DISCUSSION PAPERS

ANALYSING THE IMPACT OF CONSENSUAL INCOMES POLICY ON AGGREGATE WAGE OUTCOMES: THE 1980S AUSTRALIAN EXPERIMENT

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* This paper owes a great deal to many. Ian Russell, in particular, provided useful early estimates of the model originated by Christopher Pissarides and used by Andrew Hanlan, and Ric Simes was instrumental in the development of NJ788. Bob Gregory offered some excellent ideas, and Fred Gruen provided the impetus for the initial work. We are grateful for constructive comments received from Richard Bandy, George Fane, Peter Kenyon, and participants at over a dozen seminar presentations. Catherine Baird and Eileen Berry assisted with the word-processing and Karen Byng put the diagrams together. The Commonwealth Treasury does not necessarily share the views of the authors.

** Respectively from: Economics Program, Research School of Social Sciences, Australian National University; Commonwealth Treasury; Economics Department, Murdoch University; Economics Department, University of Newcastle; Statistics Department, Faculty of Economics and Commerce, Australian National University; Commonwealth Treasury; Economics Department, University of Newcastle.
EXECUTIVE SUMMARY

Recent innovations in macroeconomics have suggested that institutional arrangements have significant implications for real wages and/or the relationship between wage inflation and unemployment. In particular it is argued that countries with relatively high union coverage perform better with respect to these variables in the presence of a consensual incomes policy. Whether or not this is the case is clearly of importance for governments facing the issue of the costs and benefits of the integration of the union movement into centralised ("corporatist") policy-making processes.

Until now tests of the consequences of the corporatist model have used cross-national comparisons of relative labour market outcomes of OECD countries, a methodology limited by the small number of observations typically used. Moreover, in such studies it has been necessary to use subjectively determined measures or rankings of labour market arrangements across countries. Consequently the essential proposition of the literature is not beyond doubt.

In May 1983 the Australian government, in tandem with the union movement, instituted the Prices and Incomes Accord, which has been argued by many to represent a significant labour market institutional change towards more centralised and consensual wage setting arrangements. Some evidence that there was a shift in policy away from confrontation between industrial relations groups is that econometric estimates of Australian strike activity reveal a substantial fall after the Accord was signed, relative to both the past and the contemporary experience of other OECD countries. It is generally accepted that the country adopted a consensual incomes policy in the early 1980s.

It follows that it is possible to test the basic conjectures of macroeconomic corporatist theory in a time-series context for a specific country, which is the goal of this paper. Such an approach is empirically appealing because it avoids the subjectivity and small number problems associated with the cross-national comparisons. This is not to say, however, that the exercise is straightforward methodologically.

One of the important challenges relates to the theoretical and empirical underpinnings of the econometric models typically employed in research such as this. It is highly unlikely that any particular representation of the relationship between labour demand and either real wages or wage inflation is generally acceptable to a wide audience of economists. It follows that it would be risky to base conclusions concerning the efficacy of (essentially immeasurable) changes in institutional arrangements on the results of a particular modelling approach.
As a result two real wage and three wage inflation quarterly models are employed to address the issue raised in the incomes policy literature. While the models used are very different conceptually, the two techniques used are the same: one, the equations are estimated up to the signing of the Accord, with the predicted values of the dependent variable being compared with actual wage outcomes over the rest of the 1980s; and two, the models are estimated over the entire period for which data are available including a shift dummy variable for the period of the Accord. While both approaches are simplistic they provide useful information concerning the wage effects of a consensual incomes policy.

It is unlikely that disparate models would give the same answer to the question of the macroeconomic role of institutional change in the labour market. And while there are important differences in the reported results, there are similarities worth noting, most obviously with respect to real wage relationships. This is that in both models used there appears to be a decrease in real wages after the signing of the Accord which is unexplained by changes in measured macroeconomic variables; this implies that this incomes policy contributed to lower real unit labour costs.

As far as the nexus between wage inflation and aggregate demand is concerned the story is not as clear-cut. Two of the three models used imply a leftward movement in the inflation-unemployment tradeoff, but a third suggests no statistically significant change (although the direction is the same). It follows that a conclusion with respect to wage inflation cannot be made independently of a judgement concerning the relative efficacy of the modelling approaches. In the absence of such an assessment, or under the assumption that the models are of equal validity, it would be fair to suggest that the Accord was associated with lowered wage inflation.

The bottom line is that the Australian consensual incomes policy experience offers some support for the principal hypothesis of the corporatist macroeconomic literature. Importantly, this conclusion is not driven by a particular perspective concerning the structure of underlying aggregate labour market relationships. Nor does it rely upon cross-country comparisons likely to be sensitive to subjective judgements concerning the nature of institutions.

However, the results do not represent unambiguous support for such a policy approach, for several reasons. One is that the econometric methodology used is fairly simple and is thus unlikely to have captured all the important aspects of such a process. Two, there may be long-run costs, in the form of decreased labour productivity growth, from the possible increased wage rigidity associated with the policy. Finally, it may very well be that legislative or other changes which move the institutional environment in the opposite direction -towards decentralisation- have

similar (or more propitious) implications for macroeconomic relationships. A possible test for this last proposition might entail a direct comparison of the 1980s macroeconomic experience of Australia with the United Kingdom, given that the latter country apparently followed the opposite industrial relations approach to that of the Accord.
1. Introduction and Motivation

Recent macroeconomic research has promoted the importance of the role played by wage setting institutions in the functioning of aggregate labour markets. In that literature (Bruno and Sachs, 1985; Calmfors and Driffill, 1988; Freeman, 1987; and Newell and Symons, 1987) it is argued that countries with strong union representation, usually taken to mean coverage of the workforce, can deliver favourable or unfavourable inflation and unemployment outcomes, depending on whether or not centralisation of wage-setting practices occurs. A consensual incomes policy is seen to be more desirable the less fragmented is the union movement, because powerful labour groups have the potential to deliver considerable external diseconomies when free to pursue their own wage interests.

