THE IMPACT OF WAGE INDEXATION
ON WAGE INFLATION AND STRIKE ACTIVITY
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I Introduction

Before the introduction of wage indexation by the Full Bench of the Arbitration Commission in April 1975 and subsequently, arguments raged as to whether wage indexation leads to a higher, lower or unchanged rate of inflation. Most of these arguments were based either on a priori economic theorizing or on very casual empiricism. However, as Section II of this paper shows, it is impossible to deduce even the direction of the effect of wage indexation on inflation from economic theory alone. Indexation will affect the rate of inflation in a number of different ways, and the final outcome will depend on the relative significance of these different effects, as well as on the type of indexation regime introduced and the source of prevailing inflation. Moreover, casual empiricism may be very misleading about the effects of indexation on inflation. An empirical investigation of the impact of the Australian wage indexation scheme on wage inflation, which first seeks to estimate how wage inflation would have behaved in the absence of that scheme, is urgently required. A similar study of the much debated impact of wage indexation on aggregate strike activity is also needed. It is these needs which this paper seeks to satisfy.

Before we spell out the contents of this paper, we should make it clear that one very important aspect of the debate over wage indexation is ignored. The most forceful argument in favour of indexation is that it will make "living with inflation" less costly. Proponents of indexation argue that most welfare costs of inflation (such as an undesirable redistribution of income and a misallocation of resources) relate almost wholly to unanticipated inflation. Further, the proper indexation of all contracts expressed in monetary terms replaces the role of expectations in contract formulation by frequent adjustment to the most recently experienced rate of inflation and, hence, significantly reduces such welfare costs. In spite of their central role in the debate over indexation, this paper ignores such welfare arguments.¹

Firstly, this paper examines the impact of indexation on two things only: the rate of wage inflation and strike activity. Secondly, it deals exclusively with wage indexation without any attempt to consider the implications of indexing either financial instruments or income taxes.
Thirdly, whilst the theoretical analysis considers a few representative wage indexation schemes, the empirical analysis concentrates wholly on the Australian experience.

The paper takes the following form: Section II examines theoretically one of the most controversial questions in the wage indexation debate, viz., is the introduction of wage indexation likely to improve or worsen the rate of wage inflation? Section III looks at the possible effects of wage indexation on industrial unrest. Section IV briefly outlines the three equation, inflation/strike model of Phipps [24] which will be used to estimate those rates of change of wages and levels of strike activity which would have prevailed in Australia in the absence of wage indexation. In Section V, the impact of wage indexation is examined empirically, partly by comparing actual rates of wage inflation and strike activity during 1975 and 1976 in Australia with estimates of how those variables would have behaved in the absence of the indexation scheme. Section VI presents some tentative conclusions.

II Wage Indexation and Wage Inflation

We start by outlining a simple model of wage-price behaviour in the absence of indexation which should help us isolate those channels by which wage indexation can influence the rate of wage inflation.² Let us suppose, as for example in many studies of inflation, that

\[ w_t = a_1 p_t^e + a_2 q_t^e + a_3 (v-u)_t + a_4 r_t \]  
\((a_1, a_2, a_3, a_4 > 0)\)  

(1)

\[ p_t = \beta_1 v_t^e + \beta_2 q_t^e + \beta_3 m_t + \beta_4 r_t \]  
\((\beta_1, \beta_3, \beta_4 > 0 \text{ and } \beta_2 < 0)\)  

(2)

\[ p_t^e = \gamma_0 \sum_{i=0}^{\infty} \lambda_i p_{t-1} \]  
\((0 < \lambda_i < 1)\)  

(3)

and other expected rates of change are similarly determined by a weighted average of current and previous actual rates of change. In equations (1) to (3)
\[ w = \text{proportional or percentage rate of change of wage earnings.} \]

\[ \omega = \text{expected percentage rate of change of wage earnings.} \]

\[ p = \text{percentage rate of change of general price level.} \]

\[ q = \text{percentage rate of change of labour productivity.} \]

\[ m = \text{percentage rate of change of import price level.} \]

\[ v-u = \text{vacancy rate minus unemployment rate; an index of excess demand in the labour market.} \]

\[ z = \text{an index of excess demand in the product market.} \]

\[ T = \text{an index of trade union aggressiveness.} \]

It should be noted that the time-dependent coefficient, \( \gamma_t \), in equation (3) is usually implicitly taken to be equal to unity. However, economists still know very little about how expectations concerning the future rate of inflation are determined from current and previous experience. It is quite plausible that, for a given value of \( \sum_{i=0}^{\infty} \lambda_i p_{i-1} \), people may expect very different future rates of inflation in different political and economic circumstances. The time-dependent coefficient, \( \gamma_t \), is introduced to reflect the "pessimism/optimism" with which people convert their recent experience of inflation into expectations about the future rate of inflation. For example, general confidence in the government's ability to cope with the inflationary problem might produce \( \gamma_t < 1 \), while a lack of such confidence might produce \( \gamma_t > 1 \). Further, if the recent experience has been one of rising inflation leading people to predict even higher rates in the future, \( \gamma_t \) should be greater than unity. If inflation has generally been falling, \( \gamma_t \) might be less than unity.

Given the above wage-price model, wage indexation may affect the rate of inflation in any one of four general ways:

(a) By altering the values of any of the explanatory variables in equations (1) to (3).

(b) By altering the values of any of the coefficients in the same equations.

(c) By introducing a new and/or eliminating an old explanatory variable in the same three equations.

(d) By altering the time lags in any of the relationships.

More specifically we may concentrate on:

(i) Changes brought about by indexation in the money wage response to actual price changes; a combination of altering the coefficient
\( \alpha_1 \) in equation (1) and replacing \( p^e \) by \( p \).

(ii) Changes brought about by indexation in union militancy and its impact on wage inflation; possible changes in \( T \) in equation (1).

(iii) Changes brought about by indexation in the way wage inflation is affected by excess demand in the labour market; a possible change in the coefficient \( \alpha_3 \) in equation (1).

(iv) Changes in the relationship between aggregate demand, price inflation and wage inflation, especially changes in the time lags in this relationship.

(v) Changes in other time lags in the relationships.

(vi) Problems arising from the difference between the rate of change of the price index (CPI) to which wages are linked and the rate of change of the price of output (\( p \) in equation (2)).

It should be made clear from the outset that the approach of the rest of this section is strictly taxonomic. The large number of different effects are discussed separately under *ceteris paribus* assumptions.

(i) The Money Wage Response to Price Changes and the Role of Expectations

The first channel through which wage indexation might affect the rate of inflation is via its effect on the way money wage inflation responds to price inflation. In our model, equations (1) to (3), the change in money wage inflation resulting from a change in the actual rate of price inflation in the absence of wage indexation depends on two sets of parameters: the response of money wage inflation to expected price inflation (\( \alpha_1 \)); and the response of expected price inflation to actual price inflation (\( \gamma_t \sum_{i=0}^{\infty} \lambda_i \)).

