TURNING A BLIND EYE: COSTLY ENFORCEMENT, CREDIBLE COMMITMENT AND MINIMUM WAGE LAWS[*]

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In many countries, noncompliance with minimum wage legislation is widespread, and authorities may be seen as having turned a blind eye to a legislation they have themselves passed. We show that turning a blind eye can indeed be an equilibrium phenomenon with ex post credibility, in a model of minimum wage policy with imperfect competition, imperfect enforcement and imperfect commitment. Since credible enforcement requires costly ex post transfer of income from employers to workers, a government concerned only with efficiency but not with distribution is shown, paradoxically, to be unable to credibly elicit efficiency improvements via a minimum wage reform.

JEL Classification: D6, E61, J38.

Keywords: non-compliance, minimum wage, dynamic consistency, equity and efficiency.

Pagehead title: "Turning a Blind Eye and Minimum Wage Laws"

The comparative statics of a minimum wage have inspired a vast empirical literature and vigorous policy debates. The tradeoffs associated with a minimum wage hike are typically articulated in efficiency and equity terms, depending in particular on the competitiveness of the labour market.[1] Arguments based on a standard competitive model of the labour market imply sharp efficiency and equity tradeoffs, as employment is predicted to fall with a well enforced and binding minimum wage.[2] In contrast, if the relevant frame is of the monopsonistic variety, predicted employment response runs in the opposite direction, so long as the minimum wage is not too high (Stigler, 1946). Consequently, both efficiency and equity improvements may be brought about at once provided the minimum wage is "skillfully-set",[3] and perfectly enforced.

A standing assumption in both these archetypal settings is perfect enforcement, and by implication, full compliance with the minimum wage. This assumption is at odds with a growing body of empirical evidence however, which finds non-compliance with minimum wage legislation to be widespread. Specifically, the pioneering work of Ashenfelter and Smith (1979) found compliance rate in the United States in 1973 to be around 65%.[4] Non-compliance is also found to prevail in an accumulating list of developing countries, including for example Brazil (Lemos, 2004, 2006), Costa Rica (Gindling and Terrell, 1995), Honduras (Gindling and Terrell, 2006), Indonesia (Harrison and Scorse, 2004), Mexico (Bell, 1994), Peru (Baanante, 2005), Trinidad and Tobago (Strobl and Walsh, 2001), and a selection of Latin American countries (Maloney and Nunez, 2004).[5] Evidently, not only is it the case that compliant and non-compliant employers co-exist, there are also broad ranges of non-compliance, which come typically in the form of a spike at the official minimum, alongside a dispersion of subminimum wages in covered sectors.[6]

This emerging evidence underscores that the legislated wage floor and the intensity of enforcement are two indispensable arms of a minimum wage policy. Meanwhile, the same evidence also raises two issues that have so far evaded rigorous scrutiny. First, can a simple deviation from perfect to imperfect enforcement alone be sufficient to overturn the predicted impacts of a minimum wage hike when non-compliance is now a genuine possibility? Equally important, and backtracking one step, what are some of the reasons behind the pairing of lax enforcement but a high minimum wage, enough to provoke non-

compliance to begin with? More formally, the first question deals with the comparative static properties of a minimum wage hike at a given, but less than perfect level of enforcement. The second deals instead with the issue of endogenous enforcement, and questions the underlying determinants of enforcement imperfection.

Answers to these questions contribute to the minimum wage policy debate in a number of ways. First, we study the full set of equilibrium labour market implications of an imperfectly enforced minimum wage hike in an imperfectly competitive labour market,[7] when labour supply is taken to respond endogenously to the extent of enforcement imperfection, given any minimum wage.[8] Whether employment response to a rise in minimum wage should be expected to be (i) positive within the standard range, consistent with the familiar monopsonistic frame with perfect enforcement, or (ii) negative, thus consistent with a competitive labour market response also with perfect enforcement, or (iii) muted because precisely of enforcement imperfection, are clearly key but nevertheless open questions.[9]

Second, while there has been extensive discussion on the efficiency and equity tradeoffs associated with a perfectly enforced minimum wage (Freeman, 1996; Fields and Kanbur, 2007), a symmetric treatment of the tradeoffs associated with, and thus some of the underlying determinants of the enforcement of such a wage has not received equal attention. This is despite the fact that enforcement has been noted to differ widely between developed and developing countries (Neumark and Wascher, 2007). Within countries, enforcement is also known to differ across employers in different geographical locations (Ashenfelter and Smith, 1979) and in different industries (Weil, 2004). Further, the familiar distinction between covered and uncovered sectors (Maloney and Nunez, 2004; Gindling and Terrell, 2006) may also effectively be seen as a legislated distinction between sectors where there may be some enforcement, and others with no enforcement by design.

As a third contribution to the minimum wage debate, the combination of imperfect and endogenous enforcement can open up new ways to understand how labour market responds, or fails to respond to minimum wage legislation, depending ultimately on whether the minimum wage is expected to be enforced ex post. The potential insights that this combination can yield was first pointed out by Ashenfelter and Smith (1979) in the context of the minimum wage provisions of the Fair Labour Standards Act in the United States.

Somewhat unexpectedly, the study finds that compliance rates were higher in the southern states of the United States where wages were typically lower, while higher compliance rates also prevailed among employers of female workers compared to males. This counterintuitive finding can indeed be understood, as Ashenfelter and Smith (1979) reasoned, by recognizing that government compliance efforts were either concentrated in handling reports of actual violations, or were otherwise devoted to the inspection of sectors where the potential for violation was the greatest. The result was a skewed enforcement resource allocation, with added weight put towards sectors where violations are in fact prevalent. With rational expectations, this anticipated bias should, in turn, be expected to influence equilibrium compliance and employment responses to a minimum wage.[10]

Based on these observations, we develop in this paper an incentive compatible equilibrium model of a minimum wage policy, incorporating imperfect competition and imperfect enforcement of the minimum wage. We find this setting to yield results that are consistent with the stylised facts already noted. For the same minimum wage policy, there can be co-existence of compliant and non-compliant employers; a clustering / spike of employer types that uniformly comply; and a dispersion of firm-specific equilibrium subminimum wages.[11] With respect to our first question at the outset, having to do with how employment response to a minimum wage may change with an imperfect but fixed, as opposed to a perfect level of enforcement, we find that the possibilities run the gamut from no change at all, to a class of cases where there is a sharp reversal in sign from positive to negative, and then further to cases where there is a muted response. We show that each of these cases can prevail within well-defined ranges of minimum wages and enforcement intensities. In addition, these minimum wage thresholds and enforcement intensities are themselves specific to the characteristics of the labour market in question, including demand and supply side parameters.

We then turn to our next question and consider the decision of a planner who is at liberty to choose a minimum wage and a level of enforcement,[12] and who harbors a variable degree of concern for efficiency versus distribution. The concern for efficiency addresses underemployment in the face of an imperfectly competitive labour market, while the concern for distribution addresses earning shortfalls relative to the minimum wage on the part

of workers attached to non-compliant employers, along with those who are unemployed. In view of the documentation of ex post complaints-driven enforcement resource allocation as in Ashenfelter and Smith (1979), we contrast the case of commitment, where both the minimum wage and enforcement levels are fixed ex ante, with the case of discretion, where the choice of enforcement intensities is determined ex post, depending in particular on whether there is in fact non-compliance with the minimum wage.

Interestingly, given our formulation of a social welfare function combining both efficiency and distributional concerns, we find that non-compliance can be a rational expectation equilibrium with ex post discretion, but not with commitment. Commitment rules out non-compliance in our setting because if non-compliance is expected for any chosen level of enforcement, the minimum wage can always be adjusted downwards to alleviate the scale of any earnings shortfall. Meanwhile, full compliance cannot be a rational expectation equilibrium with discretion, because the ex post optimal level of costly enforcement will certainly be nil if there is literally nothing to enforce, which is of course the case when there is in fact full compliance.

Finally, we show that the endogenous level of enforcement subject to ex post credibility exhibits a number of interesting characteristics. First, credible enforcement is indeed need-based, in the sense that all else equal, enforcement will be higher when the incidence and severity of non-compliance is likely the greatest, due for example to low labour productivity. Ex post enforcement also rises with the minimum wage, provided that the planner espouses a sufficiently high degree of concern for distribution. Put simply, a government more concerned about the earnings shortfall relative to the minimum wage will have a higher ex post incentive to enforce. Finally, since ex post enforcement of a minimum wage is but a costly income transfer from a non-compliant employer to workers, a planner who cares only about efficiency, and who attaches no intrinsic value to the earning shortfalls of workers relative to the minimum wage, will be rendered least capable of enforcing a minimum wage in a rational expectation equilibrium. In this setting where a higher minimum wage can be used to raise employment and improve efficiency, we end with an intriging result: a planner who cares only about efficiency cannot credibly elicit efficiency improving minimum wage reforms.

4

1 The Model

Consider an employer who draws labour input from a population of $\mathcal{L}$ heterogeneous workers, and who possesses control over wages and employment within this population. The associated revenue is $R(\ell) = (a - b\ell/2)\ell$, where ℓ denotes the number of workers employed, and $a > 0$, and $b \geq 0$ are technological parameters respectively capturing labour productivity, and diminishing marginal product. The implied inverse labour demand schedule is therefore of the form

$$R_\ell(\ell) = a - b\ell \equiv w^d(\ell).$$

Workers differ according to a mobility cost of employment $t \in [0, T]$,[13] and are distributed uniformly along the $[0, T]$ interval. The utility of a worker with mobility cost t and employed at wage w is $u(t, w) = w - t$. The reservation utility of every worker is given by $\bar{u} \geq 0$.

Labour supply facing the employer, at given wage offer w, is accordingly made up of the sum of the individual labour supplies from workers with mobility cost not high enough to deter them from employment ($u(t, w) \geq \bar{u}$), or $\ell^s(w) = (w - \bar{u})\mathcal{L}/T$. This implies an inverse labour supply schedule of the familiar form:

$$w^s(\ell) \equiv \bar{u} + \tau\ell, \quad \tau \equiv T/\mathcal{L}.$$

Two benchmarks can now be singled out, respectively the competitive outcome associated with a wage-taking employer, and the monopsonistic outcome as in Stigler (1946).[14] So long as the reservation utility is not too high, $\bar{u} < a$, the competitive outcome is given by $\{w^*, \ell^*\}$:

$$\ell^* = \{\ell | w^d(\ell) = w^s(\ell)\} = \frac{a - \bar{u}}{b + \tau}, \quad w^* = w^d(\ell^*) = w^s(\ell^*) = \frac{\tau a + b\bar{u}}{b + \tau}, \tag{1}$$

where the marginal revenue product of labour coincides with the prevailing wage $w^d(\ell^*) = w^* = w^s(\ell^*)$. Thus, there is less than full employment ($\ell^* < \mathcal{L}$) if and only if mobility costs are large enough: $T > a - \bar{u} - b\mathcal{L}$. Henceforth, we focus on labour markets in which this mobility cost driven lack of full employment is a genuine concern, and assume that $\ell^* < \mathcal{L}$.

