INVESTMENT INTENTIONS 
AND INVESTMENT REALISATIONS 
IN AUSTRALIAN MANUFACTURING 

Ciaran Driver And Steve Dowrick* 
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INTRODUCTION

There has been relatively little academic work on Australian investment in recent years.\(^1\) This is unfortunate as the behaviour of investment has surprised many commentators. During the mid-1980s investment seemed stubbornly sluggish, despite a rise in the gross operating surplus from 1982. This was followed by the sharp investment boom of the late 1980s which primarily reflected private investment, broadly based across all sectors and including manufacturing (Higgins 1990). Then, in the subsequent cycle there was a further surprise when investment was so slow to follow the strong growth in output, and indeed fell for a protracted period after the trough in June 1991.

The pattern of investment in manufacturing is displayed in Figure A. The series is expressed as a fraction of trend GDP and is broken down into two components: investment in buildings and structures, and investment in equipment, plant and machinery.

In this paper we model Australian manufacturing investment in a two-step approach. Firstly we analyse the accuracy with which declared investment intentions are an indicator of actual changes in future investment. Secondly we use the intentions survey data to record and analyse the determinants of recent changes in investment behaviour.

1. INVESTMENT AND INVESTMENT INTENTIONS

The ACCI/Westpac Survey of capital investment intentions has been carried out quarterly since 1966 on several hundred manufacturing firms. It provides a wealth of detail on expectations and past performance which is useful in identifying the influences on firm decisions such as investment.\(^2\) The investment intentions reported in the survey are studied in section 2 of this paper. First, however, we concern ourselves with the logically prior question of whether these intentions provide an accurate indicator of future actual investment.

This question seems unexplored in the Australian context though previous work has been reported for the UK (Lund et al 1976, 1980; Driver and Moreton 1992). The standard approach is to construct a realisation function linking actual and planned investment (Modigliani and Weingartner 1958).

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1 Important exceptions are Stegman (1982) who argued a role for profit constraints in a regime-switching model and Cunnichael and Dews (1985) who analysed the sectoral performance of Australian investment over a number of decades.

2 Appendix 1 of this paper details the survey questions used and other data sources.
Figure A: Manufacturing Investment 1963-93

Source: UK series 0407XACN71P950P9 & NIOXAC2P71P65D

- Equipment, Plant & Machinery
- Buildings & Structures
The construction of a realisation function for our survey data is challenging because information is only available on the balance of ups over downs in intended expenditures. In response to Question 5 of the survey:

Do you expect your company’s capital expenditure during the next twelve months to be greater, the same, or less than in the past year: (a) on buildings? (b) on plant and machinery?

The responses on plant and machinery (BALPM) and on structures (BALS) are recorded as the percentage point difference between those answering ‘greater’ and those answering ‘less’.

These balances may be identified with rates of change when the underlying distributions of replies across firms are approximately uniform (Bennett 1984; Lund et al 1976; Rosewell 1985; Pesaran and Wright 1989). The dependent variable in the realisation function (actual investment) needs to correspond to this and is taken as the rate of change in real investment expenditure, broken down, as before, into the categories plant and machinery and structures (IDOTPM and IDOTS respectively). All variables and their data sources are described in Appendix 1.

The specification for the realisation function followed previous work in that lagged dependent variables were included with the intentions variable. A cyclical term was also added as previous work has suggested that there is generally an over-reaction of intentions at periods of high activity - this may also be explained in terms of supply constraints. This cyclical term is modelled here as the lagged first difference in the proportion of firms reporting capacity utilisation above normal (DCAP).  

Thus, the specification for the realisation function for plant and machinery is:

\[ IDOTPM_t = b_0 + b_1(L)BALPM_t + b_2(L)DCAP_t + b_3(L)IDOTPM_{t-1} + e_t \]  

(1)

where \( L \) is a lag operator. The structures equation may similarly be specified.

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3 In principle price surprises could also cause a divergence between planned and actual investment. However, interview evidence and econometric results for the UK reported in Driver and Moreton (1992) suggests that this is not of major importance.
1.1. Results for the realisation function

The estimated realisation functions are shown in Table 1.