We may concentrate our attention on the role of \( \alpha_1 \) by considering the impact of indexation under the assumption that the expected rate of price change equals the actual rate (i.e. that \( p^e_t = p_t \)) both prior to, and during wage indexation. Later in this subsection we shall examine the role of the relationship between the expected and actual rate of inflation. Obviously, the effect of indexation on the response of money wage inflation to actual price inflation (\( p^e_t \) assumed equal to \( p_t \)) depends on two things: the value of \( \alpha_1 \) in the absence of indexation and the form of wage indexation under consideration (basically the value of \( \alpha_1 \) during indexation).
Let us start by considering the extreme case of full indexation. Suppose that a base period is chosen for the money wage index (W) and the aggregate price index (P) and from that period every 1 per cent change in P is compensated for by a 1 per cent change in W;¹ and that all wages are adjusted fully for changes in P. Further, assume that all other determinants of W and P are left unaffected by the wage indexation policy.² In other words, we are assuming that full wage indexation means that \( \alpha_1 \) becomes unity and that all exogenous variables and other coefficients in equations (1) to (3) remain the same.

Given these assumptions, it is clear that wage indexation will be inflationary in both the short and the long run, if the response of wage inflation to price inflation in the absence of indexation is less than unity i.e. if \( \alpha_1 < 1 \). What do we know about the coefficient \( \alpha_1 \) in the absence of indexation? The vast majority of econometric studies of wage inflation in the developed economies of the world have produced estimates of \( \alpha_1 \) (the estimated coefficient on \( p_t, p_{t-1} \), or, in the case of distributed lags, the sum of coefficients on \( p_{t-1} \)) that are less than one. Only a very small fraction of such studies have produced estimates for \( \alpha_1 \), of unity and more.³ However, a large proportion have also found it impossible to reject the "natural unemployment" hypothesis that \( \alpha_1 = 1 \) (in the long run) once estimating error is taken into consideration. This is particularly true of studies which include 1968-74 in their sample period. Nevertheless, we think that the weight of evidence, especially for Australia suggests that \( \alpha_1 < 1 \), except perhaps in periods of very rapid inflation,⁴ and hence that full indexation under our assumptions and in normal circumstances would, aetris paribus, be inflationary.

However, historically most wage indexation schemes have not provided full compensation for price increases. In Italy, for example, most wage contracts have provided for a 0.6 per cent wage increase for every 1 per cent change in the cost of living. In the general case, wage indexation would be inflationary, aetris paribus, if the percentage increase in wages granted for a 1 per cent increase in the price index were greater than \( \alpha_1 \) in the absence of indexation. (In the Italian case, indexation would be inflationary, aetris paribus, if in the absence of indexation \( \alpha_1 < 0.6 \)).

The 1975 Australian wage indexation scheme was partial in a slightly different sense. It provided for full adjustment to price
changes (though at the discretion of the Arbitration Commissioners) for award wages only. If the over-award element in wages were to remain absolutely unchanged, the scheme would be inflationary, *ceteris paribus*, if the ratio of the award wage to the total wage exceeded $\alpha_1$ in the absence of indexation. Even if the ratio of award to total wage were less than $\alpha_1$, the scheme might still be inflationary depending on how strongly over-award elements responded to price changes under indexation; a possibility envisaged by the Commissioners in their laying down of the "rules of the game". If $\alpha_1$ were unity, as suggested by the "natural unemployment" hypothesis, the scheme could only be inflationary if over-award wages increased more than in proportion to price rises with the introduction of indexation.

As suggested by equation (1), one of the determinants of the rate of wage inflation in the absence of wage indexation is the expected rate of price inflation. Under indexation the role of expectations would be drastically reduced; hopefully eliminated. Indexation is supposed to reduce the uncertainty associated with future changes in the price level and hence allow labour contracts to be negotiated in "real" terms. This means that with wage indexation, the wage equation (1) can be rewritten with the actual rate of price inflation ($p$) replacing the expected rate of inflation ($p^E$).

This leads to the familiar conclusion that, for a given value of $\alpha_1$ before and during indexation, wage indexation will be anti-inflationary, inflationary or inflation-neutral as the expected rate of price inflation exceeds, falls short of or equals the actual rate. The neoclassical economists' view is that, while in the short run wage negotiators may underestimate or overestimate the inflation rate, in the long run their expectations will be correct (i.e. $\gamma_t = 1$ in our equation (3) and in the long run $p^E = p$). Hence, they believe that indexation will be inflation-neutral in the long run for a given value of $\alpha_1$. Equation (3) with $\gamma_t = 1$ indicates that the expected rate of price inflation will be less than the actual in the short run when inflation is rising and that indexation would then be temporarily inflationary. Further, the expected rate will be greater than the actual when inflation is falling and indexation would be temporarily anti-inflationary.

However, many of the proponents of wage indexation reject the neoclassical view. They believe that wage indexation is anti-inflationary
because parties to wage bargains consistently overestimate the future rate of inflation (i.e. $\gamma_T > 1$). A less extreme view would be that, in certain economic and socio-political circumstances, $\gamma_T$ takes on a value greater than unity temporarily. When a rapidly rising trend in inflation is projected into the future, when economists and the media make overoptimistic forecasts of the future inflation rate, or simply when government policy is weak and potentially inflationary, people's expectations about the future rate of price inflation will quite naturally exceed the actual rate. In such situations, indexation will, *oeteris paribus*, be temporarily anti-inflationary. One of the main reasons for the Australian Arbitration Commission's adopting wage indexation in 1975 was the claim that general expectations about the future rate of inflation were far outstripping the actual rate. Generally however, economists know so little about the formulation of price expectations that the effect of wage indexation on inflation by means of the substitution of the actual for expected rates of inflation remains an open question.

Set against this, it has been argued by some (e.g., Bhatia [5]) that the announcement of indexation will be regarded by many people as a clear signal that the government has given up the fight against inflation and opted for "living with it". If indexation occurs in only one market, say the labour market with wage indexation, the announcement may raise expectations about the future rate of inflation and hence raise the actual rate of inflation in non-indexed markets.12

(ii) Indexation, Union Militancy and Wage Inflation

It has been claimed by proponents of indexation that wage indexation will have a beneficial effect on wage inflation because it will reduce union militancy. On the other hand, the question is wide open enough for opponents of wage indexation to claim either that union militancy will be increased or that a given level of militancy will have an increased impact on wage inflation.

