IN AUSTRALIA: EVIDENCE FROM THE PAPER MODEL
Rain Incomes and the Real Exchange Rate

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By

A Seminar of the Australian Instincts
Future of Agriculture: Economic Reality, Political Perceptions and the
Paper Based on a Contribution Made to
I. INTRODUCTION

II. THE MODEL

III. EVIDENCE FROM THE CANADIAN MODEL

IV. FROM INCOMES AND THE REAL EXCHANGE RATE IN AUSTRALIA

V. CONCLUSION
detailed multisectoral model, to project the effects of four such policy decisions on the real exchange rate in Australia and the consequent effects on agricultural income and employment. The four policy shocks are:

(i) a 10.6 per cent across-the-board increase in the nominal rates of protection for the import-competing sector,
(ii) a 0.57 per cent increase in real hourly wage rates,
(iii) a change in crude oil pricing policy leading to a 26 per cent increase in the basic price of domestically refined oil products, and
(iv) a balanced 0.45 per cent increase in real aggregate domestic absorption (i.e., an increase in the domestic component of aggregate demand which leaves unchanged the shares of consumption, investment and government spending in the total).

Readers will recognize each of these shocks as reflecting elements of recent debates about macroeconomic policy in Australia. The sizes of the shocks (10.6 per cent for protection changes, 0.57 per cent for wage changes, etc.) were chosen such that under the conditions to be described in the next section, the ORANI model projects that each would result in a one per cent decrease in the real exchange rate.

1. Even the manipulation of domestic oil prices was related to short-run macroeconomic objectives during the last Federal Election. For a detailed analysis see Higgs (1981).
and

expected changes in the balance of trade.

Consumer plus investment plus government

would be affected by changes in aggregate absorption

the extent to which increased changes in national income

changes in real wages or changes in employment.

Poverty of the income effect will be measured as

the extent to which increased changes in the overall

OMNI model offers no guidance. They are:

of the microeconomic effects of shocks to the economy about which

environment. D. This is because there are three important aspects

assumptions about three important aspects of the microeconomic

OMNI users are forced to introduce their own

interest are those concerning atmospheric short-term

production section. The advantages, C. In which we will have more

shocks, n, to be considered in this paper were listed in the

value of which would have in the absence of the shocks. The fact

variations in NUT II data. By a given (A) and contrasts from the

a microeconomic environment. E. Then in the short run (long run)

production. There are no of the form: given a shock, A, and assuming

can be used to generate other short-run or long-run conclusions.

major assumptions which were made in Generalizing those results.

OMNI in order to understand the results to be presented in

2. MAJOR ASSUMPTIONS UNDERLYING THE OMNI SIMULATIONS
the extent to which induced changes in the real exchange rate will be realized as changes in the domestic inflation rate relative to the foreign rate or as changes in the nominal exchange rate.

In this paper, we have assumed that:

(i) induced labour-market effects appear as changes in the overall level of employment and not as changes in real wages. Thus, in all our simulations, real wages were set exogenously. In the simulation of a wage shock, the increase in real wages was set exogenously at 0.57 per cent. In the other simulations, zero change was assumed. An interpretation of our treatment of the labour market is that real hourly wage costs are 100 per cent indexed to the CPI and that excess labour is available at the going wage rate. This seems descriptive of the Australian labour market since 1974.

(ii) induced changes in national income appear as changes in the balance of trade and not as changes in aggregate absorption which was set exogenously. In the simulation of an expansion in demand, the increase in real absorption was set at 0.45 per cent. In the other simulations, zero change was assumed. The exogenous treatment of aggregate absorption reflects the idea that the government has available to it instruments of domestic demand management which are not modelled in ORANI but whose separate exercise can stabilize the level of real absorption in the face of shocks affecting relative prices in the economy.

REFERENCES


Finally, with regard to timing, we need some feedback on the changes in the exchange rate and its effects on the overall economy. For example, we can see that the exchange rate has increased, which may indicate a stronger demand for the country's currency. This can also affect the cost of imports and exports, leading to changes in the trade balance and overall economic growth.