**TABLE 1: INVESTMENT REALISATION FUNCTION**

DEPENDENT VARIABLES: actual real investment IDOTPM (1) AND IDOTS(2)
94 observations used for estimation 1968 Q1 to 1991 Q2

<table>
<thead>
<tr>
<th>REGRESSOR</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST</td>
<td>0.099(4.38)</td>
<td>0.427(6.58)</td>
</tr>
<tr>
<td>IDOTPM (-1)</td>
<td>-0.423(4.18)</td>
<td></td>
</tr>
<tr>
<td>IDOTPM (-2)</td>
<td>-0.263(2.76)</td>
<td></td>
</tr>
<tr>
<td>IDOTS (-1)</td>
<td></td>
<td>-0.168 (1.69)</td>
</tr>
<tr>
<td>ILS (-1)</td>
<td></td>
<td>-0.059 (3.24)</td>
</tr>
<tr>
<td>BALPM (-1)</td>
<td>0.0026(5.97)</td>
<td></td>
</tr>
<tr>
<td>BALS (-1)</td>
<td></td>
<td>0.0050(4.49)</td>
</tr>
<tr>
<td>DCAP (-1)</td>
<td>-0.0024(2.00)</td>
<td>-0.006(2.42)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.87</td>
<td>0.73</td>
</tr>
<tr>
<td>DW</td>
<td>1.97</td>
<td>2.11</td>
</tr>
<tr>
<td>SC [CHI-SQ (4)]</td>
<td>2.91(0.57)</td>
<td>4.02(0.40)</td>
</tr>
<tr>
<td>FF [CHI-SQ (2)]</td>
<td>1.51(0.22)</td>
<td>2.46(0.12)</td>
</tr>
<tr>
<td>N [CHI-SQ(2)]</td>
<td>2.25(0.32)</td>
<td>12.02(0.00)</td>
</tr>
<tr>
<td>H [CHI-SQ (1)]</td>
<td>0.58(0.48)</td>
<td>1.47(0.23)</td>
</tr>
<tr>
<td>PF[CHI-SQ (10)]</td>
<td>3.65(0.96)</td>
<td>10.27(0.42)</td>
</tr>
<tr>
<td>CHOW [CHI-SQ (8)]</td>
<td>2.35(0.97)</td>
<td>8.60(0.38)</td>
</tr>
</tbody>
</table>

**Notes:** ILS is the level of structures investment; other variables are as defined in the text. Seasonal dummies are included.

**Diagnostics:** SC is the LM test for fourth-order serial correlation. FF is the Ramsey RESET test. N is the Jarque-Bera test for normality of residuals. H is a heteroscedasticity test using squared residuals. PF is a predictive-failure (Chow's second test). CHOW is a parameter stability test (Chow's first test).
FIGURE 1 REALISATION FUNCTION FOR PLANT AND MACHINERY
FIGURE 2 REALISATION FUNCTION FOR STRUCTURES
Declared investment intentions do predict changes in actual investment. Nearly 90% of the quarterly change in real plant and equipment investment can be explained by the intentions balance along with the dynamics. The diagnostics are all acceptable. The results for structures are also reasonable with three-quarters of the variation explained: the dynamics here indicated a lagged levels term. The diagnostics are again acceptable with a failure only on the normality of the residuals: inspection of the associated histogram did not show a high degree of skewness.

The predictive failure tests for both categories of investment are highly acceptable. The out-of-sample performance for the final ten quarters are shown in Figures 1 and 2.

Both equations predict well and in the case of plant and equipment every turning point in the rate of change of investment is accurately tracked. This successful performance suggests that investment intentions are an extremely powerful tool in forecasting actual investment.  

2. MODELLING INVESTMENT INTENTIONS

It is generally easier to model investment intentions rather than actual investment because one can dispense with gestation lags. Furthermore, information is often directly available on expectations as in this case.  