Proponents argue that much union militancy arises from an attempt to maintain expected real wages in the face of price inflation. In a period of rapid inflation, unions may cautiously overestimate the future rate of inflation (particularly if inflation has been worsening). This brings them into conflict with management who, again cautiously, may underestimate the future rate of inflation. If unions generally are
powerful enough to have their overpessimistic forecasts about future rates embodied into wage bargains, wage indexation, by protecting real wages, may be able to reduce this type of union militancy and wage inflation.\(^{13}\) (In terms of equation (1), this would be represented by a simultaneous reduction in \(T\) and increase in \(a_1\), under indexation; the reduction in \(T\) being sufficiently large to outweigh the effects of increasing \(a_1\), on \(H\)). However, if unions are strong enough to obtain compensation in wage bargains for their overestimates of price inflation, then they would have little to gain from indexation. Since much pressure for wage indexation has come, particularly in Australia, from organised labour, we must conclude either that unions do not generally force their overestimates of future price inflation on management through exaggerated wage claims (and hence that wage indexation will not reduce wage inflation in this way) or that many, perhaps weaker, trade unions value the "insurance" that indexation provides even if it leaves unaffected their average increase in real wages.\(^{14}\)

Opponents of wage indexation have claimed that indexation is inflationary because it enhances union power. In particular, they claim that because unions under indexation do not have to use their "power" to protect real wages, union resources are released to push and achieve increased money wages on other bases.\(^{15}\) (In terms of equation (1), this would be represented by a rise in the value of \(a_1\) under indexation but with no compensating reduction in \(T\); an increase in \(H\), ceteris paribus). The argument, of course, leaves out a very large number of implicit assumptions, inter alia that union power is not effectively circumscribed by the market, by the power of management or, in the Australian case, by the power of the Arbitration Commission\(^{16}\) and that unions would be undeterred by the obviously adverse effect of such wage increases on employment.

(iii) Indexation, Excess Demand in the Labour Market and Wage Inflation

In the absence of indexation, excess supply in the labour market will tend to reduce the rate of increase of money wages. The excess supply will, in a neoclassical model, reduce real wages by causing money wages to increase more slowly than prices. As excess supply increases, money wage inflation will fall, other things equal.

Full wage indexation by adjusting money wages to changes in the price level (and perhaps to changes in productivity on a less frequent
basis) substantially reduces the impact of excess supply in the labour market on money wage inflation. In terms of equation (1) of our model, the coefficient $\alpha_3$ on $(v-u)_t$ will be reduced towards zero by indexation. This observation led some economists to oppose the introduction of wage indexation in Australia in April 1975 because, they argued, indexation would have prevented the high unemployment of the time from having its desired impact on money wage inflation.\(^{17}\)

However, it should be stressed that the Australian scheme provided only for partial wage indexation; only award wages were linked to changes in the CPI. This allowed over award wages to respond to excess supply. The high unemployment could, and almost certainly did, have the effect of restraining the rate of increase of over award wages.\(^{18}\)

The obvious corollary to the argument that full wage indexation prevents high unemployment from reducing wage inflation is that it also prevents excess demand for labour from increasing it. This should be listed as an advantage of full wage indexation.

Finally, it should be noted that wage indexation in no way prevents excess demand/supply in the product market from impinging on the rates of price, and hence wage, inflation. In fact, as Friedman [8] and Laidler [15] have argued wage indexation may have the effect of speeding up and reinforcing the impact of excess supply in the product market. This is an argument which deserves to be analysed more fully.

(iv) Time Lags in the Response of the Inflation Rate to Changes in Aggregate Demand

Friedman [8] and Laidler [15] have offered a further mechanism by which indexation may affect the rate of inflation. More accurately, they have argued that wage indexation will improve the government's ability to reduce inflation by speeding up the response of the inflation rate to decreases in aggregate demand. Because of the long delay (Friedman's estimate is two years) between a reduction in aggregate demand and a full reduction in the rate of inflation, governments have had to face fairly long periods in which both unemployment and the rate of inflation are unacceptably high. As a result, public pressure, sometimes reinforced by a forthcoming election, has led to a reversal of aggregate demand policy and, hence, to a continuation of the high rate of inflation. With wage indexation, Friedman and Laidler argue that the lags between aggregate demand changes and changes in the inflation rate will be reduced, and hence
that it will be politically easier to deal with inflation by appropriate demand management techniques.

Laidler puts it as follows:

"Without escalator clauses, deficient demand leads to unemployment; this decreases the inflation rate which in turn decreases inflationary expectations so that future wage and price inflation rates are also cut. Each step in the process takes time, but the use of escalator clauses "short circuits" the expectation adaption stage and hence speeds up the whole process." [15, p. 541]

This is a rather vague (and perhaps less than accurate) argument. A more precise statement is required. This is best done using our model-equations (1) to (3). An unanticipated reduction of aggregate demand, according to Friedman and Laidler, will initially lead producers to reduce output and/or accumulate inventories. Only later will the rate of their price increases start to slow. In the absence of wage indexation, money wage settlements are partly determined by expectations about the future rate of price inflation (our equation (1)). Further, the expected rate of price inflation seems to be derived largely from past experience and to change only slowly in response to changes in the actual rate of price inflation (our equation (3)). So that, whilst aggregate demand and the rate of price increase have fallen, money wage increases, based on an expected rate of price inflation greater than the actual, will for some time continue at too high a rate. Real wages paid will rise and unemployment will increase "temporarily" (above the "natural" rate).19 Only when expectations adapt to the new lower rate of price increase, i.e. only after a considerable lag, will money wage inflation start to moderate. In these circumstances, wage and price inflation will fall much more slowly than in the case where people's expectations adjust very rapidly.

Wage indexation eliminates the role of anticipated price inflation in the determination of wage settlements and so eliminates the lags involved in reducing inflationary expectations. In terms of our model, wage indexation implies that \( P^e_t \) in equation (1) is replaced by \( P \) with a small lag, usually about a quarter, depending on the institutional arrangements of the scheme, and that the (one quarter) institutional lag replaces the lags implicit in equation (3). Hence, \( w \) responds much more rapidly to changes in \( p \) brought about by changes in \( z \).
A very similar argument follows along more strictly Keynesian lines. When the rate of price inflation starts to fall (because of a reduction of excess demand in the goods market), workers are reluctant to moderate wage claims because, in a disaggregated labour market with no indexation, the worker or group of workers who accepts a rate of wage increase less than the prevailing rate loses out relative to other groups of workers. Wage indexation overcomes this resistance by producing across-the-board reductions in the rate of wage increase in response to reductions in the rate of price inflation.

However, it should be noted that Friedman's argument is couched more generally in terms of the index-linking of a wide range of financial contracts. If indexation spreads to the product market, for example by indexing of contracts for future delivery, the impact of excess demand in the product market on the rate of price inflation is likely to be reduced, and the Friedman - Laidler argument becomes less applicable. (Friedman's argument that with indexation producers will be more inclined to cut prices in response to a fall in demand because of the assurance that price cuts will reduce their wage costs, is unacceptable. No individual producer can be sure that his price cuts will lead to reduced wage costs. The influence of his price on the index to which wages are linked is negligible.)

