Abstract
Excerpt] I shall refer to minimum wages and other wage-increasing institutions collectively as "wage floors." Throughout the paper, they are assumed to be set in real terms, therefore not be eroded by inflation or devaluation. These wage floors typically are sector-specific: unions are stronger in some firms and industries than in others, minimum wage laws apply to some establishments and localities but not to others and are enforced with different degrees of diligence, and so on. As a stylized version of the differential applicability of wage floors, economists from such disparate fields as development economics, labor economics, and international trade have formulated two-sector models with a wage floor in one sector but not the other. Wage floors would be expected to affect directly the sectors involved and to affect indirectly via migration and other general equilibrium phenomena the other parts of the economy. Among the development variables influenced would be Gross Domestic Product, employment and unemployment, total wages received by labor, income inequality, and poverty.

This paper inquires into the nature of these effects from a theoretical point of view. More specifically, the question considered is:

If a minimum wage or other wage-increasing institution succeeds in establishing a wage floor in the modern sectors of a developing economy, what development effects result?

The analysis developed in the body of the paper leads to the conclusion that the answers are neither clear-cut nor unambiguous. The development effects of wage floors may be positive in some circumstances, negative in others. Simple arguments asserting that wage floors are good (because it's better if workers are paid more) or bad (because wage floors introduce factor price distortions) are shown to be simplistic. The truth is more complicated.

Keywords
minimum wage, development, wage floors, labor economics

Comments
Suggested Citation

Required Publisher Statement
Copyright held by the author.
I. INTRODUCTION

The goal of economic development is to raise standards of living throughout an economy. Most persons' standards of living are determined by their labor earnings. Consequently, rising real wages at full employment are rightly viewed as a primary means of improving living standards.

Some countries pursue policies aimed at pulling wages up. They produce for the world market and achieve high GNP growth. Firms demand more and more labor in the productive process. Ultimately, full employment is attained. Competition for labor then pulls wages up further. Japan, Hong Kong, Korea, Singapore, and Taiwan are examples of economies which have relied primarily on such wage pull mechanisms; see Fields (1985).

Most other countries have not been content to wait; see Paper #V for evidence. Five institutional forces, singly or in combination, have potent influences on wages in most of the developing world.\(^1\) Minimum

Wage laws are commonplace and when enforced cause wages to be higher than they otherwise would be. Labour unions often are very strong. At times, this is because of the close association between organized labour and the political party in power. Other times, it is because labour unions are encouraged as a means of achieving higher wages for workers. Pay policy for government workers often sets the pattern of wages for the rest of the economy, and those in charge have a propensity to pay high wages to all government workers (including themselves). Also, multinationals often pay high wages, partly to maintain parity between expatriate and local employees, and partly (in some instances) to appear to be good corporate citizens and thereby to avoid expropriation or expulsion. Finally, labor codes may require higher wages, fringe benefits, and severance pay, resulting at times in bloated work forces and inflated labor costs.

I shall refer to minimum wages and other wage-increasing institutions collectively as "wage floors." Throughout the paper, they are assumed to be set in real terms, therefore not be eroded by inflation or devaluation. These wage floors typically are sector-specific: unions are stronger in some firms and industries than in others, minimum wage laws apply to some establishments and localities but not to others and are enforced with different degrees of diligence, and so on. As a stylized version of the differential applicability of wage floors, economists from such disparate fields as development economics, labor economics, and international trade have formulated two-sector models with a wage floor in one sector but not the other. Wage floors would be expected to affect directly the sectors involved and to affect indirectly via migration and other general equilibrium phenomena the other parts of the economy. Among the development
variables influenced would be Gross Domestic Product, employment and unemployment, total wages received by labor, income inequality, and poverty.¹

This paper inquires into the nature of these effects from a theoretical point of view. More specifically, the question considered is:

If a minimum wage or other wage-increasing institution succeeds in establishing a wage floor in the modern sectors of a developing economy, what development effects result?

The analysis developed in the body of the paper leads to the conclusion that the answers are neither clear-cut nor unambiguous. The development effects of wage floors may be positive in some circumstances, negative in others. Simple arguments asserting that wage floors are good (because it's better if workers are paid more) or bad (because wage floors introduce factor price distortions) are shown to be simplistic. The truth is more complicated.

II. THE EFFECTS OF WAGE FLOORS IN ONE-SECTOR MODELS

A. The Analytical Starting Point: The Textbook Analysis of Wage Floors

To a remarkable degree, economists of virtually all analytical and political persuasions believe that wage floors have undesirable effects. Those who hold this belief range from sophisticated general equilibrium analysts to non-specialists familiar only with the fundamental tools of

¹ Investment, and hence the time paths of these variables, would also be affected. Dynamic effects merit attention in the future; but for now, in keeping with a vast literature (much of it reviewed below), only static consequences are analyzed.
supply and demand. Many, probably most, would go the next step and maintain that minimum wage laws, collective bargaining over wages, and other non-market wage-setting institutions are best eliminated.

The analytical starting point for this view is the textbook-level diagram of the labor market shown in Figure 1. (See, for example, Ehrenberg and Smith (1982)). The labor demand and supply curves are assumed to have the usual negative and positive slopes respectively. Demand and supply generate a market-clearing wage $W^*$ and full employment $L^*$.

![Figure 1](image)

The imposition of a wage floor at a level like $\bar{W}$ engenders a number of effects, all of which are viewed negatively in orthodox analysis: (1) Because a wage floor produces negative substitution and scale effects on employment, firms move up their labor demand curves and hire less labor. Disemployment of $L^* - \bar{L}$ workers results. (2) By virtue of the assumption
of an upward-sloping supply of labor curve, the wage floor causes the labor force to increase. These additional job aspirants add a further $L' - L^*$ more persons to unemployment. (3) Because of unemployed resources and because of the divergence between the wage and the marginal value product of the last laborer supplying his/her services in the market, the result is economic inefficiency (in the standard sense of the term, i.e., producing inside the economy's production possibilities frontier). (4) Because some workers end up with higher wages and others with no wages, labor income inequality increases. (5) The fact that more workers have zero incomes contributes to poverty. This effect might be offset by the gain in wages realized by those still working. Whether poverty increases or decreases depends on the sizes of these two effects and on the particular poverty measure used. (6) Because the wage differs from what firms would have chosen, profits fall.

Any one of these six consequences—falling employment, rising unemployment, economic inefficiency, increased labor income inequality, (possibly) rising poverty, and lower profits—would be enough to turn many economists against an economic policy. When all six result, as in the standard textbook analysis of wage floors, the widespread opposition among economists to wage floors is hardly surprising.

What is surprising is that most professional economists align themselves on one side of the issue while most development planners, trade unionists, and concerned members of the public align themselves on the other. Is this because economists have figured out the truth and others have not yet caught on? Or because the others know something analytical economists do not? Neither, I think. Rather, when more sophisticated
analysis has been done, the conclusions of the textbook analysis have been found not to be robust. The only certitude in analyzing the development effects of wage floors is that nothing is certain.

Let us turn to some of the sources of these uncertainties.

D. Is the Wage Floor Effective?

One view about the economics of wage floors is that the whole thing is a non-issue. To some observers, the situation depicted in Figure 1—the wage persistently exceeding the market-clearing level—would never arise. If competition in the labor market is great enough, as some assume, firms could not tolerate higher-than-market-clearing wages; they would be driven out of business. Minimum wages might not be enforced or complied with. If firms are required to pay higher money wages, they might cut back on non-wage forms of compensation such as fringe benefits, working conditions, employer-provided meals and housing, or training, leaving total compensation unchanged. Considerations like these led Milton Friedman (1951) to the position that unions have little or

1 See, for instance, Ashenfelter and Smith (1979) for an econometric analysis of non-compliance in the United States. For the case of Brazil, income distributions are regularly reported under the categories "less than minimum wage", "one to two minimum wage", etc. Morley (1982, p. 55) for example, reports 54% of Brazilian workers earning less than the minimum. Clearly, coverage and compliance are less than comprehensive.

2 This subject has been extensively studied in the United States. Weiss (1966) concluded that although unionized industries pay higher wages than non-unionized industries, they are able to attract a better grade of workers. He concludes that the wages received by high-quality workers in the unionized sector are no higher than those received by comparable non-unionized workers. Most economists reach the opposite conclusion, however. For surveys of studies of the effects of unions on wages, see Johnson (1975) and Parsley (1980).

no economic effect; collective bargaining is just a smokescreen in his view, the unions taking credit for wage increases that would have taken place anyhow due to rising productivity of labor and other market forces.

Friedman excepted, the Chicago view was and still is that wage floors really do exist. Many of the most significant analysts of the economics of minimum wages and of union wage effects—among them, Stigler (1946), Lewis (1963), Johnson (1969), Mincer (1976), and Welch (1978)—proudly represent the Chicago view.

The existence of wage floors in key sectors of developing economics seems clear enough to me. The more significant question is what to make of them.

C. Wage Floors Under Monopsony

A conclusion from standard textbook analysis is that wage floors reduce employment. But the textbooks also point out that the reverse conclusion may hold under monopsony. That is, the imposition of a wage floor may actually increase employment if the labor market is monopsonistic.

The argument goes like this. The monopsonistic firm must pay higher wages whenever it wishes to attract additional laborers. Hence, the labor supply curve to the monopsonist is upward sloping as in Figure 2. Because the firm must ordinarily raise the wages of existing workers whenever it raises the wage to hire new ones, the marginal factor cost curve (MFC) lies above the labor supply curve. The firm hires labor until the marginal factor cost equals the demand for labor (at L*). The firm need not pay a
Figure 2.
Wage Floor Under Monopsony.

Figure 3
Wage Floor with Unlimited Supplies of Labor
wage as high as $W_0$, though. A sufficient supply of labor is forthcoming if the firm pays a lower wage $W^*$. The profit-maximizing solution under market wage determination is then employment of $L^*$ workers at wage $W^*$.

Suppose now that a wage floor is imposed at some level $\bar{W}$ between $W_0$ and $W^*$. The firm must pay that wage to any worker hired. This has two effects: it raises the total cost of hiring the first $L^*$ workers and it lowers the marginal cost of hiring the next $(L - L^*)$ workers. As long as total factor costs are low enough that the firm can remain in business, it is the marginal cost that is relevant to employment decisions. Because the marginal cost falls (though the total cost rises), the firm finds it advantageous to employ more workers than it had previously. In this way, imposition of a wage floor may lead a monopsonistic firm to increase employment, not reduce it.

This argument is more than an intellectual curiosum. It delights those observers, particularly from the political left, who see rampant monopsony in the labor market. Indeed, higher wages for more workers is a lovely idea, especially when the requisite policy instruments (minimum wage laws, legal protection of collective bargaining, etc.) are readily at hand.

Among the considerations involved in evaluating the monopsony argument are the prevalence of monopsony and, where monopsony exists, the elasticity of labor supply to the monopsonistic firm. I know of no empirical studies in the context of developing countries which address the empirical importance of monopsony in the labor market. However, the unlimited supply of labor models of Lewis (1954), Fei and Ranis (1964), and others are constructed on the assumption that modern sector firms are not monopsonistic, in that they can employ more workers simply by hiring them without raising
wages. When labor supply is unlimited in the Lewis-Fei-Ranis sense, there is no band within which imposition of a wage floor will raise employment, because any wage increase moves the monopsonistic firm backward along its labor demand curve. Figure 3 shows this.¹

The conditions under which the monopsony argument stands up bear further scrutiny, both theoretically and empirically. For now, though, the provisional conclusion must be that the monopsony argument is logically valid but of questionable empirical relevance.