As Calmfors and Driffill argue, some variants of these approaches imply that there is a hump-shaped relationship between the non-accelerating inflation rate of unemployment (NAIRU) and the degree of centralisation of (and consensus about) the wage setting process. At one extreme, competitive wage setting by many small independent firms and groups of workers is argued to result in relatively moderate wage outcomes. Partial centralisation of wage setting may give the groups market power, which enables them to raise wages and prices without concern for the consequences for other groups, especially the unemployed.

Centralisation, with a consensus as to the desirability of wage restraint, may lead to large and all-encompassing trade unions [who] naturally recognise their market power and take into account both the inflationary and unemployment consequences of wage increases' (Calmfors and Driffill, 1988, pp19). It is for this reason that the NAIRU under a consensual incomes policy is argued to be lower than that which occurs with strong union organisations which give no weight to outsiders.

The empirical evidence used to support this perspective is as follows. Countries are typically given a ranking and/or assigned a measure designed to reflect the extent to which their labour market arrangements are "corporatist" or, on the other hand, "decentralised". Such judgements are made on the basis of institutional features,
including union coverage and the existence of explicit agreements to negotiate economy-wide wage settlements.

Corporatist measures are then related to indicators of labour market performance, such as the positioning of the NAIRU and the speed of adjustment of unemployment to exogeneous shocks to the economy. While Newell and Symons suggest that more corporatist economies outperform the rest, Calmfors and Driffield find their hump-shaped relationship implying that either highly centralised or highly decentralised arrangements deliver the most propitious outcomes.

The existing evidence should not be taken as being entirely conclusive, for two related and important reasons. One is that since the tests are cross-sectional\(^1\) in nature, with comparisons being made typically between only OECD countries, there are just a handful of observations. The second is that in a cross-national analysis of this issue, quantitative judgements are required to assess the degree of centralisation in the system of individual countries. These are necessarily subjective, imply a sophisticated understanding of each country's institutional arrangements and are therefore open to a range of opinion. Given the degrees of freedom involved it is likely that the results are quite sensitive to these concerns, which implies that there may be considerable gains to be had from alternative empirical approaches.

It is argued in this paper that the policy shift experienced in Australia over the 1980s provides the rare opportunity to examine the usefulness or otherwise of the corporatist model in a time-series context for one country. Interestingly, in Australia the institutional machinery has long been in place for the operation of a consensual incomes policy, but the only unambiguous application is that of the Prices and Incomes Accord, negotiated between the Australian Labor Party and the Australian Council of Trade Unions (ACTU) (the peak council of the trade union body) in 1982, and instituted in May 1983 with the change of government. While Australia had in the past experienced varying degrees of union adherence to economy-wide wage settlement arrangements, the Accord was the first explicit agreement between the government and the peak trade union body that there would be no attempts to gain wage increases outside the centralised wage-setting system.

According to Niland (1987):

The Prices and Incomes Accord is a genuine departure from conventional practice, representing a distinct move to the corporatism of social contracts. The Accord itself requires union leaders to discipline their own members, an arrangement without strong precedent in Australian industrial relations. (p 136).

And at least in terms of public and written statements, there is little doubt that the Accord was a watershed in Australian wage-setting practices.

Of course, there can be a substantial gap between statements of intent and reality. Thus before exploring the possible wage implications, it is important to establish whether or not the Accord was associated with a significant change in the industrial relations environment towards that which would be expected in a social pact. In addressing this issue Chapman and Gruen (1990), building on the analysis of Beggs and Chapman (1987a, 1987b), use measured strike activity as an indicator of consensus, with the following interesting econometric findings for both Australia and the rest of the OECD.

In Australia there was a statistically significant and substantial reduction in strike activity, as measured by working days lost per employee, after the second quarter of 1983. Further, the extent of the structural break in strikes is evident not only in relation to previous Australian experience but also in comparison with the general downward trend in OECD measured industrial disputation over the same period. That is, econometric estimation of working days lost from strikes for twelve other countries from 1964 to 1987 also revealed decreases from 1983, but on average these were significantly below that which occurred in Australia.

The data from the estimations noted above imply that the fall in strike activity in Australia associated with the Accord was of the order of 70 per cent. For the OECD as a whole the decrease was about 40 per cent, and only one country (Spain) had a figure comparable to or greater than that experienced in Australia. We take this

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\(^1\) There has been some related Australian time-series evidence (see Lewis and Kirby (1988) for analysis of the Lewis model, and Chapman and Gruen (1990)). The latter work reports the results for some variants of the equations considered in this paper, but for an earlier time period and without laying out the respective theories or analysing the properties of the models.
evidence to indicate that the Accord did indeed herald a significant change in the Australian industrial relations environment. 2

The question addressed below is whether or not this institutional change was associated with the events predicted in the recent incomes policy literature. Put simply, did the apparent increased consensus concerning the desirability of wage restraint reduce Australian real wages and affect wage inflation and unemployment relationships? Seen in the broader perspective the investigation thus relates to the potential role of institutional arrangements on the aggregate labour market.

There can be little doubt of the policy importance of the issue. For those countries with strong union movements, but without a consensus incomes policy, the question of interest is whether or not there are significant benefits to be had from movements towards broadly based income-settlement arrangements. Without such aggregate labour market gains the case for incomes policy initiatives appears weak.

2. Methodological Issues

There are many different ways to model the aggregate wage inflation and real wage level relationships, with the number of views as to which is theoretically and econometrically the most appealing being about the same as there are economists involved in such exercises. Addressing the empirical question posed above with the use of any single wage model is open to the criticism that the result is model-specific and thus potentially not generally applicable. Consequently we have employed five (very) different quarterly Australian wage equations in an attempt to determine if there are similarities in findings across quite a range of conceptual bases and functional forms.

While the equations are dissimilar, in what follows the techniques employed to determine incomes policy effects are common. Each of the equations was estimated from the beginning of their data-usually the late 1960s-to 1983(1), and the coefficients were used to predict the dependent variable over the period of the Accord which, at the time of writing, is still in existence. Comparisons with actual wage outcomes for the period are then available.