Now let $W(\ell) \equiv w^s(\ell)\ell$ denote total labour cost, and $W_\ell(\ell) = \partial W(\ell)/\partial \ell = \bar{u} + 2\tau\ell$ be the associated marginal labour cost. The monopsonistic labour market outcome

$\{w^{do}, w^{so}, \ell^o\}$ is

$$\ell^o = argmax_\ell \; R(\ell) - W(\ell) = \frac{a - \bar{u}}{2\tau + b} \le \ell^* \tag{2}$$

$$w^{do} = w^d(\ell^o) = \frac{2\tau a + b\bar{u}}{2\tau + b} \ge w^*, \quad w^{so} = w^s(\ell^o) = \frac{\tau a + (\tau + b)\bar{u}}{2\tau + b} \le w^*, \;\; \text{for} \;\; \tau \ge 0$$

with strict inequalities whenever $\tau > 0$. Thus, a strictly positive mobility cost and asymmetric bargaining power favoring the employer jointly implies that equilibrium marginal revenue product (w^{do}) strictly exceeds the corresponding equilibrium wage (w^{so}), as the employer takes advantage of per worker wage savings that come only with lower employment.[15] The result is a lower level of employment compared to the competitive benchmark $\ell^o < \ell^*$, and unemployed workers constitute a select group with some of the highest mobility costs.

2 Minimum Wage with Imperfect Enforcement

A minimum wage policy is the combination of a minimum wage $\bar{w}$ and an enforcement intensity based on a likelihood λ of inspection and discovery. The timing of the policy is:

- the government announces and commits to $\bar{w}$ and λ;[16]

- employment and wage decisions are made $\{\ell^m(\bar{w}, \lambda), w^m(\bar{w}, \lambda)\}$;

- employer inspections are carried out with likelihood λ. If the employer chooses not to comply, a penalty equaling the shortfall $\bar{w} - w^m(\bar{w}, \lambda)$, to be transferred to the worker, follows if inspection occurs. Otherwise, both the worker and the employer will be unaffected;

- workers strictly prefer receiving the minimum wage directly from a compliant employer as wage payment up front, as opposed to receiving any shortfall as settlement ex post. The transaction cost expended in the process of wage settlement upon inspection is given by a fraction $1 - \sigma \in (0, 1]$ of the settlement $(\bar{w} - w^m(\bar{w}, \lambda))$ forgone.[17]

For employers, imperfect enforcement implies three classes of options: over-compliance, exact compliance, and non-compliance. Imperfect enforcement also implies that the income

of workers attached to a non-complying employer now depends explicitly on enforcement and discovery. We consider each of these in turn.

2.1 *Imperfect Enforcement and Labour Supply*

Let $\bar{\ell} \equiv \ell^s(\bar{w}) = (\bar{w} - \bar{u})/\tau$ be the maximal labour supply corresponding to the minimum wage $\bar{w}$. Given λ, the expected utility of a worker facing a subminimum wage offer w is

$$Eu(w, t, \bar{w}, \lambda) = (1 - \lambda)w + \lambda[w + \sigma(\bar{w} - w)] - t = (1 - \lambda\sigma)w + \lambda\sigma\bar{w} - t$$

where $w + \sigma(\bar{w} - w)$ and w are respectively labour income with and without inspection, while $\lambda\sigma$ denotes the transaction cost adjusted intensity of enforcement. The adjusted weight $\lambda\sigma$ is strictly less than λ itself whenever $\sigma < 1$, and depends jointly on the enforcement intensity and the cost wage settlement σ. Comparing $Eu(w, t, \bar{w}, \lambda)$ and the reservation utility $\bar{u}$, the corresponding enforcement adjusted labour supply and inverse labour supply ($\bar{\ell}^s$ and $\bar{w}^s$) schedules are:

$$\bar{\ell}^s(w, \bar{w}, \lambda) = \frac{(1 - \lambda\sigma)w + \lambda\sigma\bar{w} - \bar{u}}{\tau} \;\; = \;\; \ell^s(w) + \frac{\lambda\sigma}{\tau}(\bar{w} - w) \; \geq \ell^s(w), \tag{3}$$

$$\bar{w}^s(\ell, \bar{w}, \lambda) = \frac{\bar{u} + \tau\ell - \lambda\sigma\bar{w}}{1 - \lambda\sigma} \;\; = \;\; w^s(\ell) + \frac{\lambda\sigma}{1 - \lambda\sigma}(w^s(\ell) - \bar{w}) \; \leq w^s(\ell), \tag{4}$$

for a non-compliant employer with $w \leq \bar{w}$ for (3), and thus $\ell \leq \bar{\ell}$ for (4). In contrast, a compliant employer and his hired workers are unaffected by inspection. A worker's expected utility is thus $w - t$ as before. Meanwhile, labour supply $\bar{\ell}^s(w, \bar{w}, \lambda)$ reduces to $\ell^s(w)$, and $\bar{w}^s(w, \bar{w}, \ell)$ to $w^s(\ell) = \bar{u} + \tau\ell$ for a compliant employer.

From (3), enforcement adjusted labour supply exceeds the unregulated benchmark at constant contracted wage w, whenever there is a positive likelihood of income gains subsequent to employer inspection $\lambda\sigma > 0$. Also from (3), either an increase in $\bar{w}$, or an increase in λ further increases labour supply at given subminimum wage w. Thus, imperfect enforcement gives rise to shifts in the labour supply in response to changes in the minimum wage policy whenever there is non-compliance, to be accounted for in the employer's decision problem below.

2.2 *Imperfect Enforcement and Expected Labour Cost*

The expected profit of the employer is:

$$\max_{\ell} R(\ell) - (1 - \lambda)\bar{w}^s(\ell, \bar{w}, \lambda)\ell - \lambda \max\{\bar{w}, \bar{w}^s(\ell, \bar{w}, \lambda)\}\ell \tag{5}$$

where the last expression $\max\{\bar{w}, \bar{w}^s(\ell, \bar{w}, \lambda)\}$ reflects the per worker wage cost conditional on inspection. For a non-compliant employer, $\max\{\bar{w}, \bar{w}^s(\ell, \bar{w}, \lambda)\} = \bar{w}^s(\ell, \bar{w}, \lambda) < \bar{w}$. Using (4), expected profit in (5) simplifies to

$$\max_{\ell} R(\ell) - (1 - \psi)W(\ell) - \psi\bar{w}\ell \tag{6}$$

where ψ adjusts the weight given to the minimum wage as part of the expected labour cost per worker by accounting for (4). Further, ψ is less than λ itself, lies between zero and unity, and is monotonically increasing in λ:

$$\psi \equiv \frac{\lambda(1 - \sigma)}{1 - \lambda\sigma}.$$

In contrast, for an employer that over- or exactly complies, expected profit is simply

$$\max_{\ell} R(\ell) - W(\ell). \tag{7}$$

Taken together, expected labour cost $E\bar{W}(\ell, \bar{w}, \lambda) \equiv (1-\lambda)\bar{w}^s(\ell, \bar{w}, \lambda)\ell + \lambda \max\{\bar{w}, \bar{w}^s(\ell, \bar{w}, \lambda)\}$ and the corresponding expected marginal labour cost where the derivative exists, $E\bar{W}_\ell(\ell, \bar{w}, \lambda)$, are given by

$$E\bar{W}(\ell, \bar{w}, \lambda) = \begin{cases} (1 - \psi)W(\ell) + \psi\bar{w}\ell & \text{if } \ell < \bar{\ell} \\ W(\ell) & \text{otherwise.} \end{cases} \tag{8}$$

$$E\bar{W}_\ell(\ell, \bar{w}, \lambda) = \begin{cases} (1 - \psi)W_\ell(\ell) + \psi\bar{w} & \text{if } \ell < \bar{\ell} \\ W_\ell(\ell) & \text{otherwise.} \end{cases} \tag{9}$$

Figure 1 illustrates. As shown, $E\bar{W}_\ell(\cdot)$ is increasing and piecewise continuous in ℓ. Furthermore, for a non-complying employer with $\ell < \bar{\ell}$, $E\bar{W}_\ell(\cdot)$ is a weighted average. As λ tends to 1 (and accordingly ψ to 1), $E\bar{W}_\ell(\cdot)$ is perfectly elastic at $\bar{w}$ for $\ell \leq \bar{\ell}$, as in the perfect enforcement setting in Stigler (1946). In contrast, in the complete absence of enforcement so that $\psi = \lambda = 0$, the marginal labour cost schedule is independent of the

minimum wage and coincides instead with the unregulated marginal labour cost. Finally, expected marginal labour cost is truncated exactly at $\bar{\ell}$ whenever $\lambda \in (0, 1]$. Beyond $\bar{\ell}$, and thus for an employer that overcomplies, expected marginal hiring cost coincides with the no-intervention benchmark.

One of the key insights of Stigler (1946) is that a perfectly enforced, binding minimum wage in the appropriate range can encourage hiring by *lowering* the marginal labour cost of hiring. Equation (9) echoes and extends this insight to cases with imperfect enforcement. Consider therefore a binding minimum wage $\bar{w}$, henceforth taken to mean $\bar{w} \geq w^{so}$. Evaluating expected marginal labour cost at the no-intervention employment level, ℓ^o,

$$E\bar{W}_\ell(\ell^o, \bar{w}, \lambda) = (1 - \psi)w^{do} + \psi\bar{w}. \tag{10}$$

Stricter enforcement via an increase in λ, and thus ψ, *lowers* expected marginal cost at ℓ^o if and only if $\bar{w} < w^{do}$. Put differently, (10) shows that even in an environment of imperfect enforcement, in which the government turns a blind eye to the possibility of non-compliance with regular frequency $(1-\lambda)$, raising enforcement continues to *lower* the expected marginal cost of hiring relative to the no intervention baseline in the range $\bar{w} \in [w^{so}, w^{do}]$. Outside the range, however, with $\bar{w}$ greater than the marginal revenue product of labour at ℓ^o (w^{do}), $E\bar{W}_\ell(\ell^o, \bar{w}, \lambda)$ is now strictly increasing in λ. These observations suggest that the comparative statics of a minimum wage policy $(\bar{w}, \lambda)$ will likely depend crucially on the size of the minimum wage relative to the thresholds w^{so} and w^{do}. We turn these next.