D. Shock Effects

Another favorite of the textbook writers is the possibility of shock effects. The idea is that firms operate with a certain amount of slack, satisficing rather than maximizing. When a wage floor is instituted, firms have a stronger incentive to do things better; they are shocked into being more efficient. Believers in shock effects contend that firms' greater efficiency enables them to afford to hire more labor—conceivably, as in Figure 4, shifting the labor demand curve upward to more than compensate for the wage increase, so that both wages and employment rise (from \( W^* \) to \( \tilde{W} \) and from \( L^* \) to \( \tilde{L} \) respectively).

¹ Note that in Figure 3 I have drawn the supply of labor curve in the unlimited-supply case as vertical, whereas usually it is drawn horizontally. Drawing it vertically reflects the definition of a labor supply function, viz., the number of workers who wish to supply their services in a given labor market as a function of the wage. The vertical labor supply curve indicates that the number wishing to supply their services consists of the entire labor force. Employment is determined by the wage rate and the consequent choice of firms where to locate along their labor demand curves. The difference between labor supply and labor demand at the prevailing wage is then the volume of underemployment or unemployment.
Figure 4
Possible Shock Effect of a Wage Floor
The shock effect argument presumes inefficiencies; without inefficiencies, firms could not be shocked into doing better. The assumption of inefficiencies runs contrary to the assumption of maximization on which rest both orthodox economics (profit maximization) and radical economics (incessant drive for capital accumulation). It is ironic that many of those who believe most strongly in shock effects are the very same persons who believe most strongly in the insatiable quest of firms for greater wealth.

Although one might hope that a higher wage would stimulate enough efficiency to shift firms' demand for labor curves to the right by more than the movement along any given negatively-sloped curve, there seems to be no empirical basis for regarding this outcome as probable. Indeed, in a world of multinational corporations and internationally mobile capital, the most likely shock effect of a wage floor is to induce the firm to move out of the economy in pursuit of lower labor costs. I see little empirical merit in the shock effect argument, in developing economies or elsewhere.

E. Wage Floors and Profit Maximization

An interesting theme in the newer theories of labor markets is the possibility that firms might deliberately choose to set their wages higher than market-clearing levels as part of profit-maximizing strategies. As noted by a number of recent writers [e.g., Lazear, 1981; Shapiro and Stiglitz, 1984; Akerlof, 1984; and Yellen, 1984], there are a number of possible reasons that firms might do this. Among them are:

1. Efficiency wage considerations. A worker who is paid more may be more efficient because of better nutrition, improved morale, or heightened self-worth.
2. **Shirking.** In a world of imperfect monitoring of job performance, workers may shirk without full detection. Payment of higher wages raises the cost to the worker of being detected shirking, which presumably induces less of it.

3. **Labor turnover.** When workers leave the firm, the firm must incur hiring and training costs. A higher wage cuts down on quits and lessens these costs.

4. **Protection against stochastic elements.** In an uncertain world, the firm faces such stochastic factors as unexpected increases in the demand for its product and worker illnesses. Higher wages bring forth a larger labor supply, which can be called upon as needed in response to unanticipated events.

5. **Hiring better quality labor.** The higher the wage, the larger and better will be the applicant pool, so the more selective the firm can be in choosing whom to hire.

In each case, the driving force is the same: the firm will pay higher wages if, by doing so, it earns higher profits. For this to happen, not only must labor efficiency increase as wages increase—the labor efficiency must increase faster than wages increase. In the terminology of Johnson (1970), the marginal proportionate increase in efficiency with respect to the wage must exceed the marginal proportionate increase in the wage itself.
In this class of models, the usual equilibrating forces do not come into play. Ordinarily, with a wage floor, workers would want to offer their services and firms would want to employ them at wages below the floor. Wages would tend to fall toward market-clearing levels. But in this class of models, the firm would not accept a worker's offer to be employed at a lower wage, because the worker would be too badly-nourished to perform effectively, too apt to shirk, or whatever. The firm chooses a wage floor on its own and maximizes its profits by so doing.

A wage floor imposed exogenously by an outside body above the wage freely chosen by the firm is very different. If the wage floor is above the level that would have been chosen by the firm, all the usual adverse effects (as described in section II.A) pertain. In no way are the negative effects of an exogenously imposed wage floor altered by the newer theories.

F. Comments and Evaluation of One-Sector Models

The analytical starting point for evaluating wage floors is the textbook model of supply and demand in labor markets. This model predicts a number of adverse consequences of a wage floor: disemployment, higher unemployment, inefficiency, (possibly) higher inequality and poverty, and lower profits.

There are some reasons for doubting the textbook view. One argument is that wage floors are more apparent than real. On this view, minimum wages collective bargaining, and other institutional practices simply ratify the wage levels that would have been reached under market forces. This is a very Chicago-esque view. Yet, virtually all Chicago school economists other than Friedman dissent from this position. Another possibility, similar in many respects, arises in the newer views which hold
that the firm might itself choose a higher-than-market-clearing wage as part of its profit-maximizing drive. In this case, the wage floor may not be binding, because firms might willingly pay wages higher than the institutionally-determined floor; but if it is binding, the effects are adverse, just as in the textbook model.

There are two logically valid counter-arguments to the textbook model. Under both of them, at least some of the adverse effects of wage floors might be avoided. One mitigating circumstance is the setting of a wage floor under conditions of monopsony. If the wage floor is set properly, employment can actually increase when a wage floor is imposed. Another countervailing force is shock effects. Imposition of a wage floor might shock a firm into new more efficient production methods. More labor might be hired as a result. These counter-arguments to the textbook view cannot be ruled out on logical grounds. Rather, their validity is an empirical matter. I am dubious about their empirical relevance.

In the balance of this paper, I take the view that wage floors oftentimes are imposed on firms against their will, i.e., firms don't realize sufficient productivity gains from higher wages to have chosen them on their own. This is what the textbook analysis assumes. But unlike the textbook analysis, which is aggregative in nature, it is important also to recognize that some sectors are affected by the wage floor differently from others. The rest of the paper examines the effects of wage floors in two-sector models.
III. CHOOSING A TWO-SECTOR FRAMEWORK

A. Stylized Facts of LDCs' Labor Markets

Any realistic analysis of the effects of wage floors in a development setting must capture two empirical features of their labor markets: open unemployment and wage dualism.1 Open unemployment rates, as tabulated by Turnham (1971), Squire (1981), and others are sizable, often in double-digits. And this excludes underemployment, the rates of which are also found to be substantial (Yotopoulos and Nugent, 1976; Sabot, 1977; Squire, 1981). Wage dualism arises when apparently homogeneous workers are paid different wages depending on the sector of the economy in which they are employed. Both tabular presentations and multivariate analysis demonstrate wage differentials for observationally-equivalent labor; see Berry and Sabot (1978), Fields (1980), Squire (1981) and the references cited therein. From my reading of this evidence, it appears that after standardizing for relevant differences in workers and firms, there remain wage differences between comparable workers in different sectors.

I shall present a model which has both open unemployment and wage dualism and analyze the development effects of a wage floor in such a model.2 Before proceeding, though, it is well to remark on the relationship between the models considered below and other classes of models which do not capture these two stylized facts.

---

1 Although not universal, the great majority of developing economies have these characteristics.

2 For analytical convenience, and in keeping with the great bulk of the literature, the model is limited to a single type of labor.
B. Models of Wage Floors in a Two-Sector Economy Without Wage Dualism

These models have two economic sectors with the same wage floor in each. Among this class of models are those of Haberler (1950), Johnson (1965), Brecher (1974a, 1974b), Helpman (1977), Hanson (1983), and Buffie (1984). They present a trading economy with an export sector and an import-competing sector. The wage floor applies uniformly to both sectors. Unemployment results.

The principal advantage of this class of models is that the models are of a general equilibrium character. This is an important advantage indeed in examining optimal trade policy in the presence of wage floors. But a serious deficiency for our purposes is the lack of a noncovered sector. This omits such important empirical features of LDCs' economies as the sector-specificity of minimum wage laws, the differential impacts of trade unions, and so on. The assumption of wage uniformity in these models is inconsistent with the reality of wage dualism. The development effects of minimum wages are more appropriately analyzed in models with wage dualism, to which we now turn.

C. Models of Wage Dualism Without Unemployment

Models from four fields of economics have the feature of wage dualism but lack unemployment. The empirical fact of unemployment is contradicted by the assumption in these models that unemployment is absent. These models include:

1. The dualistic models of economic development. Among these are the well-known classical models of Lewis (1954) and Fei and Ranis (1964) as well as such neoclassical models as Jorgenson's (1961). The economy
consists of two sectors paying different wages from one another. The high wage sector is termed the "manufacturing sector" or the "modern sector" whereas the low wage sector is termed the "agricultural sector" or the "traditional sector." Wages are higher in the manufacturing sector in order to attract a sufficient pool of labor. Lewis, for instance, thought that the urban wage premium would have to be 30% or so if workers were to be drawn away from their villages.

For present purposes the key feature of these models is that only two possible labor force situations were assumed: workers were either employed in the modern manufacturing sector or employed in traditional agriculture. Thus, unemployment was ruled out.

2. The trade models with fixed wage differentials. Included here are the works of Hagen (1958), Bhagwati and Ramaaswami (1963), and Jones (1971), among others; these and other contributions are surveyed by Magee (1976). These models occupy an important place in trade theory. In these models, it is not the wage in the covered sector that is fixed but rather the wage differential between sectors. This makes sense in some contexts—for example, in creating a sufficient compensating differential in the manufacturing sector of an economy to induce workers to leave their familiar surroundings in agriculture. However, for the purpose of analyzing wage floors, such as minimum wages imposed by governments or wage increases negotiated by trade unions, it seems more appropriate to regard the wage in the covered sector as fixed and the wage in the noncovered sector as varying with the movement of labor into or out of the noncovered sector.
Accordingly, I regard models with fixed covered sector wage rather than fixed wage differential between covered and noncovered sector as a more fruitful basis for analysis of the effects of wage floors.


In this category are Johnson's (1969) model of the general equilibrium effects of minimum wages and Johnson and Mieszkowski's (1970) analysis of the general equilibrium effects of unionization. In these models, the minimum wage or union effectively raises wages in one sector of the economy but not the other, wherein wages are market-determined. Prices adjust to clear goods markets. Foreign trade is excluded from consideration. This meets the objection raised to the previous class of models—that it is the wage differential between sectors and not the wage in the covered sector that is set rigidly. However, a significant problem remains: unemployment is absent. As in the two preceding classes of models, any worker not employed in the high wage sector is assumed to be employed in the low wage sector.

4. Some minimum wage models of labor economics.

An example is Welch (1974), who maintained that the effect of a wage floor in the covered sector is to shift rightward the supply of labor to the noncovered sector by an amount equal to the disemployment from the covered sector. Once again, we have a model of a wage floor without unemployment.

5. A comparison

These classes of models differ from one another in important ways. But despite their differences, these models have one central feature in common: full employment. Open unemployment is assumed away. In all these
models, any worker who does not gain employment in the high-paying covered sector is assumed to return to the low-paying noncovered sector and find a job there.

Is it rational for workers to do this? This question did not receive serious attention by the authors of these models. Perhaps their inattention was due to an implicit assumption that nobody could afford to be unemployed for any appreciable length of time; thus, anyone without a high-paying job would take whatever else might be available. Lack of funds to finance a period of job search would justify such an assumption. But subsequent studies of migrants showed that a great many circumvented the lack of a formal capital market by staying with friends and relatives at their destinations, returning home on weekends, and bringing home-grown produce back from their farms with them—in effect, financing their job search through non-cash means.