A second approach entails the estimation of each of the models over the whole range of the available data with the inclusion of an Accord dummy variable set equal to 1 for the post-1983(1) period.3 While this is a very simple method it has the advantage of providing both a straightforward statistical test of the underlying hypothesis and an average Accord effect for each equation. These can be used for comparative purposes between the models.

The intercept dummy variable approach is not particularly flexible in that institutional effects are constrained to be the same for the whole period. As well, slope coefficients are assumed to be identical between the Accord and pre-Accord periods. It is possible that institutional change affects other relationships, such as those between measures of labour demand and wage levels (or changes); these conjectures are not tested in what follows.

At this point, and before exploring the models and results, it is useful to consider the theoretical basis for determining the appropriate dependent variable for our analyses. One plausible interpretation of the centralisation literature is that movements in that direction in strong union countries are predicted ultimately to deliver a lower long-run trade-off between wage inflation and unemployment, that is, a leftward shift in the NAIRU, which can be taken to mean a lower constant term in a wage inflation equation. In this perspective, in the short-run which could be as long as the Accord has currently been in progress such a leftward shift in the inflation-unemployment nexus necessarily implies a cut in real wages, relative to what they would otherwise have been.

2 The Chapman and Gruen conclusion, building on earlier work by Beggs and Chapman (1987a, 1987b), is not unqualified, for two notable reasons. One is that other forms of dispute (e.g. bans) may have increased over the period (Sheen, 1990). The other is that the apparent increase in industrial harmony could have been as a consequence of the seeming greater willingness of employers to resort to legal means to break strikes (Moore, 1989).

3 While the Accord was signed in May 1983, the Australian government had initiated a public sector "wages pause" in December 1982 which could have affected wage outcomes up to 1983(1). It is not obvious, then, that the assumed timing of the potential effect of the Accord is correct. Several of the models examined later included controls for this possibility.
There are other views of how an incomes policy might affect aggregate wage relationships. One example considered below relates to movements of labour supply and demand functions, with implications for real wage levels. Within this class of models there are different ways of conceptualising and estimating relationships.

In this exercise we are not interested in sorting out the advantages and disadvantages of the theoretical frameworks. The goal instead is to explore the determinants of both real wage levels and wage inflation from the broadest possible perspective, since in the institutional context the story is the same: if the Accord has had effects consistent with centralisation predictions, *ceteris paribus* there would be decreases in both wage inflation and, at least in the (relatively) short-run, real wage levels.

3. The Models and Results

As noted above, both real wage levels and wage inflation equations are of interest. The criteria used for selecting the equations used and reported below are twofold: that they were available, and that they represent the most frequently cited Australian examples of analyses of this type. In presenting the frameworks and results we consider first the potential impact of the Accord on real wage levels (using two different models), followed by an analysis of wage inflation (using three different models).

3.1 Real Wages and the Accord

3.1(a) Lewis Model

This model is based on a disequilibrium labour market approach proposed first in Lewis and Kirby (1987, 1988) to examine in Australia the effects of incomes policies. The model has appeared in several versions with the latest being reported in Flatau, Lewis and Rushton (1991). The framework consists of labour demand and supply functions together with adjustment mechanisms for real wages when the labour market is in disequilibrium.

The model specification allows for three possible channels of influence on incomes policies. First, incomes policies may lead to increases in labour productivity through decreased strike activity or greater cooperation with management on work practices. For given output, this effect would be reflected in a downward shift in labour demand. Second, the labour force may modify its wage demands, resulting in a downward shift in the labour supply schedule. Third, an incomes policy may alter the speed of adjustment of real wages.

More generally, the equilibrium real wage, $W^*$ is determined by the demand for and supply of labour:

$$ D = a_0 - \bar{a}_0 \text{INC} - a_1 W + a_2 X \quad (1) $$

$$ S = b_0 + \bar{b}_0 \text{INC} + b_1 W + b_2 Z \quad (2) $$

where: $D$ and $S$ are the quantities of labour demanded and supplied, respectively; $W$ is the real wage; $X$ and $Z$ are vectors of variables affecting the demand for and supply of labour, respectively; and INC is a dummy variable for the particular incomes policy under consideration, taking the value of unity during its period of operation and zero otherwise.

Hence,

$$ W^* = c_0 + \bar{c}_0 \text{INC} + c_1 X - c_2 Z \quad (3) $$

where

$$ \bar{c}_0 = (a_0 - b_0) / (a_1 + b_1), $$

$$ c_1 = a_2 / (a_1 + b_1), $$

and

$$ c_2 = b_2 / (a_1 + b_1). \quad (4) $$

The process by which actual wages adjust in response to equilibrium changes is specified as

$$ \Delta W = (k + \bar{k} \text{INC}).(W^* - W(-1)) + k \text{INC} \quad (5) $$

where $W$ is actual real wages, and $k$ is the speed-of-adjustment parameter of real wages, assumed non-negative and less than or equal to unity. Values of unity for these two parameters imply instantaneous adjustment and full labour market
equilibrium, whereas values of zero imply that wages and employment are independent of market demand and supply influences.

The c's may be negative or positive. For instance, a rigid system of wage-setting could reduce flexibility and hence impede market adjustment toward equilibrium. Alternatively, by reducing transactions costs and streamlining institutional procedures, an incomes policy may increase the speed of adjustment in labour markets.