2.3   *Labour Market Equilibrium and Minimum Wage Thresholds*

A labour market equilibrium $\{\ell^m(\bar{w}, \lambda), w^m(\bar{w}, \lambda)\}$ consistent with expected profit maximization, expected utility decision-making and a binding but imperfectly enforced minimum wage can be shown to exhibit a number of possible configurations, separated by three distinct minimum wage thresholds. Two of which have already been singled out: w^{so} and w^{do}. A third threshold $\bar{W}(\lambda)$ is endogenous and depends on enforcement. $\bar{W}(\lambda)$ divides labour market equilibria into those that are to the right, left, or exactly at the point where the expected marginal labour cost schedule truncates:[18]

$$\bar{W}(\lambda) \equiv \max\{\bar{w} \geq w^{so} | R_\ell(\bar{\ell}) - (1 - \psi)(\bar{u} + 2\tau\bar{\ell}) - \psi\bar{w} \geq 0\}$$

$$= w^* - \frac{\tau(1-\psi)}{\tau(2-\psi)+b}(w^* - \bar{u}) \quad (< w^* < w^{do}). \tag{11}$$

Thus at given enforcement, expected marginal labour cost exceeds marginal value product, evaluated at the *maximal* labour supply available at the minimum wage, as soon as the minimum wage exceeds $\bar{W}(\lambda)$. As such, $\bar{W}(\lambda)$ puts an upperbound on the range of minimum wages, beyond which equilibrium employment will be scaled back to a level less than the available labour supply at the minimum wage. Using (1), (2) and (11), it is of interest to note that $\bar{W}(\lambda)$ lies between the unregulated wage w^{so} and the competitive wage w^*,[19] or

$$w^{so} \leq \bar{W}(\lambda) < w^* < w^{do}$$

whenever $\lambda < 1$. These are illustrated in Figure 2 for $\lambda \in (0,1)$. The corresponding labour market equilibria can be divided into:

Over-compliance: If $\bar{w} < w^{so}$, the minimum wage is non-binding, and there is equilibrium over-compliance. Thus, $\ell^m(\bar{w}, \lambda) = \ell^o$, $Eu(w^m(\bar{w}, \lambda), t) = w^{so} - t$, and $w^m(\bar{w}, \lambda) = w^{so}$. Consequently, employment, expected utility, and the equilibrium wage are all independent of small changes in the minimum wage policy $(\bar{w}, \lambda)$. In Figure 3a, inverse demand schedule $a_1 - b\ell$ is consistent with this regime.

Exact Compliance: Raise the minimum wage until $\bar{w} \in [w^{so}, \bar{W}(\lambda)]$. There is thus a binding minimum wage but the marginal revenue product of labour is greater than the expected marginal labour cost evaluated at $\bar{\ell}$, since $\bar{w}$ is less than the threshold $\bar{W}(\lambda)$. Labour market equilibrium is accordingly *supply-constrained* ($a_2 - b\ell$ in Figure 3a). Equilibrium employment and wages are determined based purely on supply side considerations, with:

$$\ell^m(\bar{w}, \lambda) = \frac{\bar{w} - \bar{u}}{\tau} = \bar{\ell}, \quad Eu(w^m(\bar{w}, \lambda), t) = \bar{w} - t, \quad w^m(\bar{w}, \lambda) = \bar{w} \tag{12}$$

since $\bar{w}^s(\bar{\ell}, \bar{w}, \lambda) = \bar{w}$ from (5). The elasticities of equilibrium employment, expected utility, and equilibrium wage with respect to a rise in the minimum wage are all positive. In addition, since such an employer is already in strict compliance with the minimum wage legislation, a further increase in the intensity of enforcement has no further impact on equilibrium hiring or wage.

Non-compliance: As noted, for a minimum wage $\bar{w} > \bar{W}(\lambda)$, labour market equilibrium is *demand constrained* ($a_3 - b\ell$ and $a_4 - b\ell$ in Figure 3b).[20] Equilibrium employment is determined by the intersection of the marginal revenue product and the expected marginal labour cost: $\ell^m(\bar{w}, \lambda) = \{\ell | R_\ell(\ell) = (1-\psi)(\bar{u} + 2\tau\ell + \psi\bar{w})\}$, while $Eu(w^m(\bar{w}, \lambda), t, \bar{w}, \lambda) = \bar{u} + \tau\ell^m(\bar{w}, \lambda) - t$. As long as there is positive employment, it follows from (2) and (9) that

$$\ell^m(\bar{w}, \lambda) \;=\; \ell^o + \frac{\psi}{2\tau(1-\psi) + b}(w^{do} - \bar{w}) \tag{13}$$

$$Eu(w^m(\bar{w}, \lambda), t) \;=\; w^{so} - t + \frac{\tau\psi}{2\tau(1-\psi) + b}(w^{do} - \bar{w}). \tag{14}$$

Thus, employment and expected utility exceed (are less than) their no-intervention benchmarks whenever $\bar{w}$ is less than (greater than) w^{do}. Also, from (4), (11) and (13),

$$w^m(\bar{w}, \lambda) = \bar{w} - \left(1 + \frac{\tau\psi}{2\tau(1-\psi) + b}\right)\frac{\bar{w} - \bar{W}(\lambda)}{1 - \lambda\sigma} < \bar{w} \tag{15}$$

if and only if $\bar{w} > \bar{W}(\lambda)$ and $\lambda > 0$. Thus, equilibrium non-compliance ($w^m(\bar{w}, \lambda) < \bar{w}$) is synonymous with a binding demand constraint. From (15), equilibrium subminimum wage depends on employer productivity and labour supply conditions, since $\bar{W}(\lambda) = w^* - (w^* - \bar{u})\tau(1-\psi)/(\tau(2-\psi) + b)$. In particular, a more productive employer (a), a smaller population of workers to draw from ($\mathcal{L}$) and a high mobility cost (T) are associated with a higher subminimum wage. Finally, since equilibrium employment is demand constrained in this range, (13) - (15) show that a further rise in the minimum wage decreases equilibrium employment, workers' expected utility, and equilibrium wage, at constant enforcement intensity. The preceding discussion suggests three sets of issues of particular empirical relevance, examined in greater detail below.

2.3.1 *Imperfect Enforcement and Comparative Statics*

Figure 4 summarises and compares the relationship between equilibrium employment and the minimum wage for the case of perfect enforcement, $\lambda = 1$, and imperfect enforcement $\lambda' < 1$, based on (12) - (15). As shown, the predicted comparative statics responses of a minimum wage are highly sensitive to imperfect enforcement, and accommodate cases ranging from (i) no change, (ii) a sign reversal and (iii) a muted response, depending

systematically on the size of the minimum wage relative to the minimum wage thresholds already discussed.

For minimum wages less than the endogenously determined $\bar{W}(\lambda)$, there is either over- or strict compliance despite imperfect enforcement. Equilibrium employment is accordingly independent of the intensity of enforcement, as in the perfect enforcement case. Next, for minimum wages in the range $(\bar{W}(\lambda), w^*]$, there is now non-compliance. Contrary to the case of perfect enforcement, a further rise in the minimum wage now decreases, rather than increases employment, even though the minimum wage is strictly less than the competitive baseline w^*. Finally, for minimum wages greater than the competitive wage w^*, employment continues to fall with respect to a rise in $\bar{w}$, albeit at a muted rate because of imperfect enforcement.

The same figure also shows that at a given minimum wage, the relationship between enforcement and equilibrium employment is nuanced. In particular, for a binding minimum wage $\bar{w}$ in the range $[w^{so}, w^{do}]$, an increase in λ (from λ' to 1) leaves employment unchanged for a firm in strict compliance, raise employment for any other (newly compliant or non-compliant) firms. In Figure 3b, inverse demand $a_3 - b\ell$ is consistent with this regime. The intuition follows from (10), where the expected marginal labour cost at ℓ^o is shown to *decrease* with enforcement intensity in this range. Outside this range, with $\bar{w}$ higher than w^{do}, stricter enforcement can only decrease hiring by a non-compliant employer ($a_4 - b\ell$ in Figure 3b).

2.3.2 *Compliant Clusters and Wage Dispersion*

It is worth reiterating that each of the minimum wage thresholds is endogenous, with w^{so}, $\bar{W}(\lambda)$ and w^{do} all positively associated with the productivity of labour a, the reservation utility $\bar{u}$, and supply side parameters, $T/\mathcal{L}$. Thus, the minimum wage thresholds can be re-expressed to give the combinations of labour demand *and* supply conditions consistent with over-compliance, strict compliance, and non-compliance, given the same minimum wage policy.

Figure 5 illustrates in $(a, b\mathcal{L}/T)$ space. Area A characterises the cluster of employers types and labour supply conditions consistent with exact compliance.[21] Any employer in

this area responds uniformly to the same minimum wage policy by paying exactly the minimum wage. As labour productivity falls, or when the pool of available workers ($\mathcal{L}$) increases, for example, area B applies. Area B characterises the case of non-compliance with positive employment response to stricter enforcement.[22] Finally, area C corresponds to the case of non-compliance with negative employment response to stricter enforcement.[23] Both areas B and C admit a continuous range of subminimum wages depending systematically on combinations of a and τ via (15).

These observations are consistent with a number of well-known empirical findings already noted in the Introduction. The clustering of compliant employers as in Area A is consistent with the oft noted spike at the minimum wage along the wage distribution. Workers earning the minimum wage co-exist with others subminimum wage earners along a dispersed subminimum wage distribution, consistent with Areas B and C.

In addition, an increase in the minimum wage can now be seen to give rise to two distinct sets of effects on wages. A pure wage effect works through equations (12) and (15), indicating respectively a positive wage impact on those who exactly comply and a negative impact on those who do not. But the same rise in the minimum wage also embodies a composition effect, which now accommodates an endogenous switch from compliance to non-compliance. In Figure 5, such an increase in the minimum wage moves areas A, B and C upwards. The combined wage and composition effect of a minimum wage hike is thus ambiguous in general. Not surprisingly, then, co-movements of the legislated minimum and subminimum wage have also been observed in the empirical literature, but these have so far come up with mixed findings on the direction of observed co-movements (Card and Krueger, 1995; Lemos, 2004; Baanante, 2005; Strobl and Walsh, 2001; Gindling and Terrell, 2002).

2.3.3 *Endogenous Enforcement and Turning a Blind Eye*

Implicit in our findings so far is that imperfect enforcement need not be associated with non-compliance. Indeed, the threshold $\bar{W}(\lambda)$ in (11) gives the largest minimum wage that can be applied without triggering non-compliance, for any $\lambda \in [0, 1]$. Furthermore, $\bar{W}(\lambda)$ can be fine-tuned by adjusting λ. Routine differentiation with respect to λ gives an

intuitive answer: the threshold $\bar{W}(\lambda)$ can be raised by increasing λ. As λ tends to 1, $\bar{W}(\lambda)$ approaches w^*, coinciding with the perfect enforcement case. But as λ approaches zero, $\bar{W}(\lambda)$ now tends to w^{so} implying in contrast that no employer will comply when a strictly binding minimum wage is not enforced.

Because of the monotonicity of $\bar{W}(\lambda)$ in λ, (11) can be used to retrieve the minimum enforcement intensity, $\Lambda^o(\bar{w})$, required to elicit compliance for any given minimum wage $\bar{w} \in (w^{so}, w^*)$:

$$\Lambda^o(\bar{w}) = \bar{W}^{-1}(\bar{w}), \ \ \text{for} \ \ \bar{w} \in (w^{so}, w^*). \tag{16}$$

Naturally, this is the dual to (11), which seeks the maximum minimum wage that can be imposed without eliciting non-compliance, given λ.[24] Interestingly, the minimal level of enforcement also responds to the underlying productivity and supply conditions of the labour market. Using (11), $\Lambda^o(\bar{w})$ is strictly decreasing respectively in a and in $T/\mathcal{L}$. In other words, the level of enforcement required to elicit compliance relates systematically to whether non-compliance should be expected to begin with.