An important corollary to the argument that wage indexation speeds up the links between changes in price inflation and changes in wage inflation arises from the fact that, with full indexation, workers' expectations of inflation will not affect the outcome of wage settlements. Hence, it is unnecessary to change such expectations in order to reduce the inflation rate, and consequently unnecessary to create "temporary" unemployment in excess of the "natural" rate. That is, wage indexation has the great merit of creating conditions close to those where the actual and expected rates of inflation are equal, including the special case of zero inflation.

Wage indexation has a further, less pleasant implication which may have had some relevance to Australia in 1975. If wage indexation is introduced when the anticipated rate of inflation is greater than the actual rate and when unemployment is above the "natural" rate, there is a danger of the "temporary" excess of unemployment becoming "permanent". Reduction of the unemployment rate, according to neoclassical theory, requires that
real wages fall. In turn, this requires that money wages increase less rapidly than prices for some period of time. Full wage indexation, of course, prevents this and hence prevents a recovery of employment. Although such a fear was expressed in Australia, it should again be kept in mind that the Australian scheme was not a full indexation of wages. Real wages could be reduced, and hence unemployment reduced, by an appropriately slow rate of increase of over-award wages.21

The above argument has a further implication which, more than anything else, must make wage indexation attractive to Milton Friedman. According to the "natural" unemployment hypothesis, the government temporarily raises the level of employment above the "natural" rate by raising the actual rate of inflation above the expected rate. Wage indexation, by creating conditions in the labour market approximating those where the expected equals the actual rate of inflation, makes the level of employment independent of both rates. Hence, indexation would deprive the government of one of the main incentives to pursue inflationary policy.22

The most obvious and one of the most important corollaries to the main argument of this subsection is that, if Friedman and Laidler are correct in arguing that wage indexation speeds up the downward adjustment of the inflation rate when aggregate demand is reduced, such indexation will also quicken the upward revision of the inflation rate when aggregate demand rises.

(v) Other Effects of Wage Indexation on the Rate of Inflation

A number of other ways in which wage indexation can affect the rate of inflation have been suggested. One suggestion which gained some currency in Australia needs to be outlined and dismissed very quickly. It is false. It has been argued that the more frequent adjustment of wages to price changes under wage indexation leads to a kind of "compound interest effect" which increases the rate of wage inflation. First, it is noted that, in the absence of wage indexation, wage changes take place about once a year, whereas under the Australian indexation scheme they take place quarterly. It is then pointed out that, for example, four consecutive quarterly wage increases of 5% result in a wage increase for that year of 21.55%. From the fact that 21.55 > 20, it is supposed to conclude that indexation involving quarterly adjustment is inflationary. This is, of course, nonsense. The comparison with a 20% annual increase is misleading. If the wage increase for each quarter were 5%, then the increase in the
consumer price index (CPI) for which the wage increases were granted must also have been 5% per quarter. The annual increase in the CPI would also have been 21.55%, and even under annual adjustment the wage increase for the year would have been 21.55%. Putting it another way, if the annual increase in the CPI were 20% spread smoothly throughout the year, the quarterly increase in the CPI would be 4.66%, the quarterly increase in wages would be 4.66% and the annual increase in wages would be 20%. In short, from the point of view of wage inflation, if the rate of price inflation is steady, it does not matter whether wages are adjusted annually, quarterly or once every day.\textsuperscript{23} Further, Arndt's argument that "frequency of adjustment clearly matters" because wage increases lead fairly rapidly to price increases [1] neglects the fact that each wage increase under more frequent adjustment is correspondingly smaller.

The only sensible thing that can be said along the lines of the above argument is what we have already said. Changes in the rate of price inflation are converted more rapidly into changes in the rate of wage inflation under a wage indexation scheme with frequent adjustment. This is presumed to be a good thing when the rate of price inflation is falling (as in the Friedman-Laidler argument) but a bad thing if the rate of price inflation is rising.

It has also been argued against wage indexation that rises in the rate of increase of import prices feed more rapidly into wage and price inflation under wage indexation than they do in its absence. This is not solely dependent on the Friedman-Laidler argument. It will also arise if the price index to which wages are indexed includes the price of some imported goods directly. This is true of Australia where wages are indexed to changes in the CPI. Part of any increase in import price inflation will be reflected directly in an increase in the rate of change of the CPI and hence have an effect on wage inflation with the short institutionalized lag of the wage indexation scheme.\textsuperscript{24} The converse, favouring indexation, is that reductions in the rate of increase of import prices also feed more rapidly into wage and price inflation.

(vi) Summarizing the Effect of Wage Indexation on Inflation

The main conclusion that emerges from the preceding analysis is that it is not possible to deduce even the direction of the effect of wage indexation on inflation by means of economic theory alone. However, despite the large degree of uncertainty surrounding the inflationary implications of
wage indexation in general, the following "conditional" conclusions may be drawn:

1 Wage indexation is more likely to be inflationary, *ceteris paribus*, the smaller is the wage response to price changes in the absence of indexation. This leads Goldstein [9] to conclude that wage indexation is more likely to be inflationary during a period of low inflation (say, the 1960's) than during a period of high inflation (say, the 1970's) because the wage response to price changes is apt to be closer to unity when inflation is high.

2 Partial wage indexation schemes (including the Australian scheme) are less likely to be inflationary than full wage indexation schemes, *ceteris paribus*.

3 Where the generally expected rate of price inflation exceeds the actual rate, wage indexation, *ceteris paribus*, is likely to be anti-inflationary.

4 If trade union aggression is an important source of the prevailing inflation and if unions agree to be contented with indexed wages, then *ceteris paribus*, wage indexation is likely to be anti-inflationary.

5 Since wage indexation reduces the effect of excess demand in the labour market on wage inflation, wage indexation will, *ceteris paribus*, be inflationary when there is excess supply in the labour market but anti-inflationary when there is excess demand.

6 Wage indexation speeds up the response of the rate of wage inflation to changes in the rate of price inflation and to changes in the rate of increase of import prices. Thus, it will, *ceteris paribus*, be temporarily inflationary when they are rising.

III Wage Indexation and Strike Activity

One of the other major factors to consider in assessing the case for or against wage indexation is its impact on aggregate strike activity in the economy. A number of channels by which wage indexation might affect strike frequency have been suggested. Most of the arguments lead to the prediction that wage indexation should have a restraining influence on strike activity. Let us consider these. First, there is a growing body
of econometric evidence to support the view that strike frequency varies negatively with the previous rate of increase of real wages. Wage indexation, which should reduce the variability of real wages, may thus reduce strike frequency in periods when real wages would otherwise have been undermined. Secondly, there is even more econometric evidence for the hypothesis that strike frequency varies inversely with unemployment. If, in terms of the "natural unemployment" hypothesis, wage indexation keeps unemployment closer to the "natural" rate than it would otherwise have been, much of the variation in strike frequency would be eliminated. Thirdly, there is some tentative econometric evidence to suggest that many strikes occur because unions and management have different estimates of the future rate of inflation. Since wage indexation eliminates the need for inflation forecasting in wage negotiations, it may, ceteris paribus, reduce the number of strikes.