The specification for our equation follows fairly closely the accelerator-type specifications in the literature (Junankar 1972; Clarke 1979): it includes an error correction term in the form of a capacity utilisation variable (CAPTERM). As the dependent variable is investment intentions we expect shorter lags than usual. The basic model is derived in Appendix 2. The main regressor is a term in actual past output (YTERM). A term in expected output (XTERM) was constructed analogously to this, using the expected figures from the Survey. XTERM and YTERM are both included as regressors because the expected term relates solely to short-term expectations (over the next quarter) and thus cannot fully supplant the lag structure on actual output. The basic specification (A3) is modified by terms in confidence, profits and inflation. More specifically, the explanatory variables include general business optimism (OPTERM); unit profits (UPROF) and past

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4 Indeed, there is no significant effect on actual investment of the residuals from the intentions equations in section 2, suggesting that the intentions variable is a sufficient statistic for the explanatory group of variables.

5 Although the ACCU/Westpac survey contains several variables in expectational form, we only utilised the expected output variable as several others were available only for some of the sample period.
inflation (PDOT). The latter variable is included as a proxy for inflationary expectations which might indicate caution in respect of a possible tightening of monetary policy. It was found useful to include terms in the square of YTERM (YSTAR) probably due to the truncation of the Taylor expansion terms in Appendix 2. Two dummy variables are also used: D1 is defined as unity for 1976q2 to 1978q2 and D2 is unity from 1991q2 to the end of the sample in 1993q4. The first dummy is intended to allow for accelerated replacement of energy inefficient plant after the first oil shock, while the second provides for a test of deterioration in Australian fixed capital formation that has been mooted in recent years.

Thus, the final specification of the equation for investment intentions with respect to plant and machinery is, excluding seasonal and dummy variables:

\[
BALPM = b_0 + b_1XTERM + b_2YTERM + b_3YSTAR + b_4CAPTERM(-1) + b_5OPTERM + b_6UPROF + b_7PDOT + e \quad \cdots \cdots (2)
\]

The equation for structures investment intentions, BALS, is specified similarly.

2.1 Results for the investment intentions equations.

The results for plant and equipment and for structures are reported in Table 2, columns 2 and 3 respectively.

The sample period allowing for lags is constrained to start in 1967q4. Ten data points are kept for out-of-sample tests, giving an estimation end point of 1991q2. The dependent variables in each case are the balance of ups over downs in expected capital expenditure over the next twelve months for each of the investment categories.

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6 OPTERM is the balance of improve over deteriorate in the general confidence question (1) detailed in Appendix 1. UPROF is a measure of unit profit formed by subtracting the balance figure for unit cost (question 11) from the selling price balance lagged twice (question 12). The lag here can be explained by trade credit i.e. it is really a cash flow variable. PDOT is the balance for question (12).

7 A real interest rate term (2-year government bond) was never close to significance with any lag in any formulation and was dropped from the equation. The t-ratio never exceeded unity when correctly signed. An explanation for the lack of significance for cost of capital terms may be found in Dixit and Pindyck (1994).
### TABLE 2: INVESTMENT INTENTIONS

**DEPENDENT VARIABLES:** the balance of investment intentions for plant and machinery, BALPM (1,2), and structures, BALS (3,4)

95 observations used from 1967 Q4 to 1991 Q2 for (1) and (3);
105 observations used from 1967 Q4 to 1993 Q4 for (2) and (4).