Another justification for assuming away open unemployment surfaced later; see Fields (1975). The number of people unemployed depends in part on their own choices, one aspect of which is the gain to being openly unemployed and searching full time for a high-paying job. If the payoff to job search is high, many people will search and the unsuccessful ones will be unemployed. But if the payoff to job search is low, open unemployment will also be low, because those not hired at high wages will find it more advantageous to accept low wages elsewhere rather than not work at all. A low gain to job search could arise from such disparate causes as nepotism, discrimination, hiring by word of mouth, and job filling through a central employment exchange. If these hiring channels are important enough, and
job search while unemployed unrewarding enough, workers might rationally decide not to stay unemployed. Underemployment would be widespread but open unemployment would not.

These points should be taken seriously. However, their empirical relevance should not be overblown. Open unemployment is a fact and cannot be assumed away. Accordingly, the development effects of wage floors are best analyzed in models that permit open unemployment. Such models are developed below.1

D. Models with Wage Dualism and Unemployment

Several classes of models have wage dualism and open unemployment. Foremost among them are the models of Harris and Todaro (1970) and Mincer (1976). Wage dualism arises in these and kindred models due to incomplete coverage by minimum wage laws, strong trade unions in some sectors but not others, and the like. Open unemployment arises from the purposeful movement of labor between sectors on the basis of the expected wages in each. Some of these models specify that labor moves on the basis of the strict mathematical expectation (i.e., wage multiplied by probability of employment), while others include the employment probability in some other way. But in all of them, the equilibrium tendency is toward equalization of wages adjusted for probability of employment. This contrasts with flexible wage models; it is an increase in unemployment in the high wage sectors rather than a fall in the wage that ultimately equilibrates the supply side of the market.

1 An interesting study would be to examine the effects of sector-specific wage floors in models which allow both unemployment and underemployment. (Here, "underemployment" means working at very low pay on the fringes of the covered sector, e.g., in an urban informal sector in a developing economy.) This exercise is left to the future.
These models with wage dualism and unemployment are more consistent with the stylized facts presented above. The models with which I work below feature expected wage equalization with consequent equilibrium unemployment.
IV. A TWO-SECTOR MODEL OF THE EFFECTS OF WAGE FLOORS

A. Introduction

The preceding sections contended that a desirable model of wage floors is one in which the wage floor applies to some sectors of the economy but not others and in which unemployment is an outcome. Such a model is developed in the pages below.

The strategy I follow is to build a model consistent with sector-specific wage floors and unemployment that is minimal in complexity and yet reasonable behaviorally and institutionally. The least complex model, though far from simple, is capable of yielding substantial and useful insights. Further refinements—in particular, consideration of wage floors in a dynamic setting and analysis of the welfare economics of the resultant labor force allocations—are deferred until later work.

To the extent possible, answers will be sought in general models. At some points, however, the general models yield indeterminate results. This indeterminacy poses a dilemma. Is it due to the difficulty of the problem and inability to discern clear patterns in complex expressions? Or are the results genuinely ambiguous? As I shall show, the indeterminacies arise due to genuine ambiguities, the existence of which I demonstrate using two special cases.

We shall derive eight results, termed "Propositions" below. Proposition 1 is that a wage floor generates unemployment. However, which way labor moves cannot be ascertained with certainty. Rather, we shall see that labor will flow into or out of the covered sector as that sector's labor
demand is inelastic/elastic (Proposition 2). Given our concern with the employment and unemployment effects of wage floors, it is natural to ask next, "On what does the amount of unemployment depend?" Three determinants will be addressed:

i. The elasticity of demand for labor in the covered sector.

ii. The elasticity of the wage in the noncovered sector with respect to the size of that sector's labor force.

iii. The size of the wage floor itself.

As shown by Propositions 3 through 5, the comparative static effects of these variables are surprisingly ambiguous. Distributional aspects of wage floors also turn out to be less than straightforward; see Propositions 6 through 8 for effects of wage floors on total wage bill of labor, income inequality, and absolute poverty respectively.

These results are derived for the case of a labor force of fixed size, i.e., the wage floor does not change the rate of labor force participation in the economy. Consider what would happen if the labor force participation rate were allowed to vary. A wage floor increases the wage in some jobs while reducing the number of jobs overall. Would this raise labor force participation or lower it? Additional worker effects and discouraged worker effects would be set into motion, both with respect to the employment variable and with respect to the wage variable. The net effect on the size of the labor force, and hence on the resultant number unemployed and on other outcome variables, would be indeterminate. As shown below, a
number of key results are ambiguous even when the labor force participation rate is unchanged. To avoid confounding these ambiguities with those attributable to additional and discouraged worker effects, the balance of this paper assumes a fixed labor force.

The results developed below show that a key role is played by the elasticity of demand for labor in the economic sectors covered by the wage floor. For an exporting economy engaged in international trade or thinking about engaging in such trade, labor demand may be very elastic indeed. Demand for labor is derived from supply and demand for product. If the country is a small open economy, it may have little or no scope to raise the price of its product in response to a wage floor; for if the product price were to rise, foreign buyers would buy elsewhere. The only alternative response to a wage floor is to cut back production; demand for labor in the covered sector would fall sharply as a result.

Interactions between trade policy and labor market policy will be dealt with in a subsequent paper. For now, suffice it to say that because many developing economies are small in relation to world markets, the results for the elastic demand case may well be the more pertinent ones for analyzing the development effects of wage floors in trading economies.

B. Algebraic Representation of the Two Sector Model with Unemployment

Suppose a wage floor is imposed on some sectors of a developing economy but not others. In the model that follows and throughout the subsequent discussion, these two parts of the economy will be referred to as the "covered sector" and "noncovered sector" respectively.
Elementary economic analysis of the type presented in Section II above leads one to expect that employment in the covered sector will fall as a result of the wage floor, except in extraordinary circumstances such as very large shock effects. When employment in the covered sector falls, unemployment will arise unless all of the labor released from the covered sector is absorbed into the noncovered sector.

How plausible a circumstance is this? The answer to this question requires a model of the process by which workers choose to allocate themselves between economic sectors.

The model I formulate is a single-period one. Expected wage maximization is the central behavioral postulate. Workers decide between supplying their labor to one sector or the other on the basis of the wages and probabilities of employment in the different sectors. If the expected wage is higher in one economic sector than another, purposeful migration of labor will take place. Any temporary differential between expected wages will be eroded as expected wages are brought into balance. Thus, expected wages, not nominal wages, are equalized in equilibrium:

\[ E(W_C) = E(W_N). \]  

(Here, \( W_C \) and \( W_N \) respectively denote the wages in the covered and noncovered sectors and \( E \) is the expected value operator.) The expected wage in each sector is the wage if employed multiplied by the probability of employment.

---

1 Implicitly, this assumes that workers are risk-neutral, which means that two possible job opportunities that differ in riskiness but have the same expected value are deemed by workers to be equivalent.

2 This basic framework was developed by Harris and Todaro (1970) and Harberger (1971) in the context of rural-urban migration in developing countries.
Before the imposition of a wage floor, competition in the labor market is assumed to equalize wages in the two sectors at a level denoted by $W_0$.

$E^0_C$ workers are assumed to be employed in the covered sector and the remaining $L - E^0_C$ members of the labor force to be employed in the uncovered sector.

When the wage floor is imposed, the wage in the covered sector is raised to $\bar{W}_C$. The employment probability is the ratio of covered sector employment ($\bar{E}_C$) to covered sector labor force ($\bar{L}_C$), including both employed and unemployed. The wage in the non-covered sector $W_N$ is non-increasing in the size of that sector's labor force; it adjusts to clear the market, so that the supply of non-covered sector workers equals the demand in that sector. Under these conditions, the equilibrium condition (1) becomes

$$\bar{W}_C \frac{\bar{E}_C}{\bar{L}_C} = \bar{W}_N.$$  \hspace{1cm} (2)

It is easy to show that the resultant equilibrium is characterized by unemployment. Rewrite the equilibrium condition (2) as:

$$\frac{\bar{L}_C}{\bar{E}_C} = \frac{\bar{W}_C}{\bar{W}_N}.$$  \hspace{1cm} (2')

---

1 This specification assumes hiring is probabilistic so that each worker has the same chance of being hired for the available jobs. It also excludes the possibility of on-the-job search.

2 In a special case used in some of the analysis below, the wage in the noncovered sector remains unchanged as workers move into or out of that sector. Even in this case, the labor market clears, in the sense that all workers who supply their labor to the noncovered sectors are employed at the prevailing wage.
The right hand side is strictly greater than one, because the sector-specific wage floor has raised the wage in the covered sector above that in the noncovered sector. It follows that in equilibrium, for (2') to hold, the left hand side must also be greater than one; that is, each covered sector job must have more than one job seeker. Overall, the labor force in the covered sector will be $L_C$ workers, of whom $\bar{E}_C$ will be employed and the remaining $L_C - \bar{E}_C$ will be unemployed. This result is so important that it receives a special designation:

**Proposition 1:** A wage floor causes unemployment.

Proposition 1 enables us to answer a question posed earlier: how plausible is it that if a wage floor is imposed all of the labor displaced from the covered sector will be absorbed into the noncovered sector? The answer given for this model is, "Not very." But the reason for this answer is different from what might have been thought. It is not that the noncovered sector is incapable of employing the labor released by the covered sector—indeed, this model assumes that the noncovered sector will employ all who seek work there. Rather, it is that the unemployed do not seek work in the noncovered sector. This is because if they were all to enter the noncovered sector labor force, the expected wage there would be lower than the expected wage in the covered sector. This would not be a stable situation. Instead, some of these in the noncovered sector would find it advantageous to seek jobs in the covered sector. Some succeed in their job search and some do not. The unsuccessful comprise the unemployed in equilibrium.
As we shall see in Section V, the amount of unemployment generated by a wage floor varies predictably (although not straightforwardly) with a number of economic variables. But before examining these variations, it is worthwhile to view the preceding model in graphical terms. This graphical formulation will be helpful in deriving the comparative static results presented below.

C. A Diagrammatic Representation of the Two-Sector Model with Unemployment

For purposes of analyzing the labor market effects of a wage floor in the two-sector model, the critical question is the division of the labor force between employment in the covered and noncovered sectors and unemployment. Figure 5 helps determine the equilibrium allocation of the labor force before and after the imposition of a wage floor.

Before the wage floor is imposed, the labor force is allocated according to the two curves NN and CC. NN represents the wage-employment locus in the noncovered sector. If the predominant mode of labor market organization in that sector is the hiring of workers by firms, then NN is nothing more than the usual demand for labor curve. Alternatively, if the predominant mode of labor market organization in the noncovered sector is self-employment (for instance, in traditional agriculture), NN is still the wage-employment locus, but instead has the interpretation of being the wage from self-employment expressed as a function of the number of persons working in that sector. Likewise, when viewed from origin O', CC is the wage-employment locus in the covered sector. In the covered sector, the usual demand-for-labor interpretation holds.

---

1 This representation is due to Corden and Findlay (1975).
Figure 5
Effect of a Sector-Specific Wage Floor on Labor Force Allocation, Elastic Demand for Labor in the Covered Sector.
Competition in the labor market tends to equalize wages between the two sectors of the economy. The initial equilibrium allocation of the labor force prior to the wage floor is represented by point A. The wage is $W^0$ in both sectors. $L_N^0$ workers are employed in the noncovered sector and $L_C^0$ in the covered sector. Initially, there is no unemployment, because $W^0$ is a market-clearing wage.