Of course, $\Lambda^o(\bar{w})$ also rises with a higher minimum wage $\bar{w}$. As such, (16) provides one possible endogenous link between the two components of a minimum wage policy, applicable whenever a minimum wage policy combines a legislated wage floor $\bar{w}$, and the minimal enforcement required to elicit the market payment of this wage, $\Lambda^o(\bar{w})$.

All these prompt two important questions: What is the nature of the comparative statics of a minimum wage with endogenous enforcement, represented by the pair $(\bar{w}, \Lambda^o(\bar{w}))$, when it is common knowledge that the government is committed to choosing enforcement systematically based on $\Lambda^o(\bar{w})$? Meanwhile, under what conditions will such a minimum wage policy $(\bar{w}, \Lambda^o(\bar{w}))$ be consistent with social welfare maximization?

The first question points to an endogeneity problem, when enforcement is now dependent on the size of the minimum wage itself. To appreciate the potential scale of this problem, note from (12) that $\ell^m(\bar{w}, \Lambda^o(\bar{w}))$ for $\bar{w} \in (w^{so}, w^*)$ reduces to $\ell^s(\bar{w}) = (\bar{w} - \bar{u})/\tau$, and $w^m(\bar{w}, \Lambda^o(\bar{w})) = \bar{w}$. As such, the intricacies of the comparative statics of a minimum wage policy with imperfect (but fixed) enforcement are effectively cancelled out with this endogenous enforcement scheme. The predicted comparative statics of a minimum wage hike thus coincides with that of a world with perfect enforcement, even when imperfect

enforcement is clearly still in play, and $\Lambda^o(\bar{w})$ is strictly less than unity.

At the heart of the second question is the issue: why do governments turn a blind eye to the minimum wage law that they have themselves passed? A minimum wage policy like $(\bar{w}, \Lambda^o(\bar{w}))$ accordingly sets out a baseline, and turning a blind eye simply means a level of enforcement that is less than $\Lambda^o(\bar{w})$, given $\bar{w}$. In what follows, we examine the nature of the comparative statics of a minimum wage policy with an endogenous, and social welfare maximizing level of enforcement.

3 Minimum Wage and the Credibility of Enforcement

Starting with the announcement of a minimum wage $\bar{w}$, let λ be the *expected* intensity of enforcement, held by both employers and workers when employment contracts are made, as we have done up to now. Let p, in contrast, denote the actual intensity of enforcement carried out post contract negotiations. Thus, p also determines the fraction of contracted workers earning less than the minimum wage, who ultimately receive wage settlement net of transaction costs, $\sigma(\bar{w} - w^m(\bar{w}, \lambda))$.

Consider therefore a social welfare function made up of three components, taking as given the expectation λ: (i) the sum of the profit of the employer, the income net of mobility cost for all workers along the $[0, \ell^m T/\mathcal{L}]$ interval, and the reservation income equivalent $\bar{u}$ of the unemployed,[25] (ii) a strictly increasing and strictly convex cost of employer inspection $C(p)\ell^m$, where $c \equiv C_p(0) \geq 0$, denotes the marginal cost of raising enforcement evaluated at $p = 0$,[26] and (iii) a loss function which captures the government's distributional concern $D(\cdot)$, with respect to employer wage decisions that deviate from the legislated minimum.[27]

$$\Omega(\bar{w}, \lambda, p) = R(\ell^m) - \left(\bar{u} + \frac{\tau \ell^m}{2}\right) \ell^m - p(1 - \sigma)(\bar{w} - w^m) \ell^m + \bar{u}\mathcal{L} - C(p)\ell^m - \gamma D(\bar{w}, \lambda, p).$$
(17)

The first two components of the government's objective function capture efficiency concerns in the standard way. The third distributional concern component is captured by a loss function. With non-compliance, the loss function is

$$\gamma D(\bar{w}, \lambda, p) = \gamma\left[\left(\frac{\bar{w} - (w^m + \sigma(\bar{w} - w^m))}{\bar{w}}\right)p\ell^m + \left(\frac{\bar{w} - w^m}{\bar{w}}\right)(1 - p)\ell^m + \left(\frac{\bar{w} - 0}{\bar{w}}\right)(\mathcal{L} - \ell^m)\right]$$

$$= \gamma[\frac{(\bar{w} - w^m)}{\bar{w}}(1 - p\sigma)\ell^m + (\mathcal{L} - \ell^m)]$$

With full (exact or over-) compliance, the loss function is just $\gamma D(\bar{w}, \lambda, p) = \gamma(\mathcal{L} - \ell^m)$. Within the distributional realm, $D(\cdot)$ gives the number of workers receiving less than the minimum wage target, weighted by the corresponding proportional income shortfall. $D(\cdot)$ may also be interpreted as analogous to one of the Foster-Greer-Thorbecke (1984) measures of poverty, where the minimum wage serves as the government's definition of who is poor. The parameter $\gamma > 0$ measures the government's concern for distribution relative to efficiency overall, and represents the marginal social welfare cost of a small change in the poverty measure $D(\cdot)$. The social welfare function is thus:

In what follows, we focus on minimum wages in the range $\bar{w} \in [w^{so}, w^{do}]$, and do so for two reasons. First, and as has been discussed, $\bar{w} \geq w^{so}$ is required for the minimum wage to bind. Meanwhile, $\bar{w} > w^{do}$ always reduces employment relative to the unregulated benchmark, and is thus inferior to no regulation at all both on efficiency grounds, and on equity grounds based on $\Omega(\cdot)$. Second, from (13) - (15), stricter enforcement of a minimum wage greater than w^{do} cannot improve social welfare since it raises enforcement costs, but serves only to decrease employment, expected utility, and subminimum wages even further. As such, it will be not at all surprising that a government turns a blind eye to minimum wages greater than w^{do}.

3.1 Commitment

In this regime, the government simultaneously commits to a minimum wage and a corresponding level of enforcement to maximise the social welfare function $\Omega(\bar{w}, \lambda, p)$. Let $(\bar{w}^c, \lambda^c)$ be such a minimum wage policy with ex ante commitment. Rational expectation in the case of commitment implies $p = \lambda^c$. We can thus denote social welfare as $\Omega^c(\bar{w}^c, \lambda^c) \equiv \Omega(\bar{w}^c, \lambda^c, \lambda^c)$.

We now show that social welfare maximizing minimum wage policy with commitment $(\bar{w}^c, \lambda^c)$ exhibits two important characteristics: it must be the case that (i) there is full compliance: $w^m(\bar{w}^c, \lambda^c) = \bar{w}^c$, and (ii) the cost minimizing level of enforcement is undertaken, $\lambda^c = \Lambda^o(\bar{w}^c)$ as in (16). To see this, suppose in contrast that $(\bar{w}^c, \lambda')$ maximises

the social welfare function but $\lambda' \neq \Lambda^o(\bar{w})$, and $\ell^m(\bar{w}^c, \lambda') = \ell'$ and $w^m(\bar{w}^c, \lambda')$ are the corresponding equilibrium employment and market wage. There are two possibilities: (i) the hypothetical λ' is strictly greater than $\Lambda^o(\bar{w}^c)$, and (ii) λ' is strictly less than $\Lambda^o(\bar{w}^c)$.

Suppose first that $\lambda' > \Lambda^o(\bar{w}^c)$. It follows by definition of $\Lambda^o(\bar{w}^c)$ that there is full compliance, with employment and wage respectively at:

$$\ell^m(\bar{w}^c, \lambda') = \ell^m(\bar{w}^c, \Lambda^o(\bar{w})), \quad w^m(\bar{w}^c, \lambda') = w^m(\bar{w}^c, \Lambda^o(\bar{w})) = \bar{w}^c.$$

In other words, both employment and market wage are at their full compliance levels consistent with the minimum wage $\bar{w}^c$, but the cost of enforcement $C(\lambda')$ is strictly higher than $C(\Lambda^o(\bar{w}^c))$. Thus, $\Omega^c(\bar{w}^c, \lambda') < \Omega^c(\bar{w}^c, \Lambda^o(\bar{w}^c))$. Intuitively, therefore, there is no reason to raise enforcement beyond the minimal level $\Lambda^o(\bar{w}^c)$ required to guarantee full compliance.

Suppose instead that $\lambda' < \Lambda^o(\bar{w}^c)$, and enforcement is insufficient to guarantee full compliance. Equilibrium employment and the (subminimum) market wage are then:

$$\ell^m(\bar{w}^c, \lambda') < \ell^m(\bar{w}^c, \Lambda^o(\bar{w})), \quad w^m(\bar{w}^c, \lambda') < \bar{w}^c$$

which follows since $\bar{w} < w^{do}$ and stricter enforcement increases employment from (13). Also from (13), a reduction in the minimum wage from $\bar{w}^c$ to $\bar{W}(\lambda')$ can thus raise employment, and ensure full compliance at the same enforcement cost. It follows therefore that $\Omega^c(\bar{w}^c, \lambda') < \Omega^c(\bar{W}(\lambda'), \lambda')$ and $(\bar{w}^c, \lambda')$ is dominated by $(\bar{W}(\lambda'), \lambda')$. The intuition here is that if enforcement too low to guarantee compliance, the minimum wage should be adjusted downwards since doing so can in fact raise employment. Thus, using (11) and $\ell^m(\bar{w}^c, \Lambda(\bar{w}^c)) = (\bar{w}^c - \bar{u})/\tau$, we have

Proposition 1 *With ex ante commitment, if a minimum wage policy $(\bar{w}^c, \lambda^c)$ maximises the social welfare function $\Omega^c(\bar{w}, \lambda)$:*

1. There is equilibrium compliance achieved at the lowest possible cost, with $\lambda^c = \Lambda^o(\bar{w}^c)$, and $w^m(\bar{w}^c, \Lambda(\bar{w}^c)) = \bar{w}^c$.

2. Given $\bar{w}^c$, $\Lambda^o(\bar{w}^c)$ is independent of γ.

3. Given $\bar{w}^c$, $\Lambda^o(\bar{w}^c)$ is higher in a labour market with lower productivity a, lower mobility cost T, or a larger available work force $\mathcal{L}$.

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4. $\Lambda^o(\bar{w}^c) > 0$ is strictly increasing in $\bar{w}^c$. Equilibrium employment $\ell^m(\bar{w}^c, \Lambda^o(\bar{w}^c))$ and expected workers' utility are both strictly increasing in $\bar{w}^c$.

We have thus set out a benchmark, and confirmed that there is little justification for governments to turn a blind eye to a minimum wage legislation that they themselves have passed in this setting, so long as they can commit ex ante, and carry through ex post, both parameters of the minimum wage law $(\bar{w}^c, \Lambda^o(\bar{w}^c))$. As shown, since endogenous enforcement is indeed given by the minimum enforcement required to guarantee compliance, $\Lambda^o(\bar{w}^c)$, demand conditions such as labour productivity and labour supply parameters such as T and $\mathcal{L}$ govern the size of $\Lambda^o(\bar{w}^c)$, but not the degree of government distributional concerns γ.