<table>
<thead>
<tr>
<th>REGRESSOR</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST</td>
<td>49.133(3.23)</td>
<td>49.136(3.36)</td>
<td>12.732 (1.25)</td>
<td>17.683(1.74)</td>
</tr>
<tr>
<td>XTERM</td>
<td>0.114(1.97)</td>
<td>0.115(2.26)</td>
<td>0.234 (7.85)</td>
<td>0.208 (7.23)</td>
</tr>
<tr>
<td>YTERM(-1)</td>
<td>0.103(1.93)</td>
<td>0.109(2.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YSTAR(-1)</td>
<td>-0.0024(2.85)</td>
<td>-0.0023(2.86)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XTERM(-2)</td>
<td>0.876(6.28)</td>
<td>0.283(6.50)</td>
<td>-0.152(3.75)</td>
<td>0.148(3.76)</td>
</tr>
<tr>
<td>YSTAR(-2)</td>
<td>-0.0019(2.26)</td>
<td>-0.0002(2.52)</td>
<td>-0.0008(1.21)</td>
<td>-0.001(1.57)</td>
</tr>
<tr>
<td>CAPTERM(-1)</td>
<td>-0.192(2.19)</td>
<td>-0.467(2.35)</td>
<td>-6.063(2.30)</td>
<td>-6.890(2.67)</td>
</tr>
<tr>
<td>OPTERM(-1)</td>
<td>0.062(2.02)</td>
<td>0.060(2.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTERM(-3)</td>
<td></td>
<td></td>
<td>0.034(1.79)</td>
<td>0.030(1.57)</td>
</tr>
<tr>
<td>OPTERM(-4)</td>
<td></td>
<td></td>
<td>0.030(1.73)</td>
<td>0.038(2.25)</td>
</tr>
<tr>
<td>UPROF(-2)</td>
<td>0.262(3.32)</td>
<td>0.247(3.38)</td>
<td>0.110 (1.72)</td>
<td>0.117(1.92)</td>
</tr>
<tr>
<td>PDOT(-1)</td>
<td>-0.172(3.06)</td>
<td>-0.171(3.14)</td>
<td>-0.082(1.79)</td>
<td>-0.085(1.89)</td>
</tr>
<tr>
<td>D1</td>
<td>8.525(2.55)</td>
<td>8.540(2.59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td></td>
<td></td>
<td>-9.031(2.18)</td>
<td>-8.90(2.59)</td>
</tr>
<tr>
<td>R²</td>
<td>0.81</td>
<td>0.81</td>
<td>0.78</td>
<td>0.76</td>
</tr>
<tr>
<td>DW</td>
<td>1.74</td>
<td>1.72</td>
<td>1.78</td>
<td>1.89</td>
</tr>
<tr>
<td>SC</td>
<td>4.19(0.38)</td>
<td>5.09(0.28)</td>
<td>4.88(0.30)</td>
<td>2.36(0.67)</td>
</tr>
<tr>
<td>FF</td>
<td>1.61(0.20)</td>
<td>0.88(0.35)</td>
<td>0.67(0.41)</td>
<td>0.88(0.35)</td>
</tr>
<tr>
<td>N</td>
<td>0.49(0.78)</td>
<td>0.81(0.67)</td>
<td>18.03(0.00)</td>
<td>16.20(0.00)</td>
</tr>
<tr>
<td>H</td>
<td>0.11(0.75)</td>
<td>0.12(0.73)</td>
<td>0.00(0.97)</td>
<td>0.007(0.93)</td>
</tr>
<tr>
<td>PF</td>
<td>11.44(0.33)</td>
<td>18.00(0.055)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* Seasonal dummies included in each case

Diagnostics as for Table 1.
Plant and Equipment (BALPM)
This equation explains over 80 per cent of the variation in planned investment. The
diagnostics are all satisfactory and there is no indication of mis specification or predictive
failure.

The variables expected output term XTERM and the optimism variable OPTERM(-1) are
jointly significant at the 1 per cent level and the t-ratio rises to nearly 4 on the former term
if OPTERM is excluded. Two lagged terms on the past output variable YTERM are
significant (with corresponding negative YSTAR terms). This may reflect the existence of
carry-over effects in investment or these terms may supplement the expected output term
as the latter refers only to one quarter ahead. Lagged unit profits seems highly significant
with a lag of two and inflation adversely affects intentions with a one-quarter lag. The
significant oil-shock dummy D1 indicates that the balance was raised by nearly 9
percentage points during 1976-8.