Suppose now that a wage floor is imposed on the covered sector at a wage $\tilde{W}_C$. Employers in the covered sector move along the labor demand curve $CC$ to a new point $X$. At that point, they hire $\tilde{E}_C$ workers at the new higher wage. Employment in the covered sector falls.

How does the labor force respond? The equilibrium condition given by equation (2) can be represented graphically in the following way. Draw a rectangular hyperbola through the covered sector labor demand point $X$; denote this hyperbola by $RR$. The rectangular area under $X$ represents the total wage bill paid in the covered sector when the wage floor is set at $\tilde{W}_C$:

Rectangular area under $RR$ at $X = \tilde{W}_C \tilde{E}_C$. \hfill (3)

Look now at the point $\tilde{A}$ where the rectangular hyperbola $RR$ intersects $NN$, the wage-employment locus in the noncovered sector. The rectangular area under $\tilde{A}$ represents the average wage $\tilde{W}_N$ of the $L_C$ persons in the covered sector labor force, $\tilde{E}_C$ of whom are employed and $L_C - \tilde{E}_C$ of whom are unemployed. Thus:

Rectangular area under $RR$ at $\tilde{A} = \tilde{W}_N L_C$. \hfill (4)
Now, a property of rectangular hyperbolas is that the rectangular area under one point is the same as that under any other. So from (3) and (4):

\[ \hat{w}_C \hat{e}_C = \hat{w}_N \hat{e}_N. \]  

(5)

But this is nothing more than a rearrangement of the equilibrium condition (2). Thus, the point \( \hat{A} \) where the rectangular hyperbola RR intersects the noncovered sector wage-employment locus NN depicts the equilibrium allocation of the labor force between the covered and the noncovered sectors.

This information, when combined with the information on covered sector employment at X, tells us how many members of the labor force will be employed in the covered sector (\( \hat{e}_C \)), employed in the noncovered sector (\( \hat{e}_N \)), and unemployed (\( \hat{u} \)) as a result of the wage floor. It also tells us what the resultant wage structure will be (\( \hat{w}_C \) and \( \hat{w}_N \)).

The existence of unemployment in equilibrium confirms diagrammatically the claim demonstrated algebraically in Proposition 1. This is a general result—that the wage floor results in unemployment.

Figure 5 also illustrates some results that are not general. In the figure, the net effect of the wage floor is to move labor from the covered sector (the labor force of which falls from \( L^C \) to \( \tilde{L}^C \)) to the noncovered sector (the labor force of which increases from \( L^N \) to \( \tilde{L}^N \)). The influx of labor into the noncovered sector lowers the wage there from \( \hat{w}_N \) to \( Q_N \).

These results are not necessary; all are reversible. Section IV.D shows that the key variable determining which way labor moves is the elasticity of demand for labor in the covered sector.
D. Which Way Does the Labor Force Move When a Wage Floor is Imposed?\textsuperscript{1}

A wage floor in the covered sector induces two offsetting effects on the labor force. The higher wage itself serves as an inducement for labor to enter the covered sector in search of high wage employment. But the higher wage also causes employers in the covered sector to demand fewer workers than before; this loss of employment stimulates movement of labor out of the covered sector. Whether labor on balance moves into the covered sector or out of it depends upon the relative strength of these opposing effects.

Early analyses of the pre-formal modeling era made alternate, indeed contradictory, assumptions about the direction of the labor force response.

The minimum wage and union wage effect literatures used to take for granted that the decline in employment would move labor out of the covered sector, either through direct disemployment or through reduced employment growth and lower replacement hiring. As the demand for labor in the covered sector fell, workers would move into the noncovered sector. The literature on rural-urban migration in less developed countries tended to make the opposite assumption: that labor would move into the covered sector from the noncovered sector in search of higher-paying jobs. Although employers would not hire as many workers, the fact that the wage if employed was higher was taken to imply that more workers would enter the covered sector labor force to try to get jobs there. Note that both perspectives recognize that the wage will increase and employment will

\textsuperscript{1} Mincer (1976) deserves credit for the first thorough analysis of this question, though Harris and Todaro (1970) and Corden and Findlay (1975) both raised the issue earlier.
decrease in the covered sector. However, one view is that the labor force responds primarily to the loss of jobs in the covered sector, while the other is that the primary precipitating factor is the increase in wages.

A more comprehensive view would be one that recognizes that workers respond both to wages in alternative jobs and to the possibilities of securing employment at various wages. A natural way of taking account of both wages and employment is to frame the problem in terms of the wage elasticity of demand for labor in the covered sector.

If the labor demand elasticity is high, the wage floor would substantially diminish employment. The sharp fall in employment would be expected to provoke a large outflow of labor. The net direction of labor flow in this case would be from the covered sector to the noncovered sector. On the other hand, if the elasticity of demand for labor in the covered sector is low, the wage floor would diminish employment only modestly. The combined effect of a large wage increase and a small decline in a number of jobs would be to stimulate an inflow of job searchers into the covered sector. The net direction of labor flow in this case would be expected to be from the noncovered sector into the covered sector—the opposite direction from the net flow in the highly elastic case.

The preceding discussion leads to a dual conclusion: that a sector-specific wage floor would be expected to shrink the size of the covered sector labor force if the demand for labor in the covered sector is elastic and to expand the size of the covered sector labor force if the demand for labor in the covered sector is inelastic. Thus, the wage elasticity of
demand for labor in the covered sector plays a pivotal role in determining the ultimate allocation of the labor force, and consequently the amounts of employment and unemployment, resulting from the wage floor.

The conclusion that labor on net moves into or out of the covered sector as the demand for labor in that sector is inelastic or elastic may be shown both algebraically and diagrammatically. Algebraically, the sector-specific wage floor in the covered sector raises the wage by

$$\gamma = \frac{\tilde{w}_C - w_0}{w_0}$$

percent. A wage increase of $\gamma$ percent changes employment by $\eta \gamma$ percent, where $\eta$ is the wage elasticity of demand for labor in the covered sector evaluated between $w_0$ and $\tilde{w}_C$. (Note: $\eta$ is an arc elasticity.) It is hardly controversial to assume that $\eta$, the wage elasticity of demand for labor, is negative. It turns out to matter a great deal, though, how negative $\eta$ is.

Suppose the demand for labor in the covered sector is elastic, i.e., $\eta < -1$. The claim is that labor will move from the covered sector to the noncovered sector as the result of a wage floor. This result may be shown algebraically as follows. The initial equilibrium condition is

$$w_C^0 \cdot \frac{E_C^0}{L_C^0} = w_N^0,$$

where $w_C^0 = w_N^0 = w_0$ and $E_C^0 = L_C^0$.

The new equilibrium is

$$\tilde{w}_C \cdot \frac{\tilde{E}_C}{\tilde{L}_C} = \tilde{w}_N \iff \tilde{w}_C \cdot \tilde{E}_C = \tilde{w}_N \tilde{L}_C.$$ 

(2"

By definition, $\tilde{w}_C = w_0(1 + \gamma)$ and $\tilde{E}_C = E_C^0 (1 + \eta \gamma)$; as above, $\gamma > 0$ and
\( \eta < 0 \). Substituting these into the left hand side of the equilibrium condition (5), we have

\[
\tilde{w}_C \tilde{E}_C = W_0 (1 + \gamma) E_C^0 (1 + \eta \gamma)
\]

\[
= W_0 E_C^0 (1 + \gamma + \eta \gamma + \eta^2).
\]

Now, since \( \eta < -1 \) and \( \gamma > 0 \), then \( \gamma + \eta \gamma < 0 \) and \( \eta^2 < 0 \). Thus

\[
(1 + \gamma + \eta \gamma + \eta^2) < 1,
\]

from which it follows that \( \tilde{w}_C \tilde{E}_C < W_0 E_C^0 \), i.e., \( W_C E_C \) falls when labor demand is elastic. If the left hand side of (2") falls, so too must the right hand side. This happens if and only if labor moves out of the covered sector.\(^1\) We may thus conclude that an elastic demand for labor in the covered sector implies that a wage floor will on balance move labor out of the covered sector.

The case of an elastic demand for labor is the case depicted in Figure 5 above. Observe that the curve \( CC \) is flatter than the curve \( RR \) at point \( X \). This means that the demand for labor in the covered sector is more elastic than the rectangular hyperbola. Now, since rectangular hyperbolas have unitary elasticity, it follows that the demand for labor in the covered sector must be elastic between \( A \) and \( X \). In the elastic case, the rectangular hyperbola \( RR \) cuts the noncovered sector wage-employment locus

---

\(^1\) a) Proof of if part: If labor moves out of the covered sector, \( L_C \) falls and \( L_N \) rises. When \( L_N \) rises, \( W_N \) falls. Therefore, \( \tilde{w}_N L_C \) falls when labor moves out of the covered sector.

b) Proof of only if part: If labor moves into the covered sector, \( L_C \) rises and \( L_N \) falls. The fall in \( L_N \) causes \( W_N \) to rise, so \( \tilde{w}_N L_C \) rises. This contradicts the original condition, establishing the only if part.
NN to the right of the initial intersection, i.e., ᾱ lies to the right of X. Thus, the new equilibrium occurs with more labor in the noncovered sector and less in the covered sector, as was to be shown.

The case of inelastic demand for labor in the covered sector proceeds in parallel fashion. The key result is that the wage floor will induce labor to move on balance from the noncovered sector into the covered sector. This is illustrated diagrammatically in Figure 6, in which the inelastic demand for labor in the covered sector CC appears as a very steep curve and the rectangular hyperbola RR cuts the noncovered sector wage-employment locus NN to the left of the initial intersection.

Tying together the results of this section, we have seen that the imposition of a sector-specific wage floor will result in unemployment. However, the direction of labor force movement depends on the elasticity of demand for labor in the covered sector as follows:

**Proposition 2:**

A sector-specific wage floor induces movement of labor out of the covered sector if the demand for labor in the covered sector is elastic and into the covered sector if the labor demand is inelastic.

An important implication of Proposition 2 is that analyses that assume that labor flows in one direction or the other will be in error. Consequently, we will work with the elastic and inelastic cases separately in the sequel. As it turns out, some key results are exactly reversed for the two cases, so the distinction is an important one indeed.
Figure 6.

Effect of a Sector-Specific Wage Floor on Labor Force Allocation, Inelastic Demand for Labor in the Covered Sector
E. Special Cases of the Two-Sector Model

Section V develops the comparative statics of the two-sector model. Some results are derivable in general and some are not. For those that are not, the comparative statics are ambiguous. These ambiguities are best demonstrated using two models which are special cases of the general model we have worked with up to now.

Model I makes a special simplifying assumption: that the wage in the noncovered sector, while continuing to be market-clearing, is invariant with respect to the size of that sector's labor force. This could arise in the following circumstance. Imagine a dualistic economy with a modern manufacturing sector and a traditional agricultural sector. The wage floor applies to the modern manufacturing sector only, as in the Lewis-Fei-Ranis and Harris-Todaro types of models. The assumption of a constant wage in the noncovered sector might be realistic if a) land is abundant, so that anyone who wants can find a plot of land, till it, and earn the same amount as is earned by others already in the traditional sector, and/or b) the covered sector is small in relation to the noncovered sector, so that in the relevant range, such inflows or outflows of labor as occur leave the wage in that sector effectively unchanged. In Model I, the wage in the noncovered sector is constant and given by:

\[ W_N(L_N) = W^0_N = W_0. \quad (6) \]

This simplifying assumption has been made by Fields (1975), Anand and Joshi (1979), and Stiglitz (1982), among others.