However, the first two of these points depend upon the ways in which wage indexation affects the rate of change of real wages and the level of unemployment. Until there is much more certainty about the direction and strength of these effects, the impact of wage indexation on strike frequency cannot be predicted with accuracy. There is also the possibility that, if wage indexation does not automatically provide full compensation for price increases, industrial unrest may increase. For example, it is feasible that an Australian style scheme could produce increased industrial friction over increases in over-award wages which are not index linked.

IV The Model

One way of examining the effectiveness of wage indexation in Australia would be to compare actual rates of wage inflation and strike activity for the period after the first quarter 1975 with estimates of how those variables would have behaved in the absence of the wage indexation scheme. This, of course, requires an estimated econometric model to provide the estimates of wage inflation and strike activity. The three equation - strike/wage inflation/price inflation - model estimated in Phipps [24] would appear to be appropriate for this purpose. A brief description of that model follows, but for a more detailed analysis readers are referred to the original text.
The model estimated in Phipps [24] comprised the following three equations:

\[ s_t = \alpha_0 + \alpha_1 \sum_{i=0}^{\infty} K_i p_{t-1} + \alpha_2 (v-u)_t + \alpha_3 \pi^t_{t-1} + \alpha_4 t + \epsilon_{1t} \]

\[ w_t = \beta_1 \sum_{i=0}^{\infty} \theta_1^i p_{t-1} + \beta_2 \sum_{i=0}^{\infty} \theta_2^i q_{t-1} + \beta_3 (v-u)_t + \beta_4 s_t + \epsilon_{2t} \]

\[ p_t = \gamma_1 \sum_{i=0}^{\infty} \tau_1^i w_{t-1} + \gamma_2 \sum_{i=0}^{\infty} \phi_1^i m_{t-1} + \gamma_3 \sum_{i=0}^{\infty} \eta_1^i q_{t-1} + \gamma_4^t + \epsilon_{3t} \]

For estimation purposes the following definitions were adhered to: 28

\( s \) = number of strikes per ten thousand civilian employed (s.a.). 29

\( p \) = annual percentage rate of change of the consumer price index.

\( w \) = annual percentage rate of change of average weekly earnings.

\( m \) = annual percentage rate of change of import prices.

\( q \) = annual percentage rate of change of gross national non-farm product per civilian employee.

\( v \) = registered vacancies (s.a.)/(total civilian employed (s.a.) plus registered unemployed (s.a.)).

\( u \) = registered unemployed (s.a.)/(total civilian employed (s.a.) plus registered unemployed (s.a.)).

\( \pi \) = gross operating surplus of companies (s.a.)/wage and salary bill (s.a.).

\( t \) = time in quarters.

Excess demand in the product market (s) was approximated by \((v-u)\), excess demand in the labour market, in spite of the well-known problems involved. Annual rates of change are calculated in a manner similar to

\[ p_t = \frac{p_t - p_{t-4}}{p_{t-4}} \times 100 \]

where \( P \) is the consumer price index, and all seasonally adjusted variables (all variables other than rates of change) are simple four point moving averages centred on \( t-2 \) (the centre of the period over which the rates of change are measured) e.g.

\[ V_t = \frac{1}{4} [k(v_{t-4} + v_{t-3} + v_{t-2} + v_{t-1}) + k(v_{t-2} + v_{t-1} + v_t)] \]

where \( V \) is the number of registered vacancies, seasonally unadjusted. 30

The strike equation is based, albeit loosely, on the model of Aschenfelter and Johnson [2]. This analysis avoids the problems of bilateral monopoly by postulating the involvement of three main parties in the bargaining process: management, union leadership and union rank and file. When the union rank and file desires and expects to obtain a wage
increase in excess of that which management is willing to concede, the union leadership knows that it cannot come to terms with management without jeopardizing its own standing within the union. A strike, however, enables the union leadership to reconcile the expectations of the rank and file, which decline with the length of the strike, with the offers of management thereby ensuring its own political survival. The probability of a strike increases as the difference between the wage rise initially acceptable to the union rank and file and management's expected ability to pay increases. Phipps [24] concentrates on the difference between the worker's expectations about the future rate of price inflation and those of management as the source of this conflict. This gap is postulated to increase with the actual rate of price inflation; hence, $\alpha_1$ is presumed positive. The wage rise initially acceptable to the rank and file is also postulated to increase as the labour market tightens (hence, $\alpha_2 > 0$) and as the profit/wage bill ratio rises (hence, $\alpha_3 > 0$). However, since the cost of a strike to the firm in the form of foregone profits rises as profits increase, it is also presumed possible that $\alpha_3$ might be negative (i.e. $\alpha_3 \leq 0$). Further, time (t) is used as an additional explanatory variable in the strike equation to gauge whether or not there has been an increase in trade union militancy in the period.

The wage equation is based on the Lipsey [16] interpretation of the Phillips Curve with modifications suggested by Phelps [23], Mortensen [18] and Hines [13]. As a result, the rate of increase of money wages is taken to be an increasing function of excess demand in the labour market ($\nu-u$), of the rate of wage inflation expected by firms and of trade union pushfulness. The expected rate of wage change is proxied by the sum of the expected rates of change of prices and labour productivity and trade union pushfulness is proxied by aggregate strike activity. Assuming that expected rates of change are a function of a weighted average of current and previous rates of change, this yields the wage equation of Phipps [24].

The derivation of the price equation follows Lipsey and Parkin [17]. Although the price-theoretic content is limited, this approach is adopted for its simplicity and for its performance in previous empirical studies. The only modification incorporated is an allowance for the possibility that the markup varies directly with the state of excess demand in the product market.
All three equations are overidentified, and the model was estimated using both two-stage least square (2SLS) and three-stage least square (3SLS) on Australian quarterly data. The sample period was 1960 (third quarter) to 1973 (second quarter). After trying a number of different lag structures, the preferred equation estimates of Phipps [24] are those set down in Tables 1 and 2.

### TABLE 1

2SLS Estimates

\[
s_t = 0.01 + 0.04p_t + 2.40m_{t-1} + 0.009t
\]

(3.01)** (2.69)** (5.05)**

\[
R^2 = 0.75, \quad d = 1.15^+, \quad \text{S.E. of residuals} = 0.12
\]

\[
w_t = 0.23p_t + 0.24q_t + 0.92(v-u)_t + 6.24s_t
\]

(0.98) (2.69)** (2.46)** (6.50)**

\[
R^2 = 0.72, \quad d = 1.98^{++}, \quad \text{S.E. of residuals} = 1.56
\]

\[
p_t = 0.27w_t + 0.18w_{t-1} - 0.02q_t + 0.12q_{t-1} + 0.26m_{t-1} + 0.38(v-u)_t
\]

(1.68)* (1.10) (1.22) (2.77)** (2.09)*

\[
R^2 = 0.66, \quad d = 1.17^+, \quad \text{S.E. of residuals} = 1.16
\]

**Notes:**

( ) \text{t ratios}

* Coefficient significant at 5% level.