Finally, the last item of Proposition 1 highlights the comparative statics implications of the endogenous enforcement scheme $\Lambda^o(\bar{w}^c)$. Importantly, it suggests that the comparative statics of a minimum wage with a non-compliant employer are out of equilibrium phenomena in this case with commitment, and occur only when starting with a minimum wage and / or an intensity of enforcement that are not optimally set.

With Proposition 1, the problem of the government can be simplified as essentially the choice of an optimal level of minimum wage, for full compliance implies that $\ell^m(\bar{w}^c, \lambda^c) = (\bar{w}^c - \bar{u})/\tau$. The maximization problem of the government can therefore be rewritten via a change of variable (replacing $w^m(\bar{w}, \lambda)$ by $\bar{w}$, $\ell^m(\bar{w}, \lambda)$ by $\bar{\ell} = (\bar{w} - \bar{u})/\tau$, and λ by $\Lambda^o(\bar{w})$). We assume henceforth that the enforcement cost is sufficiently convex, so that the revised objective function

$$\Omega^c(\bar{w}, \lambda) = R(\bar{\ell}) - \left(\bar{u} - \gamma + \frac{\tau\bar{\ell}}{2}\right)\bar{\ell} + (\bar{u} - \gamma)\mathcal{L} - C(\Lambda^o(\bar{w}))\bar{\ell}$$

is strictly concave in $\bar{w}$. The first order condition for an interior optimum requires:

$$[w^d(\bar{\ell}) - w^s(\bar{\ell}) + \gamma]\eta^\ell = C(\Lambda^o(\bar{w}))\eta^\ell + C_p(\Lambda^o(\bar{w}))\Lambda^o_{\bar{w}}(\bar{w}), \tag{18}$$

where a subscript denotes partial derivative and η^ℓ denotes the elasticity of equilibrium employment $\bar{\ell}$ with respect to the minimum wage $\partial \ln \bar{\ell}/\partial\bar{w}$. The expression $(w^d(\bar{\ell}) - w^s(\bar{\ell}) + \gamma)\eta^\ell$ measures the efficiency and distributional gains from raising employment, to

be balanced against the marginal cost of enforcement. Evaluating the first order condition above at $\bar{w} = w^{so}$, social welfare maximization implies a strictly binding minimum wage if

$$w^{do} - w^{so} + \gamma > \frac{c(2\tau + b)}{\tau(1 - \sigma)} \Leftrightarrow \frac{(a - \bar{u})\tau}{2\tau + b} + \gamma > \frac{c(2\tau + b)}{\tau(1 - \sigma)} \tag{19}$$

This follows since the degree of monopsonistic labour market distortion is given by $w^{do} - w^{so} = (a - \bar{u})\tau/(2\tau + b)$, while $\Lambda^o_{\bar{w}}(\bar{w})|_{\bar{w}=w^{so}} = (2\tau + b)\bar{\ell}/(\tau^2(1 - \sigma))$ from (11) and (16), and also since $\bar{\ell} = (\bar{w} - \bar{u})/\tau$. Thus,

Proposition 2 *With commitment, a binding minimum wage $\bar{w}^c > w^{so}$ and the associated endogenous enforcement $\Lambda^o(\bar{w}^c)$ improve social welfare beyond the no-intervention benchmark if labour productivity a and the degree of distributional concern γ are both sufficiently high relative to the cost of enforcement c so that inequality (19) holds.*

Put differently, a minimum wage legislation may no longer be welfare maximizing in sectors where labour productivity is sufficiently low, since the costs required to enforce such a minimum wage outweigh benefits. Thus, even within the same country and hence arguably the same government objective function, the co-existence of covered and uncovered sectors (Proposition 2), and full compliance in covered sectors (Proposition 1) are consistent with social welfare maximization with ex ante commitment.

3.2 Credible Enforcement

We turn now to the case where ex ante commitment is not feasible.[28] For any minimum wage announcement $\bar{w}$, enforcement credibility requires that p is determined ex post taken as given expectation λ, and hence $\ell^m(\bar{w}, \lambda)$:[29]

$$p(\bar{w}, \lambda) = argmax_p \ \Omega(\bar{w}, \lambda, p). \tag{20}$$

A rational expectation equilibrium level of enforcement is thus given by the fixed point

$$\Lambda(\bar{w}) = \{\Lambda | p(\bar{w}, \Lambda) = \Lambda\}. \tag{21}$$

Turning a blind eye in a rational expectation equilibrium requires

$$\Lambda(\bar{w}) < \Lambda^o(\bar{w}), \ \ or \ \ \bar{w} - w^m(\bar{w}, \Lambda(\bar{w})) > 0, \ \ for \ \ \bar{w} \in [w^{so}, w^{do}].$$

We proceed first by taking as given the announcement of the minimum wage $\bar{w}$, and an expectation $\lambda \in [0,1)$. The ex post welfare implications of enforcement can be determined via

$$\frac{\partial \Omega(\bar{w}, \lambda, p)}{\partial p} = (\gamma \sigma - \bar{w}(1-\sigma)) \frac{(\bar{w} - w^m)\ell^m}{\bar{w}} - C_p(p)\ell^m.$$

It follows immediately that

Proposition 3 $p(\bar{w}, \lambda) = 0$ *for any* $\bar{w} \in [w^{so}, w^{do}]$ *and* $\lambda \in [0,1)$ *if*

$$(\gamma \sigma - \bar{w}(1-\sigma)) \frac{\bar{w} - w^m(\bar{w}, \lambda)}{\bar{w}} < c. \tag{22}$$

Thus, there will be no enforcement of the minimum wage ex post, or $p(\bar{w}, \lambda) = 0$, if any one of the following holds: (i) the cost of enforcement is too high, (ii) the government harbors only efficiency concerns ($\gamma = 0$); (iii) the labour market exhibits full compliance to begin with, or $\bar{w} \leq w^m(\bar{w}, \lambda)$, since there is literally nothing to enforce given full compliance; and (iv) a transaction cost $1 - \sigma$ that is sufficiently large, even when $\gamma > 0$ and non-compliance is known to exist, $\bar{w} - w^m > 0$. The latter applies since the transfer of wage settlement is costly whenever $\sigma < 1$. Thus, as much as there may be a desire to enforce the minimum wage on equity grounds, enforcement alone may be made ineffectual if the resulting income gain for workers, net of transaction costs, is too low. This is reflected in the difference $(\gamma \sigma - \bar{w}(1-\sigma))$.

Suppose instead that (22) is not satisfied. The ex post optimal and thus credible level of enforcement $\lambda^D = \Lambda(\bar{w})$ implicitly solves $\Lambda(\bar{w}) = \{\Lambda | p(\bar{w}, \Lambda) = \Lambda\}$, or

$$(\gamma \sigma - \bar{w}(1-\sigma)) \frac{\bar{w} - w^m(\bar{w}, \Lambda)}{\bar{w}} - C_p(\Lambda) = 0 \tag{23}$$

Three issues of particular interest here are the uniqueness, slope and existence of the rational expectation equilibrium enforcement $\Lambda(\bar{w})$ for $\bar{w} \in [w^{so}, w^{do}]$. To this end, we continue to assume that the cost of enforcement $C(\Lambda)$ is sufficiently convex, while γ is large enough relative to the transaction cost of wage settlement $\bar{w}(1-\sigma)$, such that the left hand side of (23) is strictly decreasing in Λ and increasing in $\bar{w}$. Intuitively, these require that (i) the marginal welfare gains from raising enforcement ex post in a rational expectation

equilibrium is diminishing in λ^D, and (ii) the transaction cost of wage settlement is never high enough to offset the distributional gains from enforcing the minimum wage. It follows then by standard arguments that $\Lambda(\bar{w})$, if it exists, is uniquely determined, and strictly increasing in $\bar{w}$.

The credibility constraint (23) additionally implies that the range of credible minimum wage is bounded from below, since ex post incentives to enforce depend critically on the severity of violations, as measured by $\bar{w} - w^m(\bar{w}, \lambda^D)$. This new lower bound can be obtained by identifying the minimum wage consistent with $\lambda^D = 0$ in (23),

$$\hat{w} = \{\bar{w} | (\gamma\sigma - \bar{w}(1-\sigma))\frac{\bar{w} - w^{so}}{\bar{w}} = c\} \tag{24}$$

so that no enforcement, and thus $\lambda^D = 0$ exactly solves (23). It follows from (24) that as long as enforcement cost c is strictly positive, the new lower bound $\hat{w}$ is strictly greater than the monopsonistic wage w^{so}. Also from (24), this new lower bound $\hat{w}$ is decreasing in the degree of distributional concern γ. The range of feasible minimum wages that satisfies the credibility criterion but still capable of improving employment outcomes relative to no-intervention is thus $[\hat{w}, w^{do}]$ from (13). As a sufficient condition for existence, therefore, we assume henceforth that γ is large enough, so that $\hat{w} < w^{do}$ and the range $[\hat{w}, w^{do}]$ is accordingly non-empty.

With these observations in mind, (23) gives rise to a new set of comparative static responses to a minimum wage hike, in which it is expected that enforcement is too low to guarantee full compliance, but the expected degree of imperfect enforcement systematically changes with the minimum wage itself:[30]

Proposition 4 *A rational expectation equilibrium level of enforcement $\Lambda(\bar{w})$ that solves (23) has the following characteristics:*

1. There is equilibrium non-compliance: $\Lambda(\bar{w}) < \Lambda^o(\bar{w})$, and $w^m(\bar{w}, \Lambda(\bar{w})) < \bar{w}$.

2. Given $\bar{w}$, $\Lambda(\bar{w})$ rises with γ.

3. Given $\bar{w}$, $\Lambda(\bar{w})$ is higher in a labour market with lower employer productivity a, lower mobility cost T, or a larger available work force $\mathcal{L}$.

4. If γ is sufficiently large, $\Lambda(\bar{w})$ is strictly increasing in $\bar{w}$, while equilibrium employment $\ell^m(\bar{w}, \Lambda(\bar{w}))$ and expected workers' utility are likewise strictly increasing in $\bar{w}$.

Thus, turning a blind eye survives the credibility criterion laid out in (23), whereas full compliance does not.[31] Interestingly, a government that is only concerned with efficiency ($\gamma = 0$), and hence $p(\bar{w}, \Lambda(\bar{w})) = 0$, is guaranteed the *least* efficient (monopsonistic) labour market outcome ℓ^o, since the credible level of enforcement rises with γ, and is equal to zero for $\gamma = 0$. This is indeed striking – governments espousing only efficiency concerns cannot credibly implement efficiency improving minimum wage reforms.

In addition, the ex post credible enforcement intensity is once again need-based, with $\Lambda(\bar{w})$ higher in labour markets where labour productivity is relatively low, and where market wages are low driven by an excess supply of labour, and a low mobility cost.