Substitution of equation (3) into (5) yields the reduced form solution to the model:

\[ W = k_c 0 + (k_c 0 + \tilde{k}_c 0 + \tilde{k}_c 0) \text{INC} + (1-k)W(-1) - \tilde{k}_c 0 \text{INC}.W(-1) \]

\[ + k_c 1 X + k_c 1 \text{INC}.X - k_c 2 Z - k_c 2 \text{INC}.Z \]

Equation (6) is highly non-linear in parameters, with a linear approximation estimated for this paper being:

\[ W = d_0 + d_1 \text{INC} + d_2 W(-1) + d_3 X + d_4 Z \]

Estimation issues are now considered. The dependent variable is the log of real average weekly earnings, and LW (-1) is its lag, with the major exogenous variable affecting the demand for labour being GDP (real non-farm gross domestic product). The variables influencing the supply of labour comprise: BEN, real unemployment benefits per beneficiary (a component of the opportunity cost of supplying labour), and POP, the adult population, used here to capture long-run changes in labour force size and characteristics. RELIMP (the price of imports relative to the consumer price index), and TAX (the average wage and salary income tax rate) are included to reflect the 'wedge' between the wage relevant to workers and the cost of labour to employers. LTU, the number of long term unemployed (defined as being continually jobless and searching for 12 months or more), captures the extent of reduced effective labour supply arising from workers becoming 'outsiders' as their period of unemployment lengthens.

Two periods of incomes policy are considered in dummy variable form. The first period, referred to as INDEX, covers 1975(2) to 1981(2), when a system of wage indexation was in operation. The second period of incomes policy, referred to as ACCORD, is 1983(2) to the end of the data, during which the Accord was in operation.

The model was estimated in the two forms described in section 2 using seasonally adjusted quarterly data for the period. All variables, other than dummies, are measured in logarithms and all data are from the Australian Treasury's NIF 10 data base. Table 1 reports the results.

The effect of the Accord on real wage levels in this exercise may be illustrated in two ways. The first is through using the coefficients from Model (i) to predict real wage levels in the post 1983 (2) period, and to compare predicted with actual values. The result is presented in Figure 1.
Table 1: The Lewis Real Weekly Wage Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model (i)</th>
<th>Model (ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.660</td>
<td>3.709</td>
</tr>
<tr>
<td></td>
<td>(1.29)</td>
<td>(3.83)</td>
</tr>
<tr>
<td>LW(-1)</td>
<td>0.604</td>
<td>0.729</td>
</tr>
<tr>
<td></td>
<td>(7.56)</td>
<td>(12.37)</td>
</tr>
<tr>
<td>LGDP</td>
<td>0.307</td>
<td>0.336</td>
</tr>
<tr>
<td></td>
<td>(3.36)</td>
<td>(4.05)</td>
</tr>
<tr>
<td>LRELIMP</td>
<td>0.075</td>
<td>0.044</td>
</tr>
<tr>
<td></td>
<td>(1.36)</td>
<td>(1.42)</td>
</tr>
<tr>
<td>LBEN</td>
<td>0.034</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(2.29)</td>
<td>(1.63)</td>
</tr>
<tr>
<td>LPOP</td>
<td>-0.266</td>
<td>-0.597</td>
</tr>
<tr>
<td></td>
<td>(1.17)</td>
<td>(1.58)</td>
</tr>
<tr>
<td>TAX</td>
<td>0.052</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>(1.45)</td>
<td>(1.78)</td>
</tr>
<tr>
<td>LTU</td>
<td>0.001</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(2.14)</td>
</tr>
<tr>
<td>INDEX</td>
<td>-0.015</td>
<td>-0.021</td>
</tr>
<tr>
<td></td>
<td>(1.99)</td>
<td>(3.35)</td>
</tr>
<tr>
<td>ACCORD</td>
<td>-0.0141</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.83)</td>
<td></td>
</tr>
</tbody>
</table>

R² = 0.99  R² = 0.99
Durbin's h = -0.1725  Durbin's h = -0.1651
SE = 0.0129  SE = 0.0138

* Coefficients (with absolute t-statistics given in parenthesis).
+ The L prefix is used to indicate the natural log of the independent variable.

The data from Figure 1 imply strongly that Lewis' model overpredicts real wages in the post-Accord period, most clearly from 1985, but with another apparent break in mid-1986. The projected value of real weekly wages exceeds the actual in 93 per cent of observations, which is weak evidence that a structural break occurred over the period of the Accord.

The direct test of the Accord effect, the coefficient on the ACCORD dummy variable, is significant at the 7 per cent level. The implied sign and size of the effect is an equilibrium reduction in real weekly wages of just over 5 per cent after the second quarter of 1983. This is over and above the effects on real wages of changes in tax and long-term unemployment, which themselves may be consequences of the Accord.

3.1(b) Hanlan Modelling

The second real wage equation is based upon a model reported first by Pissarides (1991), and updated by Ian Russell in work reported in Chapman and Gruen (1990). Pissarides' equation is not derived precisely from any particular theoretical
framework. However, it is consistent with a bargaining model where small firms and small unions negotiate over wages by assuming that they cannot influence the rest of the market, except by fully taking into account conditions elsewhere in the economy.

The dependent variable is the (log of the) hourly wage rate (including on-costs) deflated by the price of domestic value-added. The explanatory variables measure the following: labour productivity; leakages to outsiders, in particular to the government in the form of taxes and to foreigners as higher import prices; an error in inflationary expectations; the cost of job loss to the worker; average weekly hours of work; investment; various forms of incomes policies; and a lag of the dependent variable. Explanation of the variables follows.

The labour productivity variable is the capital stock deflated by the population of working age, the latter being used because it is less cyclically sensitive than either employment or the labour force. An increase in labour productivity is hypothesised to raise total revenue and in turn real wages. The variable measuring leakages to the government and foreigners is referred to as the tax wedge, as these leakages drive a wedge between the real cost of labour and the real consumption wage, with a rise reducing real wages. The error in inflationary expectations is measured simply by the inflation rate, with the prediction being that if inflation exceeds expectations real wages will fall.

The variable measuring the cost of job loss to the worker is the ratio of unemployment benefits to the consumption wage, referred to as the replacement ratio. As this ratio falls the propensity of unions to bargain rises and thus real wages increase. Average weekly hours of work are found to have an inverse relationship with real wages. Pissarides postulated that this is related to the growth in part-time employment which causes a decline in average weekly hours. As the hourly wage for a part-time job is higher than that for the equivalent full-time job this would produce the observed inverse relationship.