Model II makes a different simplifying assumption: that total product in the noncovered sector does not change with the size of that sector's labor force—a classic labor surplus situation. As in the surplus labor
literature, suppose that labor in the noncovered sector is paid its average product. Denote the total fixed output in the noncovered sector by $Q_N$. Then, setting the wage equal to the average product, in Model II:

$$w_N = \frac{Q_N}{L_N}.$$  \hspace{1cm} (6')

These two cases effectively bound the economically meaningful possibilities. The reasoning is as follows. It is hard to imagine that the wage in the noncovered sector might rise if labor moves into that sector or fall if labor moves out. For this to happen, the production function would have to exhibit increasing returns—hardly a likely circumstance for the low-income sector of an economy. Constant returns is thus one boundary value. On the other hand, it is equally hard to imagine that total product in the noncovered sector would vary inversely with the size of that sector's labor force. This would require a production function with negative returns—also an unlikely circumstance. Zero returns is thus the other boundary value. Thus, the normal situation—production under positive but diminishing returns—is bounded by a constant positive marginal product (Model I) and zero marginal product (Model II).
V. UNEMPLOYMENT IN THE TWO-SECTOR MODEL: COMPARATIVE STATIC RESULTS

This section develops the relationship between the equilibrium amount of unemployment in the two-sector model and three parameters of interest:

A. Elasticity of demand for labor in the covered sector
B. Elasticity of the wage in the noncovered sector with respect to the noncovered sector labor force
C. Size of the wage floor

It turns out that for none of these parameters is the comparative static effect unidirectional.

A. Elasticity of Demand for Labor in the Covered Sector

When a wage floor of given size is imposed, will there be more unemployment in an economy when the demand for labor in the covered sector is highly elastic or when it is less elastic? Two lines of reasoning might be invoked.

Those familiar with the standard textbook labor market model of a wage floor might draw two demand curves for labor in the covered sector, shown as $D'D'$ and $D"D"$ in Figure 7; they start out at the same place at the market-clearing wage $W_0$, but curve $D"D"$ is more elastic than curve $D'D'$. The more elastic the demand for labor in the covered sector, the less employment there, the greater the gap between the quantities of labor supplied (as given by $SS$) and demanded, and thus the more unemployment there will be in this model.

Those familiar with two-sector models might think of it differently.

Start with the equilibrium condition

$$W_C \frac{E_C}{L_C} = W_N$$

(2)
Figure 7.
Possible Effect of a More Elastic Demand for Labor in the Covered Sector, for a Stationary Labor Supply Curve
Two-sector reasoning might lead one to think that the more elastic is the demand for labor, the less employment there will be in the covered sector after the imposition of a wage floor. If $E_C$, the numerator of the left hand side, falls, the denominator $L_C$ must also fall so as to keep the same ratio $W_N/W_C$. If the ratio of employment to labor force remains the same in the covered sector, but if covered sector employment and hence covered sector labor force are smaller when the demand for labor is more elastic, the difference between them will also be smaller. And since this difference between labor force and employment in the covered sector is the amount of unemployment in the economy, this line of reasoning might lead one to conclude that unemployment will be smaller the more elastic is demand for labor in the covered sector.

Alas, something is amiss. These two lines of reasoning have led to contradictory conclusions. The first line of reasoning leads one to believe that the more elastic demand for labor would result in more unemployment while the second concludes that a more elastic demand for labor would result in less unemployment. Which is right? The answer is that both are partially right and partially wrong.

The first analysis is right in assuming that a more elastic demand curve implies less employment. But the analysis reaches an unambiguous conclusion only by assuming that the supply of labor curve remains stationary if fewer jobs are available. However, the supply curve would not be expected to stay put. This is because the number of workers willing to
supply their services to the covered sector at any given wage decreases the fewer jobs there are, i.e., the supply curve shifts leftward. The smaller the number of jobs, the larger the shift. This is illustrated in Figure 8. In the diagram, supply curve $S'$ corresponds to demand curve $D'$ and $S''$ to $D''$. If the supply curve of labor shifts leftward by more than the leftward rotation of the demand curve, unemployment decreases; otherwise, it increases. By ignoring the shift of the supply curve, the diagrammatic analysis of Figure 7 is in error.

The second analysis (i.e., the two-sector model including equation $(2''')$) is right in concluding that a more elastic demand for labor will result in less unemployment if the ratio of wages in the two sectors remains constant. In general, though, the ratio will not remain constant, because labor will move from one sector to another, causing the wage in the noncovered sector to change accordingly. A more comprehensive analysis is needed.

One way of performing the more comprehensive analysis is to use the diagrammatic representation of the labor force allocation. The necessary diagrams appear as Figures 9 and 10, for the cases of elastic and inelastic labor demand respectively. In both diagrams, the more elastic labor demand curve is represented as a flatter curve rotated through the initial allocation $A$. The initial allocation of the labor force is denoted without superscripts, the allocation for the less elastic labor demand curve by prime superscripts, and the more elastic labor demand curve by double-prime superscripts.

In both cases, the more elastic labor demand curve generates less employment for any given wage floor $\bar{W}_C$, i.e., $E''_C < E'_C < E_C$. In the case of an elastic demand for labor in the modern sector (Figure 9), $L_N$ increases
Possible Effect of a More Elastic Demand for Labor in the Covered Sector, for a Shifting Labor Supply Curve.
Figure 9.
Effect of More Elastic Demand for Labor in the Covered Sector When the Demand for Labor is Elastic

Figure 10.
Effect of More Elastic Demand for Labor in the Covered Sector When the Demand for Labor is Inelastic
and \( L_C \) decreases. The decrease in \( L_C \) is larger the more elastic is the demand for labor in the modern sector, i.e., \( L'' < L' < L_C \). Since \( L'' < L'_C \) and \( E'' < E'_C \), the respective unemployment figures \( U'' = L'' - E'' \) and \( U' = L'_C - E'_C \) cannot be compared on this basis alone. For the case of an inelastic demand for labor in the modern sector (Figure 10), a similar indeterminancy appears in the diagrams. In this case, \( L_N \) decreases and \( L_C ( = E + U) \) increases. The increase in \( L_C \) is smaller the more elastic is the demand for labor in the modern sector, i.e., \( L'_C > L'' > L_C \). Once again, since \( E'' < E'_C \) and \( L'' < L'_C \), the unemployment figures \( U'' = L'' - E'' \) and \( U' = L'_C - E'_C \) cannot be compared on this basis alone. Thus, the diagrammatic method has proven incapable of determining whether, in response to a wage floor of a given size, a greater elasticity of demand for labor in the covered sector results in more unemployment or less unemployment in equilibrium.

In actuality, the diagrammatic method is inconclusive for good reason: both outcomes are possible. I shall now demonstrate this.

A more elastic demand for labor in the covered sector results in less unemployment in the following circumstance. Take the special case referred to as Model I above, in which \( W_N \) is constant regardless of the size of the noncovered sector labor force. Then, \( W_N/W_C \) is the same as \( W'_N/W'_C \). Write unemployment in Model I explicitly as

\[
U = \left( \frac{\tilde{W}_C}{W_0} - 1 \right) E^I_C = \gamma E^O_C (1 + \eta). 
\]

For a given \( E^O_C \) (initial employment in the covered sector) and \( \gamma \) (wage
increment due to the wage floor), the more elastic is the demand for labor in the covered sector, the more negative is \( \eta \) in this model, and so the less unemployment there will be. This example suffices to prove the possibility that a more elastic demand for labor might be associated with less unemployment.

The opposite possibility—that a more elastic demand for labor might result in more unemployment—may also be demonstrated by means of an example. Take the special case represented by Model II, in which labor in the noncovered sector is paid its average product and total output in that sector is fixed, i.e., \( W_N = \frac{Q_N}{L_N} \). As before, denote the results for the less elastic demand curve by prime superscripts and the results for the more elastic demand by double-primes. For the less elastic demand, the equilibrium condition is

\[
\frac{\bar{W}_C}{L_C} = \frac{\bar{Q}_N}{L_N} = \frac{L'_C}{L_N} = K', \quad \text{where} \quad K' = \frac{\bar{W}_C E'_C}{\bar{Q}_N}. \tag{7}
\]

Manipulation of (7) yields an equilibrium volume of unemployment

\[
U' = L'_C - E'_C = \frac{K'}{1+K'} \bar{L} - E'_C. \tag{1}
\]

By analogy,

\[
\frac{L'_C}{L_N} = K' \implies \frac{L'_C}{L-L'_C} = K' \implies \frac{L}{L'_C} - 1 = \frac{1}{K'} \implies \frac{L}{L'_C} = \frac{1}{K'}, \quad \frac{L}{L} = \frac{K'}{1+K'}, \quad L'_C = \frac{K'}{1+K'}, \quad \bar{L}.
\]

\[
U' = L'_C - E'_C = \frac{K'}{1+K'} \bar{L} - E'_C. \quad \text{Q.E.D.}
\]
The difference between the two unemployment amounts is given by

\[ U' - U'' = \left( \frac{K'}{1+K'} \right) \bar{L} - E'_C - \left( \frac{K''}{1+K''} \right) \bar{L} + E''_C \]

\[ = \frac{(K' - K'') \bar{L}}{(1+K') (1+K'')} - (E'_C - E''_C) \]

\[ = \left\{ \frac{\bar{W}'_C}{Q_N} \bar{L} \right\} \left\{ \frac{\bar{W}'_C E'_C}{Q_N} + \frac{\bar{W}'_C E''_C}{Q_N} + \frac{\bar{W}'_C E''_C}{Q_N} \right\} (E'_C - E''_C) - (E'_C - E''_C) . \] (8)

The term \((E'_C - E''_C)\) is positive, because the prime term corresponds to the less elastic labor demand curve, for which employment is greater. Suppose that for certain parameter values, the term in curly braces is less than one. Then the first term on the right hand side of (8) will be less positive than the second term is negative and therefore the whole expression will be negative. \(U' - U'' < 0\) implies \(U'' > U'\), i.e., unemployment is greater for the more elastic labor demand curve.

The requisite parameter values can be found by establishing conditions under which the denominator of the term in curly brackets exceeds the numerator. A sufficient condition for this to hold is

\[ \frac{\bar{W}'_C E'_C}{Q_N} + \frac{\bar{W}'_C E''_C}{Q_N} > \frac{\bar{W}'_C \bar{L}}{Q_N} . \] (9)

(This is sufficient because the other terms in the denominator are also positive.) Condition (9) is simply that \(E'_C + E''_C > \bar{L}\).
Is this permissible? An example will show that it is. Assume the following initial conditions:

\[ \bar{L} = 1000 \]
\[ E_C^0 = L_C^0 = 0.7 \bar{L} = 700 \]
\[ L_N^0 = \bar{L} - L_C^0 = 300 \]
\[ Q_N = 300 \]
\[ W_O = 1. \]

The wage in each sector is 1 and employment is full, so this is an equilibrium labor force allocation by (2). Suppose now that a wage floor is imposed in the covered sector 10% above the original equilibrium, i.e., \( \tilde{W}_C = 1.1 \). Under the less elastic labor demand curve, covered sector employment is assumed to fall from 700 to 600, and under the more elastic situation, from 700 to 500. The labor force allocation under the less elastic situation is given by

\[
L'_C = \frac{K'_C}{1 + K'_C} \bar{L} = \frac{\tilde{W}_C E'_C / \bar{Q}_N}{1 + \tilde{W}_C E'_C / \bar{Q}_N} \bar{L} = \frac{660/300}{1 + 660/300} 1,000 = \frac{2.2}{3.2} 1,000 = 687.5,
\]

\[
L'_N = \bar{L} - L'_C = 1,000 - 687.5 = 312.5,
\]
and \( U' = L'_C - E'_C = 687.5 - 600 = 87.5; \)

under the more elastic situation, the equilibrium allocation is

\[
L''_C = \frac{K''_C}{1 + K''_C} \bar{L} = \frac{\tilde{W}_C E''_C / \bar{Q}_N}{1 + \tilde{W}_C E''_C / \bar{Q}_N} \bar{L} = \frac{550/300}{1 + 550/300} 1,000 = \frac{550}{850} 1,000 = 647,
\]

\[
L''_N = \bar{L} - L''_C = 1,000 - 647 = 353,
\]
and \( U''_C = L''_C - E''_C = 647 - 500 = 147 \).