** Coefficient significant at 1% level.

d Durbin-Watson statistic.

+ Test for serial correlation indeterminate.

++ Rejection of hypothesis of serial correlation in residuals at 5% level of significance.
TABLE 2
3SLS Estimates

\[ s_t = 0.20 + 0.06P_t + 1.67\pi_{t-1} + 0.008t \]
\[ (0.84) \quad (3.90)** \quad (1.90)* \quad (4.54)** \]
\[ R^2 = 0.73 \quad d = 1.15^+ \quad S.E. of residuals = 0.12 \]

\[ w_t = 0.65p_t + 0.26q_t + 0.53(v-u)_t + 4.53a_t \]
\[ (3.09)** \quad (2.95)** \quad (1.50) \quad (5.15)** \]
\[ R^2 = 0.68 \quad d = 1.79^{++} \quad S.E. of residuals = 1.67 \]

\[ p_t = 0.39w_t + 0.11w_{t-1} - 0.09q_t + 0.05q_{t-1} + 0.17m_{t-1} + 0.31(v-u)_t \]
\[ (2.74)** \quad (0.77) \quad (1.02) \quad (0.66) \quad (2.13)** \quad (1.75)* \]
\[ R^2 = 0.61 \quad d = 1.24^+ \quad S.E. of residuals = 1.24 \]

Notes: See Table 1

Two things should be noticed about these results. First, the excess demand term \((v-u)_t\) has been omitted from the strike equation. This is because, when it was included, its coefficient took up a significant, negative value without adding to \(R^2\). The most likely explanation for this perverse result is that it stems from the high collinearity between \(p_t\) and \((v-u)_t\). The simplest way out of the dilemma was to drop \((v-u)_t\) from the strike equation. The second thing to notice about these estimates is that, except for the price equation, additional lagged values of the explanatory variables did little or nothing to improve the goodness of fit. This can be explained, in part, by the fact that annual rates of change were used rather than quarter to quarter changes.

V Australian Wage Indexation: Some Empirical Evidence

In this section, we examine the effectiveness of the Australian wage indexation scheme in controlling wage inflation and curbing industrial unrest. We start this by looking at the behaviour of three variables: the rate of change of the CPI, the rate of change of average weekly earnings and the number of strikes, from the first quarter of 1973 onwards.
Because the scheme was introduced in April 1975, we should expect it to begin to have an impact on the data in the second quarter of 1975. In the case of annual rates of change, this initial impact will only be slight. The requisite data are set out in Table 3.

<table>
<thead>
<tr>
<th>Year and quarter</th>
<th>Per cent change in CPI from Previous quarter</th>
<th>Corresponding quarter of previous year</th>
<th>Per cent change in average weekly earnings from Previous quarter&lt;sup&gt;+&lt;/sup&gt;</th>
<th>Corresponding quarter of previous year&lt;sup&gt;+&lt;/sup&gt;</th>
<th>Number of strikes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973 1</td>
<td>2.19</td>
<td>5.76</td>
<td>1.7</td>
<td>9.8</td>
<td>699</td>
</tr>
<tr>
<td>2</td>
<td>3.30</td>
<td>8.28</td>
<td>4.7</td>
<td>11.5</td>
<td>523&lt;sup&gt;)&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>3.64</td>
<td>10.61</td>
<td>4.8</td>
<td>13.9</td>
<td>664&lt;sup&gt;)&lt;/sup&gt;</td>
</tr>
<tr>
<td>4</td>
<td>3.58</td>
<td>13.23</td>
<td>3.3</td>
<td>15.3</td>
<td>652&lt;sup&gt;)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

| 1974 1           | 2.42                                      | 13.57                                  | 2.9                                           | 16.6                                          | 737<sup>)</sup>  |
| 2               | 4.05<sup>)</sup>                         | 14.40                                  | 7.1<sup>)</sup>                               | 19.2                                          | 757<sup>)</sup>  |
| 3               | 5.13<sup>)</sup>                         | 16.04                                  | 10.2<sup>)</sup>                              | 25.4                                          | 777<sup>)</sup>  |
| 4               | 3.77<sup>)</sup>A<sub>v</sub> = 4.13     | 16.25                                  | 5.4<sup>)</sup>A<sub>v</sub> = 6.22           | 27.9                                          | 548<sup>)</sup>  |

| 1975 1           | 3.57<sup>)</sup>                         | 17.55                                  | 2.4<sup>)</sup>                               | 27.3                                          | 577<sup>)</sup>  |
| 2               | 3.50<sup>)</sup>                         | 16.93                                  | 2.4<sup>)</sup>                               | 21.7                                          | 703<sup>)</sup>  |
| 3               | 0.78<sup>)</sup>A<sub>v</sub> = 3.19    | 12.09                                  | 3.1<sup>)</sup>A<sub>v</sub> = 3.17           | 13.8                                          | 701<sup>)</sup>  |
| 4               | 5.56<sup>)</sup>A<sub>v</sub> = 3.19    | 14.03                                  | 4.8<sup>)</sup>A<sub>v</sub> = 3.17           | 13.3                                          | 451<sup>)</sup>  |

| 1976 1           | 2.97<sup>)</sup>                         | 13.38                                  | 2.4<sup>)</sup>                               | 13.3                                          | 592<sup>)</sup>  |
| 2               | 2.53                                      | 12.32                                  | 4.5                                           | 14.7                                          | 497              |
| 3               | 2.22                                      | 13.93                                  | 4.0                                           | 16.9                                          | 509              |

Notes:

Av. of \( x_i \) = (Geometric mean of \( 1 + \frac{x_i}{100} \)) - 1

\( \Sigma = \) sum

<sup>+</sup> On Dept. of Employment and Industrial Relations seasonally adjusted data.

* Downward biased as an indicator of price inflation because of introduction of Hedibank.
The data reveal some very striking changes which, superficially at least, point to wage indexation having had very desirable effects on the rate of inflation and the level of industrial unrest. The rate of increase of average weekly earnings changed dramatically. During the year beginning second quarter 1975, average weekly earnings rose by 13.3% compared with an increase of 27.3% during the previous year. Average quarterly rates of increase for the corresponding years were 3.17% and 6.22%. Thus, the rate of wage inflation was approximately halved in the first year of wage indexation as compared with the previous year. Even more striking pro-indexation evidence is revealed by a comparison of rates of price and wage change. In the year prior to the introduction of wage indexation, the rate of increase of wage earnings exceeded the rate of increase of the CPI by a factor of more than one and a half; 27.3% compared with 17.55% on an annual basis or 6.22% compared with 4.13% on a quarterly basis. This is evidence either of a situation in which the generally expected rate of price inflation was running way ahead of the actual rate of price inflation or of a very substantial "trade union push" on money wages. In the first year of wage indexation, the rate of wage earnings increase (13.3%) was kept within the bounds of the rate of increase of the CPI (13.38%). The role of expectations in wage determination and/or a substantial trade union push were beneficially reduced. Just as importantly, the data indicate that there was no "explosion" of over-award wages in the first year after the introduction of wage indexation. The rate of increase of award wage rates and the rate of increase of average weekly wage and salary earnings both remained within the bounds of the rate of increase of the CPI. However, the rate of increase of wage earnings began to rise alarmingly in 1976(2) and 1976(3).