In this model investment has a positive relationship with real wages, the Pissarides argument having two strands: new technology is embodied in new capital; and investment may be associated with structural change, implying that employers will be offering higher wages to attract workers from other sectors. It is not clear which of several possible investment measures is most appropriate, but in the analysis it was found that the change in investment performed best.

Shift dummy variables are used to represent the effects of three incomes policies: the 'equal pay push' (1974(2)-1975(1)), when various Government initiatives apparently resulted in about a 25 per cent increase in relative female wages; the period of centralised wage indexation (1975(2)-1980(4)); and the Accord (1983(2)-1990(3)). The coefficient of the first of these dummies is expected to have a positive sign, whilst for the latter two the sign is predicted to be negative.\(^4\)

The independent variables are: LWP(-1), the lag of the dependent variable; LKZ, the ratio of capital stock to population aged 15 years or more; LH, weekly hours of work (instrumented);\(^5\) LH(-1), lag of the above; ΔINV, the change in investment; TW, the tax wedge; LRR(-1), the lag of the replacement ratio; LINFL, inflation (instrumented); DL, the equal pay dummy (1974(2)-1975(1)); DL, the indexation dummy (1975(2)-1980(4)); and ACCORD, the Accord dummy (1983(2)-1990(3)). All variables are in logs, except the tax wedge, and the results are reported in Table 2.

When estimated over the full sample period, the results show that the coefficients of all the variables have the anticipated sign. However, the magnitude of the coefficients are in some cases larger than expected. For example, on the 'incomes policy' side the results indicate that the period of indexation reduced real wages, with

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\(^4\) When included in the preferred equation a dummy variable for the so-called "wage pause" (1983(1)), in which the Government attempted to freeze public sector wages, implied an effect insignificantly different from zero (t-ratio of 0.3).

\(^5\) The instruments used are: the lag of inflation; the lag of the ratio of the labour force to the population of working age; the proportion of females in the population of working age; person hours lagged twice; the lag of the real interest rate plus one; a measure of international competitiveness; the ratio of the female to male wage; the lag of the ratio of employment to population of working age; and the lag of the change in the ratio of employment to population of working age.
a long-run effect of 9 per cent. Perhaps of more concern is that the results indicate
that the 'equal pay push' was successful in raising long-run real wages by 15 per cent.

The long-run equal pay effect described above could be caused by model
misspecification. When estimated over the full sample period the model passes a test
for up to fourth order autocorrelation, and - consistent with an Accord effect - fails a
Chow test with a split at 1983(1)-1983(2), indicating a structural break at this point.
However, the model also fails a Chow test with the split at 1974(4)-1975(1), implying
some parameter instability.

The coefficients from Model (i) have been used to predict the dependent variable
over the period of the Accord. Its comparison with actual hourly wages is shown in
Figure 2.

![Figure 2: Real Hourly Wages (Hanlan)](image_url)

### Table 2: The Hanlon Real Hourly Wage Equation

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.81</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>(4.76)</td>
<td>(0.63)</td>
</tr>
<tr>
<td>LWP(-1)</td>
<td>0.25</td>
<td>0.86</td>
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<td>(4.08)</td>
<td>(1.98)</td>
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<tr>
<td></td>
<td>(3.84)</td>
<td>(3.84)</td>
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R^2 = 0.997     R^2 = 0.993
SE = 0.0091     SE = 0.0129
Durbin's h = -2.25 Durbin's h = -1.32

*Coefficients (with absolute t-statistics given in parenthesis).
The direct dummy variable test of the Accord effect revealed a long-run dynamic decrease in hourly wages of around 17 per cent, with the coefficient being statistically different from zero at less than the one per cent level. Interestingly the Accord effect found is considerably greater than that suggested by Pissarides (1991) in his estimations with the same model for the period ending 1986(2). Figure 2 helps explain this discrepancy: apparently the incomes policy was much more influential in the most recent four years of the data.

3.2 Wage Inflation and the Accord

3.2 (a) Murphy Model Wage Equation

The basis for the wages equation is an inflation expectations augmented Phillips Curve, with no long-run trade-off between inflation and unemployment (Murphy, 1988). This raises issues concerning the measurement of inflation expectations, and the dynamics and functional form of the unemployment rate. The wages equation is part of a large macroeconometric model and is given by:

\[ \Delta \log W = \text{LAM1}/4 + C0 + C1.(\text{LPCON} - \text{LPCON}(-1)) \]
\[ + (1 - C1).(\text{LPCON}(-1) - \text{LPCON}(-2)) + C2.\text{UR}(-1) - \text{UR}(-2) \]
\[ + C3.\text{UR}(-2) \]

The first term, \( \text{LAM1}/4 \), is the model estimate for the rate of Harrod-Neutral technical progress per quarter, and is included to capture increases in wages due to increases in productivity. Inflation expectations are modelled in the next part of the equation as a weighted average of current and lagged growth in consumer prices, denoted below as LP.

The last part of the equation involves two unemployment rate-related variables, where the unemployment rate is expressed as a proportion. The first of these is the lagged change in the unemployment rate, \((\text{UR}(-1) - \text{UR}(-2))\), denoted below as \(\Delta \text{UN}(-1)\). This picks up the phenomenon that even starting from a relatively high unemployment rate a sudden reduction in joblessness can give rise to wage pressures because of short-term job-mismatch.

The second unemployment rate-related variable is the reciprocal of the unemployment rate lagged two quarters, \(1/(\text{UR}(2))\), denoted below as \(\text{RUN}(-2)\). This is the non-linear unemployment rate effect associated with the traditional Phillips Curve.

It is instructive to consider the long-run equilibrium form of the equation where the rate of wage inflation equals the rate of price inflation plus the rate of technical progress. That is, the form of the wages equation simplifies to:

\[ 0 = C0 + C3 \left(\frac{1}{\text{UR}}\right) \]

where UR is the unemployment rate.