Summarizing the respective outcomes:

<table>
<thead>
<tr>
<th></th>
<th>Originally</th>
<th>Less Elastic</th>
<th>More Elastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment in Covered Sector ((E_C))</td>
<td>700</td>
<td>600</td>
<td>500</td>
</tr>
<tr>
<td>Labor Force in Covered Sector ((L_C))</td>
<td>700</td>
<td>687.5</td>
<td>647</td>
</tr>
<tr>
<td>Labor Force in Noncovered Sector ((L_N))</td>
<td>300</td>
<td>312.5</td>
<td>353</td>
</tr>
<tr>
<td>Unemployment ((U))</td>
<td>0</td>
<td>87.5</td>
<td>147</td>
</tr>
</tbody>
</table>

To check that these are indeed characterized by expected value equalization in the two sectors, note that

\[
\tilde{w}_C \frac{E'_C}{L'_C} = 1.1 \frac{600}{687.5} = .96 = \frac{300}{312.5} = \frac{O_N'}{L'_N}
\]

and \( \tilde{w}_C \frac{E''_C}{L''_C} = 1.1 \frac{500}{647} = .850 = \frac{300}{353} = \frac{O_N''}{L''_N} \).

Observe that the more elastic demand for labor in the covered sector is associated with more unemployment, as was to be shown.

In sum, we set out in this section to investigate whether, when a wage floor of a given amount is imposed, a greater elasticity of demand for labor in the covered sector results in more unemployment or less. The answer that has been reached is that both outcomes are possible. This may be summarized as:
**Proposition 3:** For any given wage floor and for any given elasticity of wage in the noncovered sector with respect to the size of that sector's labor force:

(a) A greater elasticity of demand for labor in the covered sector may result in less unemployment.
(b) A greater elasticity of demand for labor in the covered sector may result in more unemployment.

**B. Elasticity of the Wage in the Noncovered Sector With Respect to the Noncovered Sector Labor Force**

Suppose a wage floor of a given amount is imposed on the covered sector of an economy and suppose a given demand response in the covered sector. Another comparative static question of interest concerns the responsiveness of the wage in the noncovered sector to changes in the size of that sector's labor force. That wage may change with that sector's labor force in either of two circumstances: a) when employers in that sector have downward-sloping labor demand curves, or b) when the sector consists of self-employed workers whose marginal products are smaller than their average products. The question to be asked is: when will the unemployment resulting from the wage floor be higher—when the wage in the noncovered sector is relatively elastic or relatively inelastic with respect to the size of the noncovered sector labor force? The answer, it turns out, is that it depends; either more unemployment or less is possible.

What the comparative static result depends on is whether the demand for labor in the covered sector is elastic or inelastic. The rationale for this conclusion goes as follows.
Suppose the demand for labor in the covered sector is sufficiently inelastic that in response to the wage floor, workers are moving out of the noncovered sector in pursuit of high-paying jobs in the covered sector. Out-movement will be greatest when the wage in the noncovered sector is invariant with respect to the number of workers in that sector. But if, as labor starts to move out of the noncovered sector, the wage increases there, then the gain from moving decreases and fewer people will do so. Unemployment rises by less as a result. Thus, when the net flow of labor is into the covered sector, the size of that flow and the consequent amount of unemployment in equilibrium would be smaller the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force.

Alternatively, if the demand for labor in the covered sector is elastic, workers will move out of the covered sector into the noncovered sector. The most movement, and hence the least unemployment, will occur when the wage in the noncovered sector is invariant with respect to the number of workers in that sector. But if the wage starts to fall as workers move in, the gain from moving decreases and fewer people will move. Unemployment is greater as a result.

Overall, then, the unemployment response is expected to be flatter the more responsive is the wage in the noncovered sector with respect to that sector's labor force. This claim will now be demonstrated both diagrammatically and algebraically.

Figures 11 and 12 depict the cases of inelastic and elastic demands for labor in the covered sector respectively. In both diagrams, the demand for labor in the covered sector is represented by the CC curve and the
Figure 11.
Effects of Greater Elasticity of the Wage in the Noncovered Sector With Respect to That Sector's Labor Force When the Demand for Labor in the Covered Sector is Inelastic.

Figure 12.
Effects of Greater Elasticity of the Wage in the Noncovered Sector With Respect to That Sector's Labor Force When the Demand for Labor in the Covered Sector is Elastic.
initial market-clearing equilibrium by $A$. The case of a wage in the noncovered sector that is invariant with respect to the size of that sector's labor force is represented by the less elastic wage-employment locus $N'N'$ through $A$. A more elastic wage-employment locus in the noncovered sector appears as $N''N''$, also passing through $A$.

Take first the case of an inelastic demand for labor in the covered sector (Figure 11). When a wage floor is imposed at level $\tilde{W}_C$, employment is reduced from $L_C$ to $\tilde{E}_C$. In this case, the rectangular hyperbola $RR$ through the relevant point $X$ on the demand curve cuts the demand for labor curve $CC$ from the northeast, and thus intersects the wage-employment locus to the left of the original intersection. Thus, as established earlier in Proposition 2, when the demand for labor in the covered sector is inelastic, this wage floor induces movement of labor into the covered sector. For the two wage-employment loci $N'N'$ and $N''N''$, the respective equilibrium allocations are $A'$ and $A''$. Both entail unemployment. Of interest for the comparative static analysis is the fact that the equilibrium for the less elastic noncovered sector wage-employment locus $N'N'$ entails more unemployment in this case. This is because more labor will move into the covered sector, and hence unemployment will be greater, if the wage in the noncovered sector is constant as people move out of it than if the wage in the noncovered sector increases as people move out.

The case of an elastic demand for labor in the covered sector may be analyzed similarly; see Figure 12. Once gain, the imposition of a wage floor at level $\tilde{W}_C$ reduces employment from $L_C$ to $\tilde{E}_C$. Now, however,
because the demand for labor in the covered sector $CC$ is elastic, the rectangular hyperbola through the relevant point $X$ on the demand curve cuts the noncovered sector wage-employment locus to the right of the original intersection, i.e., labor moves out of the covered sector into the noncovered sector. For the less elastic wage-employment locus in the noncovered sector, the new equilibrium is at $A'$; for the more elastic, at $A''$. This shows that more labor will move out, and hence unemployment will be smaller, if the wage in the noncovered sector stays unchanged as people move in than if the wage in the noncovered sector decreases as people move in. Thus, the less elastic noncovered sector wage-employment locus entails less unemployment.

The dependence of the comparative static result on the elasticity of demand for labor in the covered sector may be demonstrated algebraically by comparing the two special cases referred to as Models I and II above. Model I has constant per capita wage in the noncovered sector and Model II constant total wage bill in the noncovered sector. Unemployment amounts in the two cases are given by

\[ U^I = \left( \frac{\tilde{W}_C}{\tilde{W}_0} - 1 \right) \tilde{E}_C \]  \hspace{1cm} (10)

in Model I and

\[ U^{II} = L_C^{II} - \tilde{E}_C = \left( \frac{L_C^{II}}{E_C} - 1 \right) \tilde{E}_C = \left( \frac{\tilde{W}_C}{W_N^{II}} - 1 \right) \tilde{E}_C = \left( \frac{\tilde{W}_C}{Q_N/L_N^{II}} - 1 \right) \tilde{E}_C \]  \hspace{1cm} (11)

in Model II. Form (10) and (11), it is seen that $U^I > U^{II}$ as $\tilde{W}_0 < \tilde{W}_N^{II}$.
i.e., if in Model II, the wage in the noncovered sector is greater/same/lower than initially. And since, in Model II, the noncovered sector wage is greater/same/lower than initially as the noncovered sector labor force is smaller/same/greater than initially, and since the noncovered sector labor force is smaller/same/greater than initially as the demand for labor in the covered sector is inelastic/unitary elastic/elastic, it follows that $U^I \gtrless U^{II}$ as the demand for labor in the covered sector is inelastic/unitary elastic/elastic.

In sum, the preceding analysis has shown that the more responsive is the noncovered sector wage with respect to the size of that sector's labor force, the more moderate is the response of unemployment to the wage floor. This may be summed up as:

**Proposition 4.** For any given wage floor and for any given elasticity of demand for labor in the covered sector: (a) If the demand for labor in the covered sector is elastic, then the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force, the higher is unemployment; (b) If the demand for labor in the covered sector is inelastic, then the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force, the lower is unemployment.

Thus, the responsiveness of the wage in the noncovered sector to the size of that sector's labor force acts as a leveling influence, reducing the amount of unemployment when that sector's labor force is increasing and increasing unemployment when that sector's labor force is decreasing. To the best of my knowledge, the interactive nature of this comparative static result has not appeared previously in the literature.
C. Size of the Wage Floor

What is the effect of a higher wage floor on the volume of unemployment in equilibrium? The standard supply-demand diagram, shown in Figure 13, yields an unambiguous answer: more unemployment.

By now, it should not be too surprising to be told that the textbook answer is not necessarily correct. It would be correct if, when the wage floor rises, the quantity of labor demanded falls and the quantity of labor supplied to the covered sector rises. The quantity of labor supplied to the covered sector rises if the demand for labor in the covered sector is inelastic; cf. Proposition 2. The diagrammatic analysis contained in Figure 14 shows that a higher wage floor in the covered sector ($W^H$) results in more unemployment than does a lower wage floor ($W^L$) when the demand for labor in the covered sector is inelastic.

Suppose, however, that the demand for labor in the covered sector is elastic. Then, when the wage floor is higher, both the quantity of labor demanded and the quantity of labor supplied are reduced. The diagrammatic analysis of Figure 15 is inconclusive—it appears that unemployment might either increase or decrease. Indeed both outcomes are possible.

To illustrate the ambiguity of the outcome, consider the special case in which the wage in the noncovered sector is invariant with respect to the size of that sector's labor force (Model I). The equilibria for the two wage floors are given by
Figure 13.

Textbook Analysis of Effect of Higher Wage Floor.
Figure 14.
A higher wage floor increases unemployment when the demand for labor in the covered sector is inelastic.

Figure 15.
A higher wage floor may increase or decrease unemployment when the demand for labor in the covered sector is elastic.
Here, \( w'_c \) and \( w''_c \) are the two wage floors \( w'_c < w''_c \), \( e'_c \) and \( e''_c \) the corresponding covered sector employment levels, and \( l'_c \) and \( l''_c \) the corresponding covered sector labor forces.