The mean values of the regressors are given below so as to compute the effects of a
change in any of these on the intentions balance.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>XTERM</td>
<td>11.11</td>
</tr>
<tr>
<td>YTERM</td>
<td>4.49</td>
</tr>
<tr>
<td>CAPTERM</td>
<td>3.97</td>
</tr>
<tr>
<td>OPTERM</td>
<td>2.61</td>
</tr>
<tr>
<td>PDOT</td>
<td>33.31</td>
</tr>
<tr>
<td>UPROF</td>
<td>-23.10^8</td>
</tr>
</tbody>
</table>

For example a 10 per cent change from the mean in the expected output term in the plant
and machinery equation would increase the balance of investment intentions by 0.12
points, in the context of a mean intentions balance of about 5. This sluggish response
presumably reflects the fact that capacity utilisation at its mean level has sufficient slack to
deal with short term increases in output. A 10 per cent increase in the capacity utilisation
term would increase the balance by 3.3 or about 70 per cent of the mean value.

Structures (BALS)
This equation is similar to that for plant and equipment. The explanatory power of the
equation is similar with an R-squared of 70 per cent. The diagnostics are satisfactory apart
from the rejection of normality, but an inspection of the histogram of the residuals did not
suggest that this is likely to be a severe problem. The predictive failure test is passed at
the 5% level - marginally for the Chi-square form and somewhat more comfortably with

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8 Note that this variable is significantly negative because respondents systematically report that unit costs
have risen faster than selling prices. The UPROF variable itself is fairly stationary with a slight upwards
trend.
the F-form. There is no evidence of mis-specification from the Ramsey RESET test or the other diagnostics.

The magnitude of the coefficients are not too dissimilar from the plant and machinery equation. However, the XTERM effect is larger and stronger and only the second lag on YTERM (and YSTAR) is needed. In fact the lags in general are longer in this equation as might be expected from the fact that gestation times are longer and that greater caution is likely to prevail. The unit profit and inflation effects are markedly weaker. No significance was found for the D1 dummy suggesting that the energy-conserving replacement effect was confined to equipment.

3. RECENT INVESTMENT PERFORMANCE

Both equations passed the out-of sample prediction test for the ten quarter period 1991q2 -1993q4. This might be seen to discount recent discussion in Australia that investment in manufacturing was very slow to pick up in the post-1991 recovery. However, although the predictive failure tests did not reject stability for the overall dynamic relationship, this is not the end of the story. Figures 3 and 4 show the forecasting performance in the 10-quarter period and there is a clear need for an upward constant adjustment. Although the turning points are reasonably well tracked, especially for plant and equipment it is clear that investment intentions have been lower than would be predicted by the estimated equations. This is confirmed by re-running the equations for the full sample and including the variable D2 which is unity from the second quarter 1991. This is significant and negative at the 5% level for plant and machinery and for structures.

Although we have pointed to a slowdown in investment intentions in recent years, compared with that predicted on past patterns, we have not so far suggested why this might be the case. Any answers here can only be speculative. One argument which has been voiced by industry observers is that capital is now more productive than in the past, especially office machinery and production control equipment. This argument is not always spelt out and it is indeed a complex one. If the improved productivity refers to particular equipment then one might expect a substitution of this type for older or less productive equipment. But it is not clear that the capital output ratio would fall overall. In the long run one would expect more equipment to be purchased to the point at which capital productivity deteriorated as increased use was made of it, e.g. computers to do fairly simple activities. If, on the other hand, new vintages of capital transformed old capital to be more productive, e.g. by allowing buildings or machinery to be used more
FIGURE 3 INVESTMENT INTENTIONS FOR PLANT AND MACHINERY

Plot of Actual and Static Forecast(s)
FIGURE 4 INVESTMENT INTENTIONS FOR STRUCTURES

Plot of Actual and Static Forecast(s)

BALS

Forecast
intensively, one would expect a faster depreciation rate with a transitional phase in which the ratio of replacement to expansionary investment would rise and the overall capital expenditure might well fall without any short-term effect on capacity. However, given the slow diffusion of new technology, it seems unlikely that such a scenario would occur suddenly in the space of a few years rather than imperceptibly over a lengthy period.

A final and more plausible candidate for explaining the investment slowdown is the uncertainty over income distribution and demand patterns in Australia. While we can find no significance for dummy variables corresponding to the exact dates of Union-Government labour accords, it is the expectation of the permanence of these that is relevant to an understanding of capital investment. In a recent article Drago and Wooden (1994) point to the fears building up in the early 1990s that the labour accord would be abandoned. The ensuing uncertainty may have depressed or delayed investment. Similarly, there may have been an unusual degree of uncertainty in respect of government macroeconomic policy at this time, given the unexpected severity and persistence of the 1990-91 downturn.