Solving from the above,

\[ \text{UR} = -C3/C0 \]

illustrating that the model's long-run equilibrium unemployment rate depends on the estimated values of C0 and C3.

Because the Murphy model uses about ten years less data than the other models, it is useful to consider the results for the basic equation, without the ACCORD dummy variable, for the whole sample. Consequently Table 3 presents the results for the three modelling approaches, with the dependent variable being the log of the quarterly change in average weekly earnings.

Before discussing the possible Accord effects we note the results for the model estimated over the whole period (Model (ii)). All variables are of the expected sign; with the estimated weights for current and lagged inflation in determining expected inflation being 0.61 and 0.39 respectively. The coefficient on the change in the unemployment rate is very well determined with a t-statistic of 3.66. The unemployment rate level effect is less significant, its coefficient having a t-statistic of 1.95. When a shock is applied in a simulation experiment with the complete model, the unemployment rate returns to near its original level after a period of 3-5 years.
Table 3: The Murphy Wage Inflation Equation*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model (i)</th>
<th>Model (ii)</th>
<th>Model (iii)</th>
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<tr>
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<td>(1976(1)-1983(1))</td>
<td>(1976(1)-1990(1))</td>
<td>(1976(1)-1990(1))</td>
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<td></td>
<td>(0.16)</td>
<td>(2.03)</td>
<td>(0.39)</td>
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<tr>
<td>LP</td>
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<td>0.514</td>
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<td></td>
<td>(1.48)</td>
<td>(3.025)</td>
<td>(3.076)</td>
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<td></td>
<td>(1.87)</td>
<td>(3.66)</td>
<td>(4.10)</td>
</tr>
<tr>
<td>RUN(-2)</td>
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<td>0.000977</td>
<td>-0.000299</td>
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<tr>
<td></td>
<td>(0.047)</td>
<td>(1.95)</td>
<td>(0.36)</td>
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<tr>
<td>ACCORD</td>
<td></td>
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<td>-0.01004</td>
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<tr>
<td></td>
<td></td>
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<td>(1.92)</td>
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<tr>
<td>$R^2$</td>
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<td>0.345</td>
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<tr>
<td>SE</td>
<td>0.0116</td>
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<tr>
<td>DW</td>
<td>2.23</td>
<td>2.39</td>
<td>2.23</td>
</tr>
</tbody>
</table>

* Coefficients (with absolute t-statistics in parentheses).

The implied estimate for the long-run equilibrium unemployment rate is

$$ UR = 0 - (0.00977)/(-0.01562) = 0.063, $$

that is, 6.3 per cent of the labour force, but the estimate is surrounded by a fairly wide confidence interval.

In general the equations fit the data well, having standard errors of around 1 per cent. Further, they pass tests for heteroskedasticity and for the absence of structural breaks imposed in various periods. The coefficients estimated from Model (i) were used to predict the dependent variable over the period of the Accord. These data and their comparison with actual wage inflation are shown in Figure 3.

The comparisons of projected wage inflation with the actual reveal that the former exceeded the latter in about 80 per cent of observations. The more rigorous and simpler test of the Accord effect, the coefficient on the dummy variable for the third model estimated over the entire sample, reveals lowered annual wage inflation after 1983(2), of the order of 4 percentage points. This effect is statistically different from zero at the 6 per cent level.

3.2 (b) The NIF88 Wage Equation

The NIF88 wage equation is taken from the 1988 version of the Australian Treasury's macroeconomic model, and is based on a modified expectations-augmented Phillips' curve in which wage movements adjust to price expectations and pressure in the labour market. The equation takes the form:

$$ Δ\log W = f(t,M) + (1 - Q|NX|) g(L) Δ\log PCPI $$

$$ + Q|NX| [α_1 g(L) Δ\log PCPI + (1 - α) q(L) Δ\log PCPI] $$
where: $W$ = average weekly earnings;

$f(LM)$ = labour market pressures (see below);

$QINX$ = dummy variable set equal to unity when wage indexation applied;

$PCI$ = prices, as measured by the CPI;

$g(L)$ = an estimated lag distribution to reflect expectations for wages not directly affected by indexation; and

$q(L)$ = a lag distribution designed to capture the timing of indexation decisions.

An explicit filter ($q(L)$) has been introduced to allow the wage indexation conditions prevailing at the time of the Industrial Relations Commission's decisions to be reflected in the pattern of wage increases. The size of those decisions are estimated within the equation. Even when indexation is operative, however, not all wage increases are determined by the Commission's decisions—non-zero value for $\alpha$ in the equation means that a proportion of wage increases will occur outside formal decisions.

It could be argued that outside of the indexation period the Commission still had an important impact on the timing of wage increases. To incorporate the timing effects of all such decisions would complicate an already involved story. Instead, explicit allowance has been made for only one decision, the 1974 Metal Trades decision, believed to be very important in the Australian context because this group was seen to be a wage pace-setter at the time. It is assumed that for the proportion of wages directly affected by the Metal Trades decision there was a pent-up demand for a rise which had mounted over the preceding two quarters.

Labour market pressures are modelled as:

$$f(LM) = b_0 + b_1 \cdot UN + b_2 \cdot (UN - RUNMA) + b_3 \cdot OT$$

where $UN$ = unemployment rate;

$OT$ = positive values of the level of overtime after detrending; and

$RUNMA$ = eight quarter moving average of UN.

It is postulated that the behaviour of both the unemployed and of those in secure employment has an impact on the determination of wages. The higher the unemployment rate, the weaker will be the bargaining position of employees and the lower the level of wage increases, implying that $b_1$ will be negative. The loss in human capital associated with long periods of unemployment will lessen the potential competition from the unemployed. This is captured by the second term, $(UN-RUNMA)$, referred to now as $HYS$ for hysteresis, with $b_2$ expected to be negatively signed.

While the unemployed may have some indirect effect on wage determination, those in employment, particularly in relatively secure employment (given the structure of labour markets in Australia), may have a more direct role. Recent Australian economic history would appear to confirm this view. The experience of 1974 and 1982, when wages appeared to lead price rises while the unemployment rate remained near its previous level, suggests that those bargaining were not influenced by the number unemployed, but were responding to a leading indicator of changes in labour market conditions.