Unemployment in the two cases is

\[
\begin{align*}
\hat{u}' &= \frac{w'_c e'_c}{w_n} - \frac{e'_c}{w_n} \\
\hat{u}'' &= \frac{w''_c e''_c}{w_n} - \frac{e''_c}{w_n}
\end{align*}
\]

The difference between them is

\[
\hat{u}'' - \hat{u} = \left( \frac{w''_c}{w_n} - 1 \right) e''_c - \left( \frac{w'_c}{w_n} - 1 \right) e'_c.
\]

This difference is negative, and hence a higher wage floor results in less unemployment if

\[
\frac{e''_c}{e'_c} < \frac{\frac{w'_c}{w_n} - 1}{\frac{w''_c}{w_n} - 1}.
\]  

(12)

An example suffices to illustrate the possibility of condition (12).

Suppose \( \frac{w'_c}{w_n} = 2 \) and \( \frac{w''_c}{w_n} = 3 \). Then the right hand side of (12) equals

\[
\frac{2 - 1}{3 - 1} = \frac{1}{2}.
\]
The condition for unemployment to fall when the wage floor rises is that
the left hand side of (12) be less than \( \frac{1}{2} \). Suppose therefore that
\[ E'_C = .8E^0_C \quad \text{and} \quad E''_C = .3E^0_C, \]
where \( E^0_C \) is employment in the covered sector prior
to imposition of the wage floor. Thus, \( \frac{E''_C}{E'_C} = \frac{3}{8} \), which is less than \( \frac{1}{2} \)
and therefore satisfies the condition. We thus expect to find lower
unemployment for the higher wage floor. Indeed we do:

\[ U' = (2-1) \cdot .8E^0_C = .8E^0_C \quad \text{for} \quad W'_C = 2\bar{W}_N \]

and \( U'' = (3-1) \cdot .3E^0_C = .6E^0_C \quad \text{for} \quad W''_C = 3\bar{W}_N \).

The higher wage floor (3 as opposed to 2) is associated here with less
unemployment (\( .6E^0_C \) versus \( .8E^0_C \)).

Summing up, we have:

**Proposition 5.** (a) A higher wage floor may result in
more unemployment in equilibrium. (b) A higher wage
floor may result in less unemployment in equilibrium.

**D. Summary of Comparative Static Results**

A two-sector labor market model has been constructed. One sector is
covered by a wage floor and one is not. In this model, the wage floor
creates unemployment. The amount of unemployment has been shown in this
section to depend upon three parameters of interest in the following ways:
For any given wage floor and for any given elasticity of wage in the noncovered sector with respect to the size of that sector's labor force:
(a) A greater elasticity of demand for labor in the covered sector may result in less unemployment.
(b) A greater elasticity of demand for labor in the covered sector may result in more unemployment.

For any given wage floor and for any given elasticity of demand for labor in the covered sector: (a) If the demand for labor in the covered sector is elastic, then the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force, the higher is unemployment; (b) If the demand for labor in the covered sector is inelastic, then the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force, the lower is unemployment.

(a) A higher wage floor may result in more unemployment in equilibrium. (b) A higher wage floor may result in less unemployment in equilibrium.

A remark is in order on the relation between the results derived here and those in the previous literature. The text of the seminal contribution of Harris and Todaro (1970) and their accompanying Figure 1 stated their expectation that a higher wage floor would result in movement of
labor into the covered sector (the modern manufacturing sector) from the noncovered sector (rural agriculture), and that consequently the higher the wage floor, the more unemployment there would be in equilibrium. The typical reader might naturally have been inclined to have regarded this conclusion as derived unambiguously from theoretical reasoning. But a more careful reading reveals that the unequivocal conclusion was based on empirical evidence---in particular, the findings of Katz (1968), Eriksson (1969), and Harris and Todaro (1969) that labor demand in developing countries is inelastic. However, Harris and Todaro's footnotes 10 and 11 recognized the alternative theoretical possibilities. They noted that the direction of movement of the labor force depends on the elasticity of demand for labor in the covered sector and also on price changes. They also noted that if the demand for labor in the covered sector is sufficiently elastic, a higher wage floor might actually lower unemployment; in this case, they correctly observed: "Unemployment will result from the imposition of a minimum wage but we can no longer assert that the level of unemployment will increase concomitantly with the level of the minimum wage." The possibility that unemployment might decrease is demonstrated in Proposition 5 above.

Mincer (1976) observed that a wage floor would create unemployment. Among his comparative static results was the claim that a wage floor will have a small effect on unemployment the smaller is the elasticity of demand
for labor in the covered sector.¹ This claim is not necessarily correct. Indeed, Proposition 3 demonstrates that the reverse relationship is also possible.

Corden and Findlay's (1975) treatment of the two-sector model with unemployment did not perform comparative statics on the unemployment rate.

¹ Mincer reaffirmed this claim in private correspondence with me.
VI. **OTHER DEVELOPMENT EFFECTS OF WAGE FLOORS**

Until now, we have focused on the employment and unemployment effects of wage floors. Also of interest, though, is the matter of income distribution effects. We shall examine the effect of the wage floor on three aspects of income distribution: total wages paid to labor, size distribution of labor income, and extent of absolute poverty.\(^1\) We shall also address wage floors and economic efficiency.

A. **Effects of Wage Floors on Total Wage Bill**

Analysts concerned with income distribution frequently are interested in the effects of a policy on labor's total income. Often, this is compared with the effects of the policy on the incomes of capitalists, landowners, and other groups. This result is the functional distribution of income and its change over time.

The models developed above yield information on incomes received from labor but not from other sources. Consequently, we are limited here to a consideration of total wages alone which, in the terminology of labor economics, shall be called the "wage bill."

It may be shown that a wage floor can move the wage bill in any direction. The total wage bill (WB) is the wage in each sector multiplied by the corresponding level of employment:

\[
WB = W_{CEC} + W_{NLN}. \quad (13)
\]

The equilibrium labor force allocation is given by the familiar relationship

---

\(^1\) Technical note: The measures that follow are defined on the space of actual incomes, not expected incomes. This is the customary thing to do. It is also not inconsequential.
Combining (13) and (2), we derive

\[ \frac{W_C}{L_C} = W_N \]  

(2)

from which it is seen that the following effects of a sector-specific wage floor are possible:

**Proposition 6:**

(a) The total wage bill will rise if the wage floor moves people out of the noncovered sector and those who remain receive a higher wage. This happens if i) the demand for labor in the covered sector is inelastic and ii) the elasticity of the wage in the noncovered sector with respect to the noncovered sector labor force is nonzero.

(b) The total wage bill will fall if the wage floor moves people into the noncovered sector and the wage falls there. This happens if i) the demand for labor in the covered sector is elastic and ii) the elasticity of the wage in the non-covered sector with respect to the noncovered sector labor force is nonzero.

(c) The total wage bill will be unchanged if the wage in the noncovered sector does not change when a wage floor is imposed in the covered sector. This happens if the elasticity of the wage in the noncovered sector with respect to the noncovered sector labor force is zero.

Thus, if the wage bill paid to labor is taken as a measure of income distribution, the effects of a wage floor on that measure cannot be determined a priori. It depends on a particular economy's circumstances.

One cautionary remark should be made. Functional income distribution measures such as this ignore the distribution of incomes within a functional category. If the total wage bill increases, that does not mean that
all workers benefit. Those who are unemployed as a result of a wage floor or who are crowded into low-paying jobs in the noncovered sector are worse off even if total labor income is increasing.

For this reason, I prefer to use income distribution measures that reflect the distribution of incomes among persons in the labor force rather than looking just at aggregate labor income. Two classes of measures are available for this purpose: measures of relative income inequality and measures of absolute poverty.

B. Effects of Wage Floors on Relative Income Inequality

Relative inequality is customarily measured by Lorenz curves like those shown in Figure 16 and Lorenz-curve-based indices. Imposition of a wage floor has a clear effect on the inequality of labor incomes.

In the absence of a wage floor, workers in the two sectors of an economy are paid the same wage. There is thus no inequality in the distribution of labor incomes. This fact is represented by a Lorenz curve coincident with the 45° line.

When a wage floor is imposed on the covered sectors of an economy and not on others, that fact alone creates labor income inequality. But in addition, the wage floor also results in unemployment. That unemployment, with consequent zero incomes for those individuals, contributes further to income inequality. Three income amounts are thus possible: zero income if the individual is unemployed, WN if the individual is employed in a noncovered sector job, and WC if the individual is employed in a covered sector job. The corresponding Lorenz curve thus consists of three line segments.
Figure 16.

Lorenz Curves of Labor Income Inequality Before and After a Wage Floor
The Lorenz curves before and after the wage floor bear a clear relationship to one another: the Lorenz curve with a wage floor lies everywhere below the Lorenz curve without the wage floor, and thus is Lorenz-inferior to it. Lorenz-inferiority is a widely-accepted criterion by which income inequality is judged to increase. Thus, by the Lorenz criterion, a wage floor results in a more unequal (or, equivalently, a less equal) distribution of income.

When one Lorenz curve is inferior to another, virtually all of the commonly used inequality indices also signal greater inequality. The income shares of the richest and the poorest, the Gini coefficient, the log-variance, and many other familiar measures all indicate greater inequality due to the wage floor.

In sum, a clear conclusion is:

Proposition 7: A wage floor results in a less equal distribution of labor incomes.

The effects on inequality from all sources—labor and other—requires a model of determinants of non-labor incomes; this task is left for another time.

C. Effects of Wage Floors on Absolute Poverty

Absolute poverty measures look at the size distribution of income differently than do relative inequality measures. Whereas the inequality measures are concerned with income shares, poverty measures are concerned with income levels.
Poverty measurement proceeds in two steps. First, a poverty line is defined. This may be done in terms of basic human needs, consumption, or income. We have data on labor incomes, so that is what we will use. Second, a poverty index must be selected. The most widely-used poverty index is the poverty headcount, i.e., the number of people in the labor force with incomes below the poverty line amount. Another possible index, which incorporates the headcount but goes beyond it, is the index suggested by Sen (1976):

\[ \pi = H[\bar{I} + (1 - \bar{I}) G_p] \]

where \( \pi \) = the Sen poverty index,

\( H \) = headcount of poverty,

\( \bar{I} \) = average income shortfall among the poor = poverty line minus average income of the poor, and

\( G_p \) = Gini coefficient among the poor.

By this measure, poverty increases whenever more people are in poverty, the poor on average are poorer, or income inequality among the poor (as measured by the Gini coefficient) is greater. Because the Sen index takes more features of poverty than just the number poor it is preferred to the headcount by many.

How does a wage floor affect poverty? The answer depends on where the poverty line is drawn and which poverty index is used. I shall now show that the wage floor might raise poverty or lower it.
Consider three examples:

Example One:

Suppose the poverty line income is higher than the initial market-clearing wage $W_0$. Using the headcount index, everyone in the labor force is poor. Suppose now that the wage floor is imposed at a level greater than the poverty line. Those employed in the covered sector now receive a wage above the poverty line. Poverty thus falls.

Example Two:

Suppose the poverty line income is less than the original wage so that nobody is poor prior to the wage floor. After the wage floor, the unemployed have incomes below the poverty line amount. Using the headcount measures of poverty, poverty thus rises.

Example Three:

Use the Sen index of poverty. Suppose the poverty line income is greater than the wage floor in the covered sector. Everybody is poor before the wage floor and afterwards as well, so the headcount of poverty is unchanged. Assume the economy in question is characterized by an elastic demand for labor in the covered sector, so that when the wage floor is imposed, workers move on balance from the covered sector into the noncovered sector. Let the
wage in the noncovered sector fall as more workers enter that sector. Under these conditions, as shown above, the total wage bill paid to labor falls. This means that the average income shortfall of the poor rises. And, as we have also seen, income inequality among the poor increases by all Lorenz-based measures including the Gini coefficient. Thus, of the three components of the Sen index, the wage floor leaves $H$ unchanged, raises $\bar{Y}$, and raises $G_p$. The Sen index of poverty therefore rises.