The last item illustrates the role of enforcement endogeneity on equilibrium employment via two sets of forces. From (13), an exogenous increase in the minimum wage negatively impacts employment whenever there is non-compliance. However, from (23), a re-definition of who is non-compliant relative to the new minimum wage increases the severity of the violation $\bar{w} - w^m(\bar{w}, \lambda)$ at constant λ. This raises the ex post incentive to enforce, as $\gamma\sigma - \bar{w}(1 - \sigma) > 0$, and runs contrary to the first round employment impact of a minimum wage increase since $\bar{w} \leq w^{do}$ and enforcement raises employment in this range from (13). As shown, the net outcome on employment will depend on the strength of the distributional concern parameter γ.

Finally, turning to the question of whether welfare maximization involves a binding minimum wage policy even with non-compliance, note that the government's problem now involves maximizing $\Omega(\bar{w}^D, \lambda^D, p(\bar{w}^D, \lambda^D))$ by choice of an appropriate minimum wage $\bar{w}^D \in [\hat{w}, w^{do}]$, subject to $\lambda^D = \Lambda(\bar{w}^D)$. The first order condition requires that

$$
\begin{aligned}
[w^d(\ell^D) - w^s(\ell^D) + \gamma]\epsilon^\ell \; = \; & C(\lambda^D)\epsilon^\ell + C_p(\lambda^D)\Lambda_{\bar{w}}(\bar{w}^D) \\
& - [\gamma\sigma - \bar{w}^D(1-\sigma)]\Lambda_{\bar{w}}(\bar{w}^D) \\
& + \frac{\bar{w}^D - w^m(\bar{w}^D, \lambda^D)}{\bar{w}^D}\Big[\gamma(1 - \lambda^D\sigma)\epsilon^\ell + [\gamma(1 - \lambda^D\sigma) + \lambda^D(1-\sigma)]\epsilon^w\Big]
\end{aligned}
\tag{25}
$$

where ℓ^D denotes employment $\ell^m(\bar{w}^D, \Lambda(\bar{w}^D))$ and $\epsilon^\ell = \partial \ln \ell^D / \partial \bar{w}^D$ denotes the elasticity of ℓ^D with respect to the minimum wage. From Proposition 4, $\epsilon^\ell > 0$ provided that γ is sufficiently large. Meanwhile, $\epsilon^w = \partial \ln[\bar{w}^D - w^m(\bar{w}^D, \Lambda(\bar{w}^D))/\bar{w}^D]/\partial \bar{w}^D$ denotes the elasticity of the proportional income shortfall with respect to the minimum wage. It can

be readily confirmed from (23) that ϵ^w is also positive.

The choice of a welfare maximizing minimum wage thus involves equating the anticipated marginal benefits, $(w^d(\ell^D) - w^s(\ell^D) + \gamma)\epsilon^\ell$, with marginal costs. The latter is now made up of three parts. The first term $C(\lambda^D)\epsilon^\ell + C_p(\lambda^D)\Lambda_{\bar{w}}(\bar{w}^D)$ is analogous to the commitment case, and expresses the marginal cost required to credibly enforce a rise in the minimum wage. The second term $[\gamma\sigma - \bar{w}^D(1-\sigma)]$ denotes the ex post gains from enforcing the minimum wage, as has already been seen in (23). The final part expresses the efficiency and distributional losses associated with a rise in an *imperfectly* enforced minimum wage. Specifically, $\gamma(1 - \lambda^D\sigma)\epsilon^\ell$ and $\gamma(1 - \lambda^D\sigma)\epsilon^w$ respectively show the distributional losses associated with an increase in the number of subminimum wage earners, and an increase in the proportional income shortfall as the minimum wage increases. Finally, the expression $\lambda^D(1-\sigma)\epsilon^w$ represents efficiency losses via the transaction costs incurred by workers in the wage settlement process.

Making use of (23), and evaluating (25) at the lower bound $\bar{w}^D = \hat{w}$ in (24), or $\lambda^D = \Lambda(\hat{w}) = 0$, a social welfare maximizing minimum wage policy involves $\bar{w}^D > \hat{w}$ if

$$w^{do} - w^{so} + \gamma > \frac{c\gamma}{\gamma\sigma - \hat{w}(1-\sigma)}\left(1 + \frac{\epsilon^w}{\epsilon^\ell}\right). \tag{26}$$

As before, since monopsonistic labour market distortion $w^{do} - w^{so} = \tau(a - \bar{u})/(2\tau + b)$ is strictly increasing in labour productivity, a, we have thus:

Proposition 5 *With ex post discretion, a minimum wage $\bar{w}^D > \hat{w}$ and the associated ex post credible level of enforcement $\Lambda(\bar{w}^D)$ improves social welfare beyond the no-intervention benchmark if labour productivity a and distributional concern γ are both large enough so that (26) is satisfied.*

Thus, within the same country, and given the same government objective function, the co-existence of (relatively productive) covered and (relatively less productive) uncovered sectors (Proposition 5) along with less than full compliance in covered sectors (Propositions 3, 4), are consistent with social welfare maximization with ex post discretion.[32]

4 Conclusion

There is now extensive evidence particularly from developing country labour markets that non-compliance with minimum wage legislations in covered sectors is pervasive. The stylised facts reviewed in this paper include: (i) co-existence of compliant and non-compliant employers, (ii) a spike at the minimum wage, (iii) a dispersion of subminimum wages and (iv) co-movements of minimum and subminimum wages. We have argued that all of these stylised facts can be consistent with a setting in which there is imperfect competition, imperfect enforcement, and imperfect commitment. But beyond this, our comparative static analysis further underscores additional insights that may be gained by taking seriously the issue of imperfect enforcement of a minimum wage. Indeed, a simple deviation from perfect to imperfect enforcement is shown to be sufficient for standard comparative static predictions to be overturned, with equilibrium employment now predicted to respond negatively to a minimum wage hike in an imperfectly competitive labour market, for cases when the standard Stigler model would yield a positive response to the same minimum wage hike when enforcement is perfect. The key message that can be drawn is that observed empirical relationship between minimum wage and employment can no longer serve as the litmus test of the competitiveness of a labour market when enforcement is imperfect.

We have also reviewed evidence that enforcement varies systematically across countries, and across geographic regions, or industries within countries. This suggests a need for a theory of the endogenous determination of enforcement. Consistent with the pioneering study of Ashenfelter and Smith (1979), the endogenous enforcement we derive does indeed exhibit the characteristic that enforcement of any given minimum wage is higher in labour markets where non-compliance is likely to be prevalent, as would be the case where productivity is low or where the pool of available labour force, given labour demand, is large enough. The endogenous level of enforcement derived here is further shown to vary with the minimum wage itself. For a government that cares sufficiently about distribution, a rise in the minimum wage can signal a rise in enforcement. Indeed, equilibrium employment and expected workers' welfare can now rise with a minimum wage hike, but for reasons that have to do with endogenous enforcement, rather than with imperfect labour market

competition per se.

Following on from the contribution to positive analysis, the paper also analyzes the behavior of governments with and without the ability to commit ex ante to both the wage and enforcement dimensions of a minimum wage policy. Since ex post enforcement of a minimum wage is but a costly transfer of income from employers to workers, a government's concern for distribution is shown to interact in interesting ways with the problem of credible commitment on enforcement intensity. Simply put, a government that cares more about distribution will care more about violations of the minimum wage and can therefore signal a commitment to enforce. By the same token, a government that does not care at all about distribution cannot improve efficiency.

The basic setup that we work with should be seen as a beginning, with a number of useful extensions that await further exploration. These can be framed under four main categories. An obvious line of research is to consider the issue of enforcement and credibility with alternative specifications of distributional concerns. This can be accomplished in two ways. First, rather than a concern for those whose income fall below a specified threshold (in our case, the minimum wage), an alternative specification can also incorporate measures of income inequality, including possibly income disparity between employers and workers. Second, additional insights may also be obtained by introducing variable poverty aversion parameters associated with the proportional income shortfall (Foster, Greer and Thorbecke, 1994). Regardless of how the distributional concern component of government objective is alternatively measured, however, our main conclusion that credible enforcement cannot come with a complete disregard for the intrinsic value of income transfer from employers to subminimum wage earners, will remain intact.

A second promising research agenda involves a re-examination of the different components of minimum wage policy package, including particularly the role of fines and penalty in addition to the compensation of any income shortfall. These penalties may be officially sanctioned by legislations (Lott and Roberts, 1995), or more indirectly through the loss of goodwill upon discovery (Harrison and Scorse, 2004), for example. Of particular interest is whether a minimum wage policy package can be further fine-tuned to encourage compliance through the threat of fines, and how the comparative statics of a minimum wage will

depend on the credibility of such a threat.

In a variety of situations, the minimum wage can arguably be thought of as an exogenously imposed labour standard, and the government is left with only the choice of an appropriate enforcement strategy. Such an exogenous minimum wage may correspond to an exogenous poverty line, a minimum labour standard imposed extra-nationally as a condition for exports, or a result of a political process, separate from the decision to allocate public funds to enforce the minimum wage, for example (Sobel, 1999). The issue of enforcement and credibility takes on a different type of significance here, particularly when the government may be held accountable not just to her own efficiency and equity concerns, but also to the very set of forces that introduced the minimum wage as a labour standard to begin with.

Finally, the comparison between commitment and discretion highlighted here can potentially shed new light on a range of policies other than the minimum wage, where enforcement and compliance are central. Some examples include tax evasion and enforcement, as well as financial bailouts and ex post enforcement of bailout conditions.[33] In Basu, Chau and Kanbur (forthcoming), the distinction between commitment and discretion is further shown to be instrumental in understanding the labor market consequences of employment guarantee programs, where the degree of distributional concern of the government is shown to directly impact the perceived credibility of the employment guarantee.

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Endnotes

1. See for example Freeman (1996), Card and Krueger (1995), Bhaskar, Manning and To (2002), Fields and Kanbur (2007), Neumark and Wascher (2007).

2. Bhaskar, Manning and To (2002) examines the usefulness and empirical relevance of the competitive, monopsonistic, oligopsonistic and monopolistically competitive frames. In the context of search theory of unemployment (Fershtman and Fishman, 1994; Mortensen and Pissarrides, 1994), a minimum wage has also been shown to be efficiency enhancing as equilibrium employment and equilibrium job retention rates rise with the legislated minimum wage.

3. As Stigler (1946) notes, such an optimal minimum wage is endogenously determined, and should vary with occupation, among firms, and through time. As such, "a national

minimum wage, infrequently changed, is wholly unsuited to these diversities of conditions" (p.361).

4. There have also been exceptions. For example, Machin, Manning and Rahman (2003) observed little non-compliance with the national minimum wage of 1999 in the residential care homes industry in the United Kingdom.

5. Also see Saget (2001) for a survey of evidence in other developing countries.

6. Kernel density plots and / or wage histograms of dispersed subminimum wage distributions and associated spikes at or about a binding minimum wage have been shown for many countries. See, for a few examples, Bell (1997) for Colombia, Maloney and Nunez (2004) for eight Latin American countries, Cardoso and Portugal (2002) for Portugal, Terrell and Gindling (2006) for Honduras, Strobl and Walsh (2001) for Trinidad and Tobago, Lemos (2004) for both the formal and informal sectors in Brazil.