4. CONCLUSIONS

We have shown in this paper that the ACCI/Westpac investment intentions survey for Australian manufacturing is highly accurate in predicting actual investment and particularly so for plant and machinery. We have also modelled the intentions series for plant and machinery and structures and obtained an acceptable forecasting equation which tracks the turning points well. That said, the model fails to account for the delay in investment recovery in the most recent economic upturn. A possible explanation for that is uncertainty over the continuance of the labour accord or in respect of macroeconomic policy.
REFERENCES


Modigliani, I. and H M Weingartner (1958) "Forecasting uses of anticipatory data for investment and sales", *Quarterly Journal of Economics*, 72, 23-34


APPENDIX 1:
SURVEY QUESTIONS AND DATA SOURCES

The following questions were used from the Survey conducted jointly by Australian Chamber of Commerce and Industry / Westpac Banking Corporation.

1. Do you consider that the general business situation in Australia will improve, remain the same, or deteriorate during the next six months?

2. At what level of capacity utilisation are you working?
   Above normal/normal for your firm/below normal.

5. Do you expect your company's capital expenditure during the next twelve months to be greater, the same, or less than in the past year
   (a) on buildings? (b) on plant and machinery?

10;11;12 Excluding normal seasonal changes, what has been your company's experience over the past three months and what changes do you expect during the next three months in respect of: output; average costs per unit of output; average selling prices?
Appendix 1: VARIABLE DEFINITIONS

(Question numbers refer to the ACCI/Westpac Survey)

BALPM: Balance of ups over downs in question 5(b)
BALS: Balance of ups over downs in question 5(a)
DCAP: First difference of percentage reporting capacity utilisation above normal (Question 2)
BCAP: Percentage reporting capacity utilisation below normal (Question 2)
CAPTERM: $\log(BCAP) + \Delta \log(BCAP)$
BAL(Y): Balance of ups over downs in Question 10 on past output
YTERM: $BAL(Y) + \Delta BAL(Y)$
XTERM: Constructed analogously to YTERM (Question 10, expected output)
OPTERM: Balance of improve over deteriorate in Question 1
PDOT: Balance of ups over downs in Question 12 on past selling price
UPROF: PDOT(-2) less the contemporaneous balance of ups over downs in Question 11 on average unit cost
YSTAR: Square of YTERM
D1: Dummy variable = 1 for 1976Q2 to 1978Q2
D2: Dummy variable = 1 for 1991Q2 to 1993Q4
IDOTPM: First difference in actual real investment in plant and machinery (source: DX database).
IDOTS: First difference in actual real investment in structures (source: DX database).
ILS: Level of investment in structures, corresponding to IDOTS
APPENDIX 2:
DERIVATION OF THE INVESTMENT INTENTIONS SPECIFICATION

We express a log-linear accelerator equation linking investment intentions (I) to output change (ΔY) as:

\[ \Delta \log(I) = b_0 + b_1 \Delta \log(\Delta Y) + ECT + e \]

where ECT is an error correction term and e is an error term.

Using a Taylor expansion we note that \( \Delta \log(\Delta Y) \) may be proxied by \( \Delta \log(Y) + \Delta \Delta \log(Y) \).

Using the survey balances to proxy growth rates, as in Bennett (1984), this may be written as:

\[ BALPM = b_0 + b_1[BAL(Y) + \Delta BAL(Y)] + ECT + e \quad (A1) \]

where BALPM is, as in the text, the intentions balance for plant and machinery investment and BAL represents the balance operator.

The error correction term ECT may be written as a lag of \( \log(\Delta Y^*/\Delta Y) \).

where \( Y^* \) is maximum or potential output. Using a Taylor expansion this term may be expressed as

\[ \log(Y^*/Y) - \Delta \log(Y/Y^*) \]

\[ = [\log(\text{BCAP}) + \