In practice, overtime has proved to be such an indicator. Since the response to changing conditions is likely to be asymmetric, in that wage claims react more to a tightening in conditions than to an easing, $OT$ is argued to have an asymmetric effect with its coefficient, $b_3$, being positive.

The above discussion provides a justification for each of the terms appearing in the labour market pressure equation. Nevertheless, the equation may be subject to a slightly different, although related, interpretation. In particular, those in secure employment may react to $UN$ and $HYS$ as well as $OT$, since even if they are not concerned about the plight of the unemployed, the unemployment rate may influence their behaviour. This is because, assuming a steady turnover of employees, the risk of becoming unemployed increases with the unemployment rate. The
perception of risk by wage bargainers will diminish, however, if unemployment has increased but they remain employed. HYS may thus reflect the behaviour of those in secure employment as well as any effect through the quality of the unemployed.

Whichever of the above interpretations is placed on this equation, the specification for labour market pressures has support from the literature on the functioning of labour markets. In terms of membership theories, the unemployed are outsiders while those in secure employment are insiders. However, it is not assumed that outsiders have no power. There are a number of reasons why stabilising forces may operate through an implicit NAIRU in an Australian wages equation, even if such forces are not strong. Through time there will be forces which will act to break down the insider/outsider distinction as the structure of the economy finds alternative means of adjusting to relative prices and changing employment opportunities.

The possible dynamics emerging from the specification of labour market pressures allow for: a sharp tightening of labour market pressures to produce a surge in wages; unemployment to dampen wage claims; and the influence of unemployment to be quite protracted. The estimation results are shown below in Table 4 with the dependent variable being the log of the quarterly change in average weekly earnings, and P1-P5 are various forms of price changes interacted with particular scenarios of wage indexation operating at various times over the period (for a description and analysis of these variables, see Simes, 1988).

The coefficients from Model (i) were used to predict wage inflation over the Accord period, and these data and their comparison with actual wage inflation are shown in Figure 4.

\[
\begin{array}{l|c|c}
\text{Variable} & \text{Model (i)} & \text{Model (ii)} \\
(1968(3)-1983(1)) & (1968(3)-1989(4)) \\
\hline
\text{Intercept} & 0.00965 & 0.0154 \\
 & (1.70) & (2.89) \\
\text{OT} & 0.0564 & 0.0158 \\
 & (2.29) & (0.80) \\
\text{UN} & -0.00107 & -0.00159 \\
 & (0.99) & (1.51) \\
\text{HYS} & -0.00142 & -0.00394 \\
 & (0.49) & (1.78) \\
\text{P1} & 0.741 & 0.762 \\
 & (3.69) & (4.86) \\
\text{P2} & 0.659 & 0.628 \\
 & (3.74) & (3.62) \\
\text{P3} & 0.402 & 0.361 \\
 & (1.35) & (1.31) \\
\text{P4} & 0.168 & 0.350 \\
 & (0.59) & (1.37) \\
\text{P5} & -0.0854 & -0.0555 \\
 & (0.29) & (0.21) \\
\text{ACCORD} & 0.007144 & - \\
 & (1.25) & \\
\hline
\end{array}
\]

\[R^2 = 0.60 \quad R^2 = 0.533\]
\[\text{SE} = 0.0127 \quad \text{SE} = 0.0117\]
\[\text{D.W.} = 1.90 \quad \text{D.W.} = 1.82\]

*Coefficients (with absolute t-statistics given in parenthesis).
The general form of the wage equation is:

\[ \Delta^4 W = a_0 + a_1(L) \Delta^4 W(-1) + a_2(L) \Delta^4 CPI + a_3(L) \Delta^4 RW(-4) + a_4(L) Z + \Sigma \beta_i IP_i + gTDI \]

Where \( a_1(L) \) and \( a_4(L) \) are fifth-order polynomials and \( a_2(L) \) and \( a_3(L) \) are fourth order polynomials. \( \Delta^4 W \) and \( \Delta^4 CPI \) are the four quarter changes in the log of average weekly earnings and the consumer price index respectively. \( Z \) is the log of the variable measuring excess demand or bargaining power in the labour market, \( RW \) is the level of real average weekly earnings and \( IP \) is a matrix of dummy variables (\( IP_1, IP_2, IP_3 \) and \( IP_4 \)), with each column representing a different phase of centralised wage fixing guidelines prior to the Accord (see Watts and Mitchell, 1988). In addition a dummy variable TDI which takes the value of unity in 1974(3) was included to pick up abnormal wage movements (Gregory, 1986).

The final form of the wage equation was the outcome of a Hendry-type testing down procedure using quarterly data for the period 1968(3)-1990(3). The functional form and its justification are as follows.

The four quarter price inflation rate lagged two quarters is modelled to slowly affect the growth in wages. This term reflects the institutional lags induced by the lengthy and retrospective National Wage Case machinery. The one quarter change in the inflation rate is also seen to be significant, and inertia in the movement of money wages is picked up by the lagged dependent variable.

Lagged values of the level of real wages were included in the attempt to identify real wage resistance to pick up the response of workers to unfulfilled expectations about price inflation and hence movements in real wages. The final form of the equation implies that workers have a target rate of real wage growth which is influenced by the presence or otherwise of different incomes policy guidelines (see Watts and Mitchell, 1988).

The pressure variable in the final specification takes the form of a one quarter change in the rate of capacity utilisation, suggesting hysteresis. The equilibrium
value of the pressure variable is thus cyclically sensitive so that a steady state level of capacity utilisation does not impact directly on the rate of wage inflation.