Strike activity also fell quite markedly in the first year of wage indexation. The total number of strikes recorded by the Department of Employment and Industrial Relations during the year starting with the second quarter of 1975 was 2447 compared with 2659 for the previous year and 2576 for the year before that. The reduction of strike frequency from 2659 to 2447 was a fall of 8% when the underlying trend had been upwards.

However, it may be argued against this casual empiricism, which strongly favours wage indexation in Australia, that all these results may have been achieved by increases in unemployment and excess capacity
during the wage indexation period. Wage indexation may even have impeded the slowing down of wage inflation and strike activity. What we need to know is how the rate of change of money wages and strike activity would have behaved in the absence of the wage indexation scheme.

In examining the impact of wage indexation on inflation in general, we need contrast only actual and predicted rates of wage inflation. The effects of indexation on inflation listed in Section II work through an initial impact on wage inflation. If wage indexation is shown to reduce wage inflation below what it otherwise would have been then, ceteris paribus, it will have had a beneficial effect on inflation in general and vice versa.

Table 4 presents post-sample period forecasts for the rate of change of average weekly earnings derived from the reduced form of the Phipps [24] 3SLS estimates. These are contrasted with the actual rates of change. The reduced-form counterparts to the equations in Table 1 and 2 are set out in the Appendix along with the standard errors of the sample period residuals.

**TABLE 4**  
*Predicted and Actual Wage Inflation*

<table>
<thead>
<tr>
<th>Year and Quarter</th>
<th>Per cent increase in average weekly earnings from same quarter of the previous year*</th>
<th>Actual</th>
<th>Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973 1</td>
<td>8.24</td>
<td>9.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.79</td>
<td>9.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.84</td>
<td>12.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.50</td>
<td>13.06</td>
<td></td>
</tr>
<tr>
<td>1974 1</td>
<td>16.56</td>
<td>15.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19.20</td>
<td>17.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25.14</td>
<td>20.94</td>
<td></td>
</tr>
<tr>
<td></td>
<td>28.61</td>
<td>21.47</td>
<td></td>
</tr>
<tr>
<td>1975 1</td>
<td>26.74</td>
<td>25.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.63</td>
<td>18.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.36</td>
<td>12.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.01</td>
<td>8.27</td>
<td></td>
</tr>
<tr>
<td>1976 1</td>
<td>15.46</td>
<td>7.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.72</td>
<td>6.38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.87</td>
<td>8.05</td>
<td></td>
</tr>
</tbody>
</table>

*Note: + Based on Dept. of Employment and Industrial Relations seasonally unadjusted data.*
The first thing to notice about this comparison is that the model increasingly under predicts the rate of wage increase in the four quarters 1974(2) to 1975(1). This may be explained in terms of a situation in which the generally anticipated rate of price inflation exceeded the actual rate or in terms of increased trade union pushfulness with respect to wage demands which was not picked up by the model. The latter would have been aided by Mr. Cameron's policy of encouraging public service unions to act as "leaders" in a wage push. Bearing in mind this tendency of the model to underpredict the rate of wage inflation, the comparison of the actual and predicted rates of wage change for the first two quarters of the indexation period, 1975(2) and (3), tells us very little about the effect of indexation. It is possible that wage indexation had some initial success in restraining the rate of increase of wage earnings in a situation in which the expected rate of wage inflation was running ahead of the actual. Thereafter, however, the comparison puts wage indexation in an increasingly unfavourable light. In the next few quarters, 1975(4) to 1976(3), the positive gap between the actual and predicted rates of wage increase widened dramatically. Wage indexation in Australia almost certainly prevented the rate of increase of wage earnings from falling as rapidly as it would have done in the absence of wage indexation. Inspection of the reduced form equation for the rate of change of wage earnings reveals that the very high level of unemployment in 1975-6 should have produced a very rapid decline in the rate of wage inflation relative to the rate of price inflation, (i.e. a rapid decline in real wages). By insulating real wages from the pressures of excess supply in the labour market, wage indexation helped to prevent a fall in wage inflation.35

Table 5 presents forecasts for the number of strikes (seasonally adjusted) per ten thousand civilian employees derived from the reduced form of the Phipps [24] 2SLS estimates. The reduced form of the 2SLS equation was used because of its slightly better productive performance.
TABLE 5

Strike Activity

<table>
<thead>
<tr>
<th>Year and Quarter</th>
<th>Number of strikes (seasonally adjusted) per ten thousand employees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
</tr>
<tr>
<td>1973</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>2</td>
<td>1.34</td>
</tr>
<tr>
<td>3</td>
<td>1.29</td>
</tr>
<tr>
<td>4</td>
<td>1.28</td>
</tr>
<tr>
<td>1974</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.35</td>
</tr>
<tr>
<td>2</td>
<td>1.36</td>
</tr>
<tr>
<td>3</td>
<td>1.49</td>
</tr>
<tr>
<td>4</td>
<td>1.49</td>
</tr>
<tr>
<td>1975</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.43</td>
</tr>
<tr>
<td>2</td>
<td>1.38</td>
</tr>
<tr>
<td>3</td>
<td>1.35</td>
</tr>
<tr>
<td>4</td>
<td>1.31</td>
</tr>
<tr>
<td>1976</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.29</td>
</tr>
<tr>
<td>2</td>
<td>1.24</td>
</tr>
<tr>
<td>3</td>
<td>1.14</td>
</tr>
</tbody>
</table>

Because of the model's tendency to overpredict the level of strike activity for the highly inflationary period 1974(2) to 1975(1), little can be said about the impact of wage indexation upon industrial conflict.

VI Conclusions

Generally, Sections II and III indicated that the effects of wage indexation on wage inflation and industrial unrest could not be predicted from economic theory alone. Further, only tentative conclusions may be drawn from the empirical work presented in Section V. We cannot reject the argument that wage indexation in Australia had some initial success in restraining wage inflation in 1975(2) and (3). This argument is based on the supposition that Australia was expecting, prior to indexation, a higher rate of price inflation than was actually experienced; a situation in which we might expect indexation to have a beneficial effect. Although our comparisons of actual and predicted rates of wage inflation cannot be used to reject this argument, they do not lend it strong support either. However, it is rather more certain from comparisons in later quarters, 1975(4) to 1976(3), that wage indexation subsequently had the effect of isolating real wages from excess supply in the labour market and consequently of preventing wage inflation from falling as rapidly as it might otherwise have done.
APPENDIX

Reduced form equivalents of the estimated equation presented in Tables 1 and 2 are set out below. The standard error of the sample period residuals are included for those equations used to produce the predictions of Tables 4 and 5.