In conclusion, the relationship between the exchange rate and the overall economy is complex and requires careful monitoring. While changes in the exchange rate may have both short-term and long-term effects, it is important to consider the broader implications for the economy as a whole.
interpret the first ORANI result shown in table 1 as follows: if protection were increased by 10.6 per cent, then after about 2 years, aggregate employment would be 0.15 per cent less than it would have been in the absence of the increase in protection.

other hand, the assumption is an understatement of the rise in agriculture's intermediate costs. This is because the share of oil products in agricultural costs is about twice that for the economy as a whole and because agriculture also uses as inputs other commodities, such as chemical fertilizers, which are themselves relatively intensive users of oil products. The first of these factors alone accounts for an additional 0.26 per cent rise in the average unit price of intermediate inputs and thus, via (4), for an additional 0.76 per cent fall in factor incomes.

A final point about the results in table 1 is that the agricultural employment projections refer to changes in the demand for aggregate labour input, including both hired and owner operators' labour. ORANI has nothing to say about how such changes will be apportioned between the two labour categories. In the short run it might be reasonable to assume that hired labour would bear the brunt of the changes. Using industries' shares of hired and owner operators' labour derived from the ORANI data base, this assumption implies the following percentage changes in hired labour for our four simulations: -5.05, -7.09, -7.37 and -4.87.
The effects of the exchange rate on the economy are significant. Exchange rate changes can affect the competitiveness of exports and imports, impacting the balance of trade and overall economic performance. Inflation rates in countries with high exchange rate volatility can also be influenced, affecting the purchasing power of citizens.

To explore these effects, our study examined the impact of exchange rate volatility on economic indicators. We found that countries with more stable exchange rates tended to have lower inflation rates and more stable economic growth.

For example, country A experienced a period of high exchange rate volatility, leading to significant fluctuations in the cost of living. In contrast, country B, with a more stable exchange rate, saw moderate inflation rates throughout the period.

These findings suggest that managing exchange rate stability is crucial for economic stability. Policies aimed at stabilizing exchange rates can help mitigate the negative effects of volatility on inflation and economic growth.

In conclusion, our study highlights the importance of exchange rate stability in economic planning. Policymakers should consider implementing measures to stabilize exchange rates to promote economic stability and growth.
Table 1: Principal Economy-Wide and Agricultural Sector Results

<table>
<thead>
<tr>
<th>Shock</th>
<th>Economy-Wide Results</th>
<th>Agricultural Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggregate Employment (hours)</td>
<td>Real Exchange Rate, (CPI)</td>
</tr>
<tr>
<td>(i) 10.6% Increase in all Tariffs</td>
<td>-0.15</td>
<td>-1.0</td>
</tr>
<tr>
<td>(ii) 0.57% Increase in Hourly Real Wage Costs</td>
<td>-0.46</td>
<td>-1.0</td>
</tr>
<tr>
<td>(iii) 26% Rise in Domestic Price of Crude Oil</td>
<td>-0.50</td>
<td>-1.0</td>
</tr>
<tr>
<td>(iv) 0.48% Rise in Real Absorption</td>
<td>+0.07</td>
<td>-1.0</td>
</tr>
</tbody>
</table>

* All results are percentage changes relative to the values which the variables would have had in the absence of the shock. The projected timing of these changes is about two years after the shock. Real factor income in column (4) is the total return in the agricultural sector to labour (hired and owner-operator), capital and land deflated by the CPI.

† Under assumption (iii) in section 2, the percentage change in the real exchange rate is the negative of the percentage change in the CPI.

Equation (3) just says that when capital and land are held fixed, the elasticity of substitution (σ) is equal to the ratio of the percentage change in employment to the percentage change in the factor price ratio ((q - cpi) - w).

Equations (1) - (3) are a simplified representation of the main mechanisms in ORANI responsible for the impact of changes in the real exchange rate on the agricultural sector. The role of the price-cost squeeze is evident in equations (2) and (3). Because they must compete with world markets, export oriented agricultural producers cannot readily pass on cost increases in the form of higher selling prices. Increases in the costs of purchased inputs (i.e., intermediate inputs and labour) thus reduce the implicit rental rates on land and capital, and result in reductions in agricultural activity and employment.

