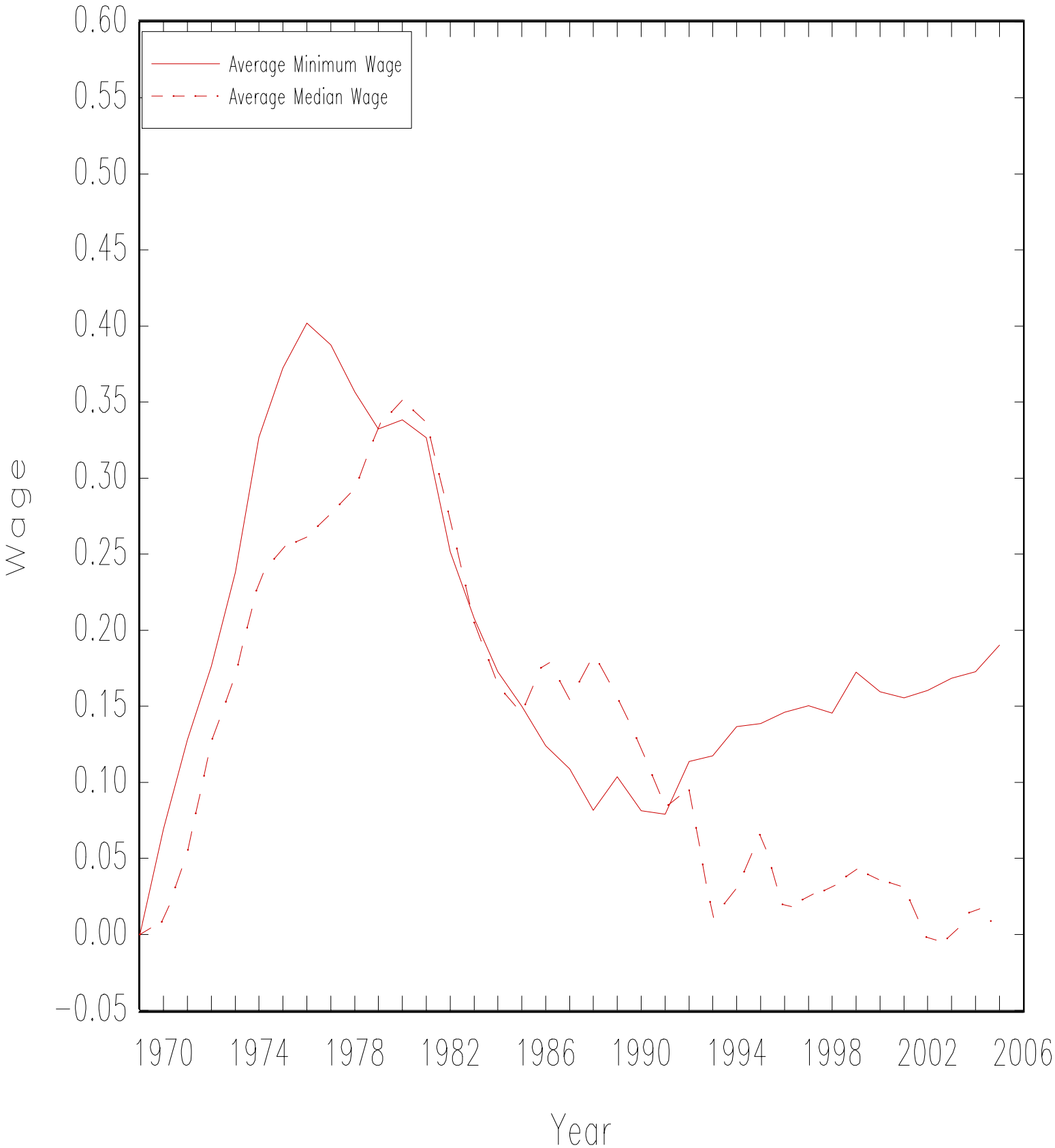

Figure 3

Real US Average Minimum Wage and Median Wage for High School or Less Educated Males