7. A theoretical literature modifies the effects of a minimum wage under different specifications of the enforcement and penalty regime based on a competitive labour market (Ashenfelter and Smith, 1979; Chang and Ehrlich, 1985; Grenier, 1982; Yaniv, 2001; Squire and Suthiwart-Narueput, 1997; Harrison and Leamer, 1997). This literature takes a single market determined subminimum wage as given, and does not address the issue of subminimum wage dispersion. Relatedly, Eckstein, Ge and Petrongolo (2006) examine a search model with exogenous exemptions to a minimum wage, but full compliance in the covered sector.

8. Like our setting, Yaniv (1988) is an exception in literature of minimum wage compliance in that it too departs from the competitive labour market assumption and examines the compliance behavior of a monopsonistic firm with an imperfectly enforced minimum wage. But unlike our setting, labour supply is taken as exogenously given, and as such it does not accommodate rational and endogenous labour supply response to any change in the likelihood of discovery or the possibility of subsequent wage settlement – the determinants of which are the central themes of this paper. With a focus on compliance behavior, Yaniv (1988) does not undertake a full-fledged comparison of the difference in employment comparative statics response that imperfect enforcement makes given *any* minimum wage, or an examination of the possible sources of enforcement endogeneity.

9. See Neumark and Wascher (2007) for a survey of the recent empirical literature of minimum wage and employment in developed and developing countries.

10. Harrison and Scorse (2004) examines empirically the issue of endogenous minimum wage compliance in Indonesia. Taking the average of the observed dispersion of subminimum wages as a proxy for the market determined subminimum wage in the competitive frame, it is shown that foreign ownership and the corresponding emphasis on enforcement are associated with a firm-level employment increases subsequent to a minimum wage.

11. With perfect competition in the standard sense, namely that of costless job search and wage-taking employers, there is by definition a market determined subminimum wage that employers then take as given, as in Ashenfelter and Smith, 1979; Chang and Ehrlich, 1985; Grenier, 1982; Yaniv, 2001; Squire and Suthiwart-Narueput, 1997; and Harrison and Leamer, 1997.

12. As we will show in the sequel, if the minimum wage is an exogenously imposed standard rather than optimally chosen, then it may come as no surprise at all that insufficient enforcement will be given to uphold the standard, and non-compliance naturally follows.

13. t should be interpreted as any employment deterring transaction costs or barriers that drive a wedge between the supply price and a worker' reservation utility. These include: geographical distance; lack of information; the cost of correcting skill mismatch; or other worker-specific disutility of employment depending on the conditions of work.

14. We note that the functional forms assumed here allow us to derive closed-form solutions, and are otherwise not necessary for our comparative statics findings. In particular, a revenue function $R(\ell)$ satisfying diminishing marginal product, and any non-degenerate distribution on $[0, T]$ with positive density can alternatively be used without changing the qualitative findings.

15. With zero mobility cost, the monopsonistic and competitive labour market equilibria coincide, in which the single employer faces a take-it-or-leave-it offer of $\bar{u}$ from every worker.

16. The question of whether such a commitment is credible is the subject of section 4.

17. As another useful interpretation, σ can also parameterise the effectiveness of the judicial system and government bureaucracy. See Flanagan (1989) for an empirical analysis of the role of substantial time lags, among other things, on employers' decision to comply with

the U.S. National Labor Relations Act.

18. Since the $R_\ell(\bar{\ell}) - (1-\psi)(\bar{u} + 2\tau\bar{\ell}) - \psi\bar{w}$ is monotonically decreasing in $\bar{w}$, $\bar{W}(\lambda)$ is well-defined and unique by standard arguments. In particular, with a binding minimum wage, $R_\ell(\bar{\ell}) \geq E\bar{W}_\ell(\bar{\ell}, \bar{w}, \lambda)$ if and only if $a - b\bar{\ell} \geq (1-\psi)(\bar{u} + 2\tau\bar{\ell}) + \psi\bar{w}$. Rearranging terms, and using $\bar{w} = \bar{u} + \tau\bar{\ell}$ yields $\bar{w} \leq w^* - \frac{\tau(1-\psi)}{\tau(2-\psi)+b}(w^* - \bar{u})$ as shown.

19. To see this, note that from (2) and (11) $\bar{W}(\lambda) - w^{so} = \tau(a - \bar{u})/[(2\tau + b)((2-\psi)\tau) + b] > 0$. Meanwhile $\bar{W}(\lambda) \leq w^*$ by inspection of (11).

20. It can also be checked using (5) that whenever $\bar{w} > \bar{W}(\lambda)$, non-compliance strictly dominates compliance with employment rationing at $\tilde{\ell}$, where $w^d(\tilde{\ell}) = \bar{w}$. To see this, expected profit maximization implies

$$
\begin{aligned}
R(\ell^m(\bar{w}, \lambda)) - E\bar{W}(\ell^m(\bar{w}, \lambda), \bar{w}, \lambda) - [R(\tilde{\ell}) - \bar{w}\tilde{\ell}] &\geq R(\tilde{\ell}) - E\bar{W}(\tilde{\ell}, \bar{w}, \lambda) - [R(\tilde{\ell}) - \bar{w}\tilde{\ell}] \\
&= (1-\psi)[\bar{w} - \bar{w}^s(\ell^m(\bar{w}, \lambda), \bar{w}, \lambda)]\tilde{\ell} > 0.
\end{aligned}
$$

whenever $\tilde{\ell} < \bar{\ell}$ from (5).

21. From (11), strict compliance requires, $\bar{w} \in (w^{so}, \bar{W}(\lambda)] \Leftrightarrow a \in [\bar{w} + (1 - \psi + \frac{b}{\tau})(\bar{w} - \bar{u}), \bar{w} + (1 + \frac{b}{\tau})(\bar{w} - \bar{u}))$.

22. This requires that $\bar{w} \in [\bar{W}(\lambda), w^{do}) \Leftrightarrow a \in (\bar{w} + \frac{b}{2\tau}(\bar{w} - \bar{u}), \bar{w} + (1 - \psi + \frac{b}{\tau})(\bar{w} - \bar{u})]$.

23. This final class requires $\bar{w} \in [w^{do}, (a - (1-\psi)\bar{u})/\psi]$, since a minimum wage greater than $(a - (1-\psi)\bar{u})/\psi$ induces zero employment upon rearranging (13).

24. For $\bar{w} > w^*$, full compliance will always require perfect enforcement.

25. This first component of the government welfare function is given by:

$$
\begin{aligned}
&R(\ell^m) - ((1-p)w^m + p\bar{w})\ell^m + \left[\int_0^{\ell^m T/\mathcal{L}} ((1 - p\sigma)w^m + p\sigma\bar{w} - t)\frac{\mathcal{L}}{T}dt \right] + \bar{u}(\mathcal{L} - \ell^m) \\
&= R(\ell^m) - \left(\bar{u} + \frac{\tau\ell^m}{2} \right)\ell^m - p(1 - \sigma)(\bar{w} - w^m)\ell^m + \bar{u}\mathcal{L}.
\end{aligned}
$$

where the expression $p(1 - \sigma)(\bar{w} - w^m)\ell^m$ denotes the transaction cost of enforcing the minimum wage policy when non-compliance is in place.

26. We assume that the government finance enforcement activities through lump sum taxation. Any additional costs of the use of public funds incurred in the process are subsumed in the enforcement cost function $C(p)$.

27. We suppress the arguments of equilibrium employment and wage $\ell^m(\bar{w}, \lambda)$ and $w^m(\bar{w}, \lambda)$ whenever there is no risk of confusion.

28. The approach to time inconsistency problems adopted here has been applied in a variety of policy settings (Kydland and Prescott, 1977; Chau, 2001). Our contribution here lies in pointing out the importance of credibility in the minimum wage setting, particularly when perfect enforcement cannot be costlessly guaranteed.

29. The second order condition of the maximization problem in (20) is always satisfied.

30. Since the left hand side of (23) is strictly decreasing in Λ with $C(\Lambda)$ sufficiently convex, the proposition follows by noting that the left hand side of (23) is increasing in γ, and decreasing in a and $T/\mathcal{L}$ by (15). The last part of the proposition follows from differentiating (13) using the implicit relationship defined in (23).

31. Of course, another possibility that may give rise to equilibrium non-compliance may simply be because of a lack of full information concerning labour market conditions, including demand and supply side parameters. Proposition 4 shows that even in the absence of such information asymmetries, a case for imperfect enforcement induced equilibrium non-compliance can still be made.

32. In Basu, Chau and Kanbur (forthcoming), we point out that an employment guarantee scheme which directly generates employment through public funds can be an alternative but viable policy option for imperfectly competitive labour markets with or without the ability to commit, precisely in labour markets where labour productivity is sufficiently low.

33. Anderlini, Felli and Postlewaite (2007) examines another intriguing distinction between ex ante and ex post decision making of contract enforcing courts. In a setup that, unlike our setting, features asymmetric information between contracting partieis, it is shown that a court can improve the welfare of contracting parties by *voiding*, ex post, voluntary contracts that these same parties would like the court to enforce ex ante. In our context, the issue of minimum wage enforcement in the presence of information asymmetry (between workers and employers, or between employers and the government) is yet another promising avenue for future research.
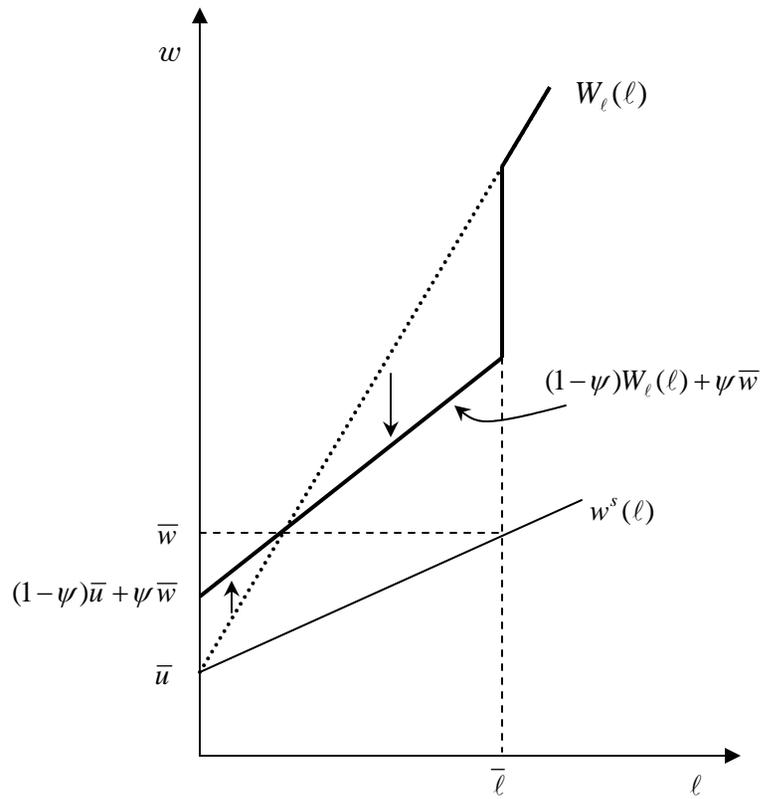
Fig. 1