From the ORANI data base we can compute the values of the parameters of equations (1) - (3). They are \( \gamma_L = 0.61, \gamma_F = 0.39, \gamma_Y = 0.61 \) and \( \sigma = 0.5 \). Using these, and combining the equations we derive:

\[
r = 0.72 (p - \text{cpi}) - 0.78w.
\]

Equation (4) is the explanation for the general rule, noted at the beginning of this section, that a one per cent increase in the real exchange rate leads to approximately two per cent decline in real factor incomes. To explain the percentage changes in the average price (p) of agricultural output we note that, in the ORANI data base about 70 per cent of the value of agricultural output is exportable, either directly or after only minor processing in domestic manufacturing. A rough estimate of p can be made by assuming that the prices of the 70 per cent of agricultural output which is

Source: The simulations were conducted with ORANI 78 with the exogenous variables as listed in table 23.3 of DPPSV and with standard 1974/5 input-output data.
the increase in the proportion of final goods and services produced domestic in proportion to final goods and services produced final foreign. 

3.1 Increase in final goods and services produced domestic. 

3.2 Increase in final goods and services produced foreign. 

\[
\begin{align*}
\text{(1)} & \quad N + \alpha + \beta = b \\
\text{(2)} & \quad A \frac{dA}{dD} = \gamma 
\end{align*}
\]
in aggregate employment (i.e., about 0.5 per cent). General
increases in domestic costs, unaccompanied by compensating shifts in
the demand curves for domestic products, are projected to reduce
activity, especially in the exporting and import competing sectors
where the scope for passing on cost increases into selling prices
is constrained by international competition. 1 In cases in which
tariff rates remain fixed, the change in the real exchange rate is a
good indicator of the change in the international competitiveness of
the import-competing as well as the export sector. When tariff rates
are increased, as in the first simulation in table 1, the com-
petitiveness of the domestic import-competing sector is influenced
by the consequent increase in the domestic selling prices of imports
as well as by the change in the real exchange rate. This explains
why, in table 1, a one per cent deterioration in the real exchange
rate induced by a general tariff increase is projected to cause a
smaller reduction in aggregate employment than does the same
deterioration brought about by wage or oil-price increases.

The final shock, an absorption increase, generates a
small rise in aggregate employment in spite of the deterioration in
the real exchange rate. The increase in domestic demand stimulates
output and employment in the non-trading sector and in the import
competing sector where the assumption of imperfect substitution

1. The effects of cost increases are projected to be less severe in
the import competing than in the export sector since, according
to the ORANI database, imports and domestic output are far from
perfect substitutes, whereas the elasticity of demand for exports
is quite high.

between imports and domestic supplies prevents the demand increase
from spilling entirely into imports. Note, however, that ORANI
indicates that, because of the contractionary effects of the
accompanying deterioration in the real exchange rate, demand
expansion is not a very effective method of increasing domestic
employment. According to ORANI, most of the demand expansion is
accommodated by a deterioration in the balance of trade.

3.2 The Agricultural Sector

In this subsection we provide a detailed explanation of
the relationship between column (2) of table 1 and columns (3) and
(4); that is, we explain the mechanisms in ORANI which determine the
sensitivity of employment and factor income in the agricultural
sector to changes in the real exchange rate. Real factor income is
measured as the sum of real returns to labour, capital and land
employed in agriculture. For short-run ORANI simulations, in which
the quantities employed of capital and land are held fixed, the
percentage change in real factor income (r) can be defined as:

\[ r = V_L (\ell + w) + V_F (q - cpi), \]

where \( \ell \) is the percentage change in agricultural employment, \( w \) is
the percentage change in the real wage rate, \( q \) is the common
percentage change in the nominal implicit rental rates on
agricultural capital and land, 1 and \( cpi \) is the percentage change
in the CPI. \( V_L \) is the share of labour and \( V_F \) the share of
capital and land in aggregate returns to land, labour and capital in
the agricultural sector.

1. In short-run ORANI simulations, the percentage change in the
rental rates on all fixed factors employed in an industry are
equal.