In summary, the independent variables are: IP₁, IP₂, IP₃ and IP₄, dummy variables for different types and time periods of government initiated "wage guidelines", respectively equal to 1 for 1975(2) - 1976(2), 1976(3) - 1978(2), 1978(3) - 1979(3), and 1979(4) - 1981(2), and equal to zero otherwise; TDI, a dummy variable equal to 1 for the unusual events of 1974(3) (the Metal Trades issue, discussed in the preceding section), and equal to zero otherwise; Δ₄W(-1), the lagged dependent variable; ΔCPI(-2), the price variable lagged two quarters; Δ⁵RW(-4), the lagged one quarter change in the log of real W; Δ¹GUT, the one quarter change in the log of the capacity utilisation variable; and ACCORD, a dummy variable equal to 1 for 1983(2) to 1990(1), and equal to zero otherwise. Table 5 shows the results with the dependent variable being the log of the four quarter change in nominal average weekly earnings.

To measure the impact of the Accord and the preceding wages pause (noted in section 2), this tested down specification was estimated for the period 1968(3) to 1983(1) and dynamic forecasts were generated for the period 1983(2) to 1990(1). The model is reasonably well specified, although there is a hint of serial correlation. The forecasts and their comparison with actual wage change data are illustrated in Figure 5.

Table 5: Watts/Mitchell Wage Equation

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<td>Δ₄W(-1)</td>
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<td>(2.80)</td>
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<td>Δ¹RW(-4)</td>
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<td>(4.98)</td>
</tr>
</tbody>
</table>

R² = .934  R² = .935
SE = .0132  SE = .0133
Durbin's h = 2.146  Durbin's h = 2.192

*Coefficients (with t-statistics given in parenthesis).
The dynamic forecasts over the Accord and wages pause periods 1983(1) - 1990(1) significantly over-predict the magnitude of wage inflation, which signifies the strong negative impact of the Accord and wages pause on the rate of wage inflation. The wages pause (assumed to operate in 1983(1) and (2)) led to a sharp fall in annual wage inflation which assumed a local minimum of 2.2 per cent in the third quarter of 1983. It could be argued that the significant over-prediction of the forecasts is largely the consequence of over-prediction during the wage pause era, due to the recursive nature of the dynamic forecast. If substantiated this result would undermine to some degree the alleged potency of the Accord era with respect to wage inflation.

Extension of the sample period to 1990(1) and the inclusion of a wage pause dummy for the two quarters, still yields significant over-prediction of the rate of wage inflation for the Accord era with the final annual forecast for 1990(1) being 21.36 per cent. Hence these results imply that the Accord era has had a moderating impact on wage inflation.

The forecast magnitudes of nominal wage growth over four quarters, which range from 11.1 per cent (1983(3)) to 21.8 per cent (1987(2)) are not unrealistic (cf Blandy 1990, pp 69-70). In 1975(1) annual wage inflation reached 31.4 per cent prior to the advent of wage indexation and about 18.7 per cent in 1982(3) prior to the introduction of the wages pause. These forecasts, it should be noted, are based on the absence of incomes policy and/or offsetting deflationary policy by government. A sharp deflationary policy may well have induced a regime shift, in other words a discrete behavioural change by participants in the labour market.

There is no hint of misspecification in Model (ii), which offers the direct test of the Accord (and wages pause dummy) effect. It is negative and strongly significant, implying a long-run equilibrium effect of around 13.5 per cent per annum lower wage growth.

4. Conclusion

It would be unrealistic to expect different models to deliver identical results with respect to the influence of institutional or policy change on aggregate wages. While this has not happened in the exercise reported, there are some noteworthy consistencies. These are most apparent in the real wage level equations.

At the 7 and 1 per cent levels respectively, the Lewis and Hanlan analyses imply a structural break in Australian real wage relationships after the signing of the Accord. They reveal that the (long-run equilibrium) decrease in real wages lies between 5 and 17 per cent. It seems to follow that the incomes policy resulted in lower real wage costs.

The story is less clear-cut with respect to wage inflation. An Accord effect is apparent in both the Watts and Mitchell (at the 1 per cent level) and Murphy (at the 6 per cent level) experiments, the sizes implying a (long-run) incomes policy influence on annual wage inflation of between 4 and 13.5 per cent. NIF88 suggests an insignificantly negative effect of about 2.8 per cent, but with the standard error being very high.

It follows that a judgement concerning the impact of the Accord on wage inflation cannot be made independently of a view of the relative efficacy of the
models used. If no such assessment is used, or the models are judged to be equally valid, a reasonable conclusion would be that the incomes policy reduced wage inflation.

The exercise demonstrates clearly the invalidity of the proposition that the Accord resulted in wage levels above what they otherwise would have been (Moore, 1989). Since none of the models support this conjecture (only one -NIF88- fails to find an Accord influence at a significance level less than 7 per cent), in terms of the positioning of the NAIRU the institution of the Accord seems to have had a desirable effect. Of course, the increased centralisation of wage-setting practices may have had adverse implications for labour productivity growth.

A caveat with respect to the methodology employed relates to its simplicity. It is likely that institutional change impacts on the coefficients of particular relationships, as well as having an overall levels effect. Also, it is credible that over the course of about seven years the extent and significance of incomes policy effects vary importantly. Neither possibility has so far been tested.

Nevertheless, in general, these results offer some support for models of the corporatist genre. Four of the equations imply a potential for strong union countries to deliver wage moderation given the adoption of a consensual incomes policy. This is consistent with the cross-national comparisons cited earlier, but arguably stronger and less subjective evidence.

All of this does not mean that such a policy shift is necessarily desirable, since there is nothing in the research which throws light on the possible benefits of moves in the opposite direction, i.e. to labour market decentralisation. Perhaps a starting point for further research would be to compare recent Australian experience with events in the UK during the 1980s, when the latter country appears to have followed an approach opposite to that of corporatism.

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7 Reference to the standard errors of the equations does not allow a clear decision as to the relative efficacy of the models since they are very similar (and all around one percentage point).

8 Dowrick (1990) has tested this proposition and finds no statistically significant support for it.

References


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Paper 2: Hughes, Barry, Twin Deficits in the IMF Model. With a Comment by John Perkins, NIEIR.

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