**3SLS Reduced Form Equations**

\[ s_t = 0.23 + 1.95w_{t-1} + 0.008t + 0.007q_t + 0.048(v-u)_t + 0.01w_{t-1} + 0.005q_{t-1} + 0.016m_{t-1} \]

\[ w_t = 1.4 + 11.82w_{t-1} + 0.06t + 0.28q_t + 1.27(v-u)_t + 0.16w_{t-1} + 0.07q_{t-1} + 0.24m_{t-1} \]

S.E. of residuals = 1.81

\[ p_t = 0.55 + 4.6w_{t-1} + 0.023t + 0.018q_t + 0.81(v-u)_t + 0.17w_{t-1} + 0.08q_{t-1} + 0.27m_{t-1} \]

**2SLS Reduced Form Equations**

\[ s_t = 0.011 + 2.43w_{t-1} + 0.009t + 0.002q_t + 0.025(v-u)_t + 0.008w_{t-1} + 0.006q_{t-1} + 0.012m_{t-1} \]

S.E. of residuals = .13

\[ w_t = 0.07 + 17.22w_{t-1} + 0.06t + 0.23q_t + 1.2(v-u)_t + 1w_{t-1} + 0.07q_{t-1} + 0.14m_{t-1} \]

\[ p_t = 0.02 + 4.65w_{t-1} + 0.017t + 0.06q_t + 0.63(v-u)_t + 0.2w_{t-1} + 0.14q_{t-1} + 0.3m_{t-1} \]
FOOTNOTES

1. This appears to be the correct thing to do in examining the Australian case because indexation of wages alone places the burden of unanticipated inflation on other income earners and hence will not prevent income redistribution and resource mis-allocation. Clearly though, full wage indexation should protect the wage earner from the ravages of inflation.

2 The method of systematising these channels of influence is similar to that employed by Goldstein [9].

3 The problem of the time lag involved is neglected for the moment.

4 This is, of course, an outrageously unrealistic assumption, but a discussion of the separate effects of wage indexation under ceteris paribus assumptions allows us to enumerate and clarify the very large number of channels of influence which operate simultaneously on the rate of inflation.

5 Only three published studies, of the well over fifty with which the author is familiar, come into this category; the three being Artis for U.K. quoted by Goldstein [9], Nordhaus [20] for Japan and Bodkin et al [6] for West Germany. Goldstein [9] reports unpublished work by Spithüller at the IMF which would add another two to the list.

6 If the divergence of the estimates of $\alpha_1$ from unity were the result of estimating error alone, one would expect, from similar populations for similar sample periods, a roughly equal number of estimates above and below unity. That the vast majority of estimates are less than one, suggests $\alpha_1 < 1$. Australian studies which produce estimates of $\alpha_1 < 1$ include, inter alia, Parkin [21], Hancock [11], Higgins [12] and Nevile [19].

7 Under our assumption of a constant over-award wage, the ratio would increase, and the scheme would be more likely to become inflationary over time.

8 See "National Wage Case, April 1975: Statement by President" [3].
9 Supported by the evidence of Parkin [21].

10 This may be tautological since many neoclassical/monetarist economists define the long run as the length of time it takes for expectations to be fully realised.

11 We come back to this point, which forms one of the bases of Friedman's pro-indexation argument, in Section II(iv).

12 Against this it might be argued that no government would propose index linking when the underlying trend in $p$ is upwards. People might then expect $p$ to fall.

13 This view was expressed by Professor J.W. Nevile in "Whither Inflation", Annual Winter School, N.S.W. Branch, Economic Society of Australia and New Zealand, (Sydney, 1973).

14 Alternatively, some unions may be sensible enough to see that relying on wage indexation (to protect their real wages) rather than prematurely forcing up the rate of money wage inflation may have a less adverse effect on employment.

15 This fear is expressed by Professor H.W. Arndt [1] in his scepticism of J. Geluck's rejection of this view in the latter's "Wage Indexation", O.E.C.D. Conference on Wage Determination (July, 1973).

16 "National Wage Case April 1975: Statement by President" [3] which shows the Commission's awareness of this problem, said that (full) indexation would not be granted where union power was being abused in this way.

17 This is clearly what the Australian Treasury now believes.

18 See Section V.

19 Our model is made consistent with the "natural" unemployment hypothesis, which both Friedman and Laidler accept, by assuming $a_1$, in equation (1), equals unity and by assuming $a_4 = 0$. 
The alternative, that Friedman [8] believes the economy to be characterized by widespread collusion or near-economy wide monopoly, is unlikely, to say the least.

These ideas are put forward in Hall [10].


Ignoring adjustment costs.

One criticism of indexing wages to changes in the CPI arises from the fact that the CPI differs from the price of domestic industry. Increases in those charges which affect the CPI directly but do not raise the price of domestic output correspondingly, e.g. rises in prices of imported consumer goods and increases in indirect taxation, are born wholly by domestic producers. The corollary again is that domestic producers gain to the extent that reductions in such charges produce a slower rate of increase of money wages than would otherwise have prevailed.


Phipps [24].

A fuller description of the data and their sources may be found in Phipps (24, Appendix II).

s.a. stands for seasonally adjusted.

Note that the method of time subscripting has changed from Phipps [24] where \( p_t = \frac{p_{t+2} - p_{t-2}}{p_{t-2}} \) and where, for example, \( v_t \) was a four point moving average centred on \( t \). This amounts to a simple relabelling of variables; and in no way changes the regression equations. The new method is employed to conform with the way annual rates of change are labelled in government statistics and with popular usage.
New time subscripting.

Step-wise regression estimates illustrating this phenomenon are presented in Phipps (24, Table 3).

The macroeconomic effects of these two phenomena are virtually indistinguishable, although one might expect the former to be accompanied by rather less industrial unrest than the latter. A situation in which the "expected rate of inflation exceeds the actual" is, one suspects, a neo-classical/monetarist euphemism for the unmentionable cost-push inflation.

This may have been encouraged by the very rapid increase in import prices during 1974 and by some economists and media forecasts of massive rates of price inflation.

Even this conclusion must be tempered a little by noting the typically Keynesian argument that money wages respond more slowly to excess supply than to a similarly-sized excess demand in the labour market. The model used to make predictions for W does not incorporate this asymmetry of response and, hence, may underpredict W when the market is responding to an excess supply of labour. This needs to be further investigated.
BIBLIOGRAPHY


WORKING PAPERS IN ECONOMICS

1. I.G. Sharpe

2. I.G. Sharpe &
   R.G. Walker
   Asset Revaluations and Stock Market Prices.

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13. I.G. Sharpe &
    P.A. Volker
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14. W.P. Hogan

15. F. Gill

16. A.J. Phipps
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