These examples have demonstrated:

**Proposition 8:**

A wage floor can increase or decrease absolute poverty.

Whether poverty rises or falls when a wage floor is imposed depends upon where the poverty line income is defined and which poverty index is used.

**D. Wage Floors and Economic Efficiency: Static and Dynamic Aspects**

One more charge against wage floors is a criticism voiced mostly by public economists: that wage floors are economically inefficient. Both static and dynamic inefficiencies are cited.

The static inefficiency arguments are of two kinds. One concerns unemployment. The argument goes that the economy operates inside its production possibilities frontier whenever resources are unemployed. Since wage floors cause unemployment, potentially productive resources are unused, and this is inefficient. The other inefficiency argument regards
the wage floor as a price distortion. Price distortions create a wedge between marginal rates of substitution and marginal rates of transformation in various sectors of the economy. Employers might, for example, seek to compensate for higher labor costs by utilizing more capital-intensive production methods in sectors covered by the wage floor and, to the extent possible, to shift production to uncovered industries/localities/... Neoclassicists would reason that profits would be lower when a wage floor is imposed—the argument being that if profits could be raised by paying higher wages, profit-maximizing firms would have chosen voluntarily to do so.

In the context of a developing economy, dynamic efficiency must also be addressed. The lower profits attributable to a wage floor would presumably lower investment, which would slow the rate of economic growth. Because the demand for labor is derived from the supply and demand for product, the modern sectors would be expected to expand less rapidly due to the wage floor. Hence, the trajectory of the demand for labor in the modern sectors would be lower with a wage floor than without it. It would also be expected that smaller shifts in the demand for labor would pull wages up less rapidly, resulting in a flatter wage trajectory under a wage floor, and quite possibly a uniformly lower wage trajectory as well. Thus, a wage floor may be presumed to generate several kinds of intertemporal inefficiencies.
The dynamic effects just presented are intuitive hunches only. No formal model exists to test them. Building such a model merits priority in future work.¹

E. Summation

In sum, we have reached the following conclusions about the income distribution effects of wage floors:

* The total wage bill paid to labor may rise or fall.
* Inequality of labor incomes increases.
* Absolute poverty may rise or fall.

It is thus quite possible for the wage floor to have quite adverse distributional consequences.

We have also speculated that a wage floor is likely to result in static and dynamic inefficiencies.

---

¹ To make sure that I hadn't missed something important in the literature, I wrote to a number of leading economists to ask whether the effects of minimum wages or other wage floors had been studied in a dynamic development model. Robert Solow replied that to his knowledge no such model exists and suggested I construct one.
VII. CONCLUSIONS

A. Overview of Results

This has been a long paper containing many results. Here, I shall highlight some of the main points.

The question under investigation has been: what are the development effects of a wage floor imposed by such forces as trade unions or minimum wage legislation? In order to address this question, an analytical framework needed to be chosen. First, in recognition of the fact that wage floors typically are more important in some sectors of an economy than in others, a framework was specified with two sectors: covered and non-covered. Then, in recognition of the fact that wage floors appear to engender search unemployment, a model with this feature was set forth. The preferred model is one that was originated by Harris and Todaro (1970) and Harberger (1971), and has since been used by Corden and Findlay (1975), Fields (1975), Stiglitz (1982), and others. The articles by Mincer (1976) and Gramlich (1976) contain this model as a special case.

Using this model, eight formal propositions were derived in this paper. They are:

1. A wage floor causes unemployment.

2. A sector-specific wage floor induces movement of labor out of the covered sector if the demand for labor in the covered sector is elastic and into the covered sector if the labor demand is inelastic.
3. For any given wage floor and for any given elasticity of wage in the noncovered sector with respect to the size of that sector's labor force: (a) A greater elasticity of demand for labor in the covered sector may result in less unemployment. (b) A greater elasticity of demand for labor in the covered sector may result in more unemployment.

4. For any given wage floor and for any given elasticity of demand for labor in the covered sector: (a) If the demand for labor in the covered sector is elastic, then the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force, the higher is unemployment; (b) If the demand for labor in the covered sector is inelastic, then the more elastic is the wage in the noncovered sector with respect to the size of that sector's labor force, the lower is unemployment.

5. (a) A higher wage floor may result in more unemployment in equilibrium. (b) A higher wage floor may result in less unemployment in equilibrium.

6. (a) The total wage bill will rise if the wage floor moves people out of the noncovered sector and those who remain receive a higher wage. This happens if i) the demand for labor in the covered sector is inelastic and ii) the elasticity of the wage in the noncovered sector with respect to the noncovered sector labor force is nonzero. (b) The total wage bill will fall if the wage floor moves people into the noncovered sector and the wage falls there. This happens if i) the demand for labor in the covered sector is elastic and ii) the elasticity of the wage in the noncovered sector with respect to the noncovered sector labor force is nonzero. (c) The total wage bill will be unchanged if the wage in the noncovered sector
does not change when a wage floor is imposed in the covered sector. This happens if the elasticity of the wage in the noncovered sector with respect to the noncovered sector labor force is zero.

7. A wage floor results in a less equal distribution of labor incomes.

8. A wage floor can increase or decrease absolute poverty.

The ambiguity of some of these results may come as a surprise to some readers. In particular, those who might be inclined on the basis of past reading to think that a higher wage floor necessarily results in more unemployment or that a more elastic demand for labor in the covered sector necessarily results in lower unemployment would be mistaken.

D. Interpretation

What do these results imply for a country's wage policy? The goal of an economic system is to provide opportunities for improved standards of living for more people. The question is whether the imposition of a wage floor in key sectors of an economy helps attain that objective.

Economists are largely opposed to non-market wage-setting. Opponents of wage floors raise the following points:

1. A wage floor would be expected to reduce employment in the covered sector, as employers in that sector move up their labor demand curves.

2. Because of search for the better-paying jobs, a higher wage would induce unemployment.

3. The economy will be operating inefficiently inside its production-possibilities frontier, because some labor resources are unemployed and because the marginal rates of transformation and substitution are unequal.
4. Income inequality may well increase due to rising wages for some and falling wages and unemployment for others.

5. Poverty may increase because fewer persons are working.

6. Growth will be impeded due to lower profits and diminished capital formation.

These presumed adverse effects have led the great majority of economists to view minimum wages, union wage-setting, and other non-market forms of wage determination as inappropriate mechanisms for trying to achieve widespread improvements in standards of living.

Supporters of wage floors react as follows:

1. A good society would not permit employers to pay workers less than a living wage. It is outrageous that workers who work so hard should be paid so little. The decent thing to do is to mandate a living wage.

2. Studies have shown that the demand for labor tends to be inelastic. Therefore, when a wage floor is imposed, the total wage bill paid to labor increases. Labor is thus better off as a result.

3. The economy is full of slack. If employers are forced to pay higher wages, they will be shocked into finding new and better ways of doing things. Higher wages thus benefit not only labor; they force management to be more efficient. The whole economy is better off.
4. The conclusion that a wage floor lowers employment assumes a perfectly competitive labor market. But in reality, labor markets are far from perfect. Monopsony is pervasive. Under monopsony, a wage floor, if properly chosen, can result in greater employment at the higher wage.

5. The argument that a wage floor reduces profits and impedes economic growth weights the future too much and the present generation too little.

How are these various points offered by the two sides to be evaluated? I view the arguments invoked by the opponents of wage floors as logical analytically and well-founded empirically. Logically, the models have become part of standard textbook labor economics and have withstood the test of time. Empirically, the evidence is strong. Downward-sloping labor demand curves are hardly exceptional. Workers' responsiveness to economic incentives in alternative sectors or locations is well-established empirically. So too is the existence of a labor aristocracy—workers who, by virtue of being employed in a favored part of the economy, receive wages two or three times those of their fellows employed elsewhere. And the development records of those economies in which market wage determination is the norm on the whole far surpass the records of economies which impose or permit wage floors. These theoretical arguments and empirical evidence create a strong presumption against institutionally imposed wage floors.

As for the points put forth by wage floor proponents, I evaluate them as follows.
1. I agree that it is outrageous that workers who work so hard should be paid so little. There's nothing fair about that. But is it any less outrageous or any more fair to impose a wage floor when the effect is to reduce job opportunities and create unemployment? The consequences of wage floors cannot be neglected. Paying a living wage to some while the many others not covered eke out whatever meagre existence they can doesn't make society any more decent.

2. Suppose labor demand were inelastic, as proponents of wage floors claim. It is true that the total wage bill will rise if a wage floor is imposed. But, although labor as a whole may earn more, in the absence of distributional mechanisms, those who lose their jobs or cannot find new ones are worse off. Only to the extent that redistribution actually takes place, either publicly (through taxes, government spending, and income maintenance programs) or privately (through remittances, private transfers, etc.) is the total wage bill of labor a sound criterion for those concerned with the well-being of the poor. Anyhow, the demand for labor in a small open economy engaged in international trade is probably quite elastic, reflecting a highly elastic demand for product. In such cases, total wage bill paid to labor would fall if a wage floor were to be imposed, so the argument at the beginning of this paragraph would be moot.
3. The shock effect argument requires a strong belief in inefficiencies. This runs very much contrary to the view that the quest for maximum profits (orthodox terminology) or the incessant drive for capital accumulation (radical terminology) has led firms to be efficient and ever-maximizing. To believe that firms can be shocked into being more efficient while maintaining that they are always maximizing is logically contradictory. This contradiction seems not to have deterred some of the strongest believers in the acquisitiveness of capitalists from also being ardent spokespersons for shock effects and the inefficiencies of capitalists. Illogic aside, the empirical evidence for shock effects is less than persuasive.

4. The monopsony argument must be evaluated in terms of the mobility of labor and the consequent elasticity of supply of labor to the covered sector. If we envision workers in the uncovered sector as constituting a vast reserve army of the underemployed (not a bad assumption, I think—precisely the one that motivated the surplus labor models of Lewis and Fei and Rania), then firms in the covered sector may have to raise wages very little if at all in order to attract more labor. In such a case, the result is only a very narrow band within which an exogenously-imposed wage floor would lead the monopsonist to increase employment. A higher wage resulting in less employment is far more likely.
5. The intertemporal issue is one of the potential for economic growth and improvements in labor well-being through saving, investment, and capital-formation. Steady-state growth models weigh only the future. I agree with critics who say those models give too little weight to the present. But it is just as wrong to consider only the present as it is to consider only the future. Rates of time preference must be weighed against the gains from investment and growth. To give no weight to capital and profits and thereby to ignore growth effects and future generations of workers is wrong too.

In sum, I am persuaded more by the arguments against wage floors than I am by the counterarguments in their favor. Consequently, in the absence of evidence to the contrary in a particular context, I am inclined to regard market wage determination as the preferred labor market regime.

In Paper #V and elsewhere, (Fields, 1984, 1985), I have made the case that those East Asian economies that rely largely on market wage determination have done very well, not only in terms of high GNP growth but also in terms of attainment of full employment, rapidly rising real wages, low to moderate levels of income inequality, and falling absolute poverty. For those very same economies, trade was the engine of growth and of improved standards of living. This creates further presumptive evidence in favor of market wage determination.
No one questions the desirability of higher standards of living for workers in developing economies. The sooner, the better. But pushing wages up prematurely through artificially-set wage floors is probably not the best way to go about it and may well be counterproductive. Policies aimed at enhancing a country's ability to produce profitably and efficiently for the world market hold out more promise. Such policies are analyzed further in subsequent papers.
BIBLIOGRAPHY