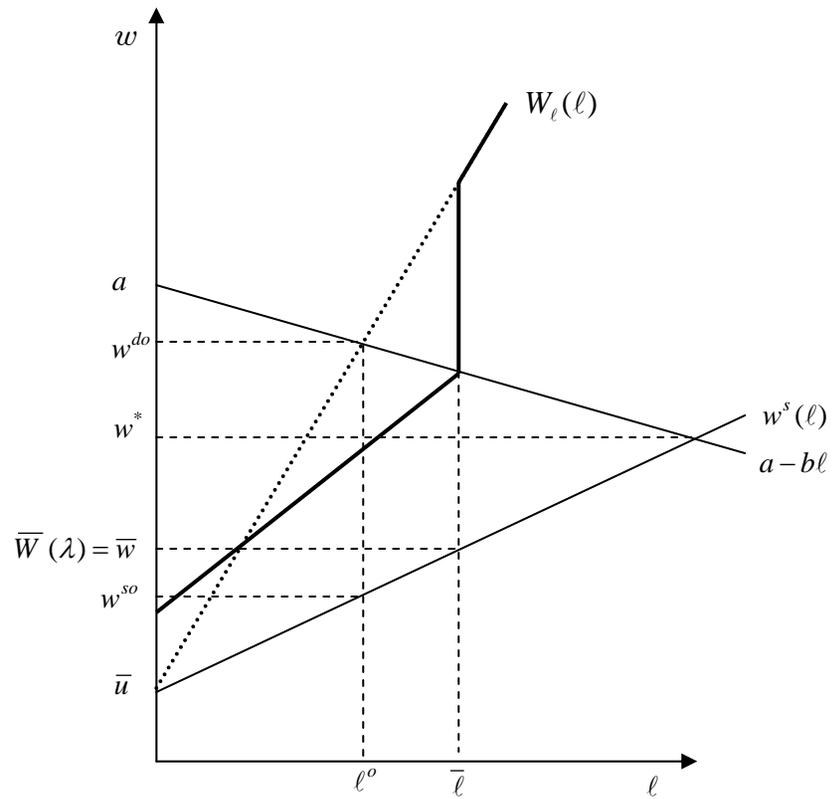Expected Marginal Labor Cost with
Imperfect Enforcement

Fig. 2
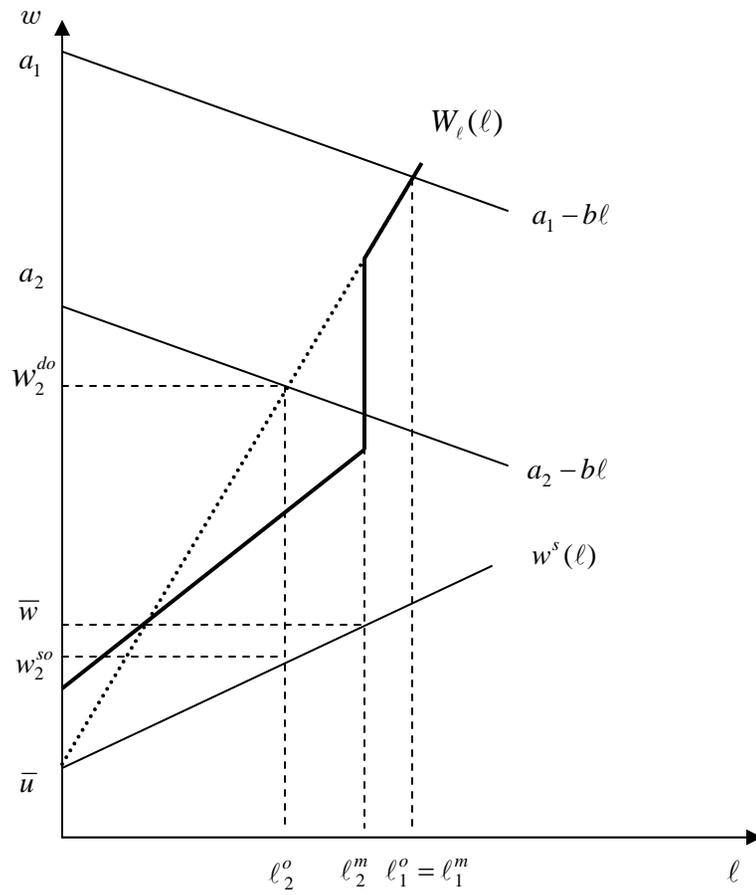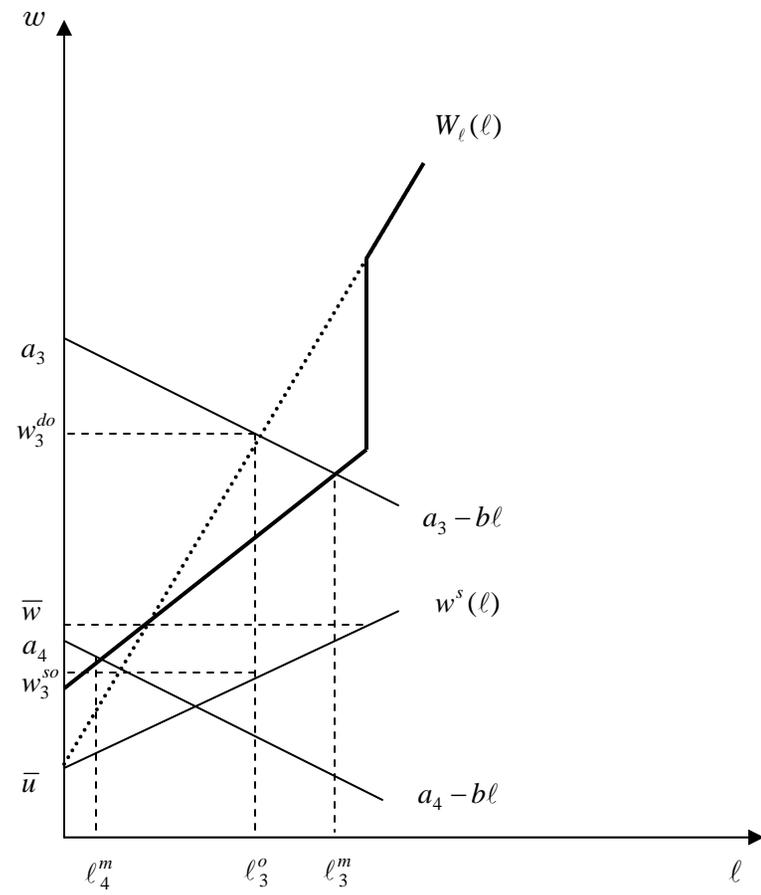
Minimum Wage Thresholds

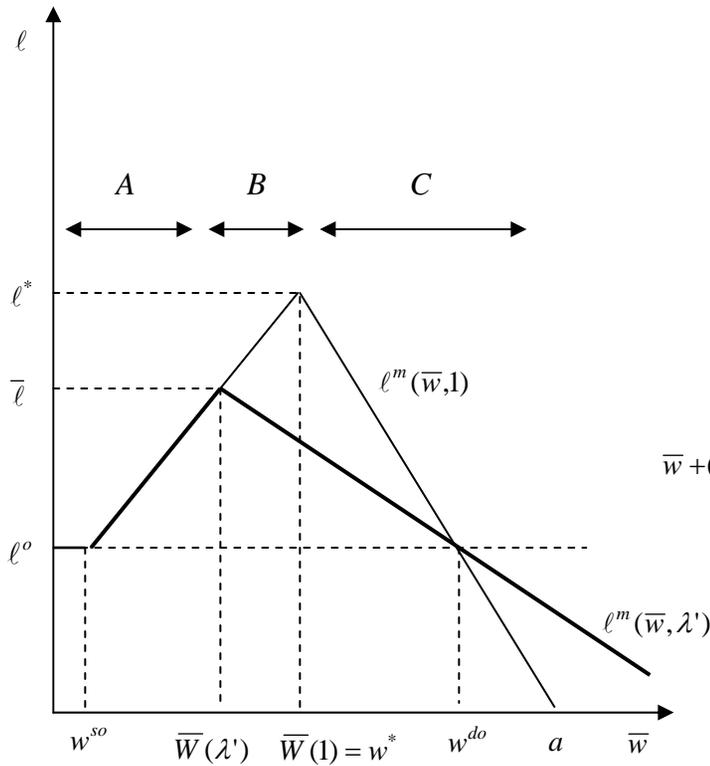Fig. 3 a

Compliance

Fig. 3 b

Non-Compliance

Fig. 4

Employment and Minimum Wage With
Imperfect Enforcement
A: No Change
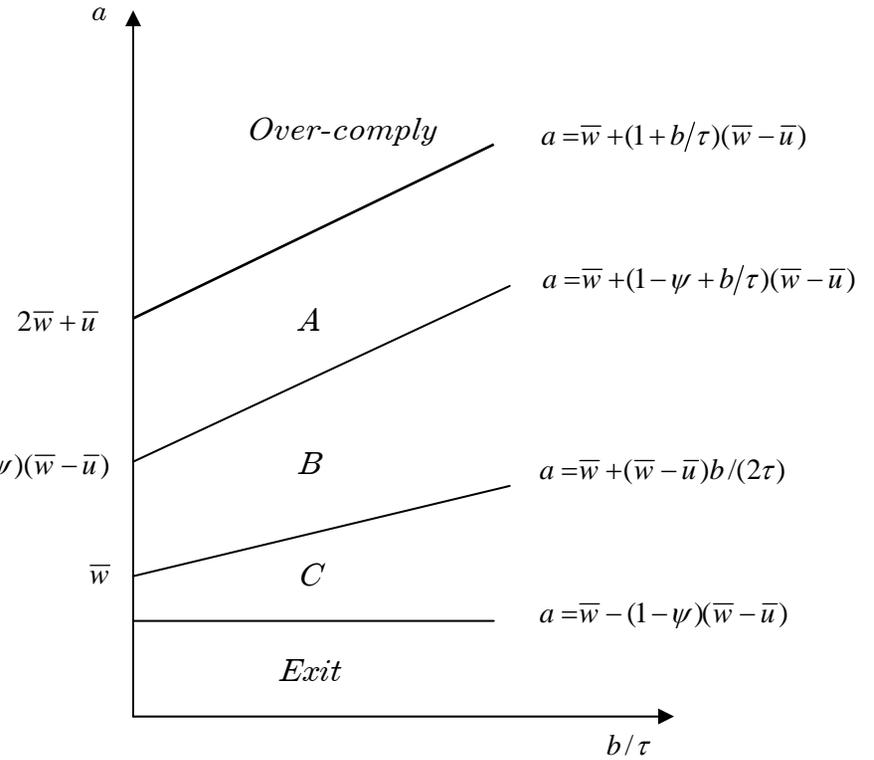B: Sign Reversal
C: Muted Response

Fig. 5

Labor Demand and Supply Determinants and
Equilibrium Configurations

A: Strict Compliance
B: Effective Enforcement
C: Ineffective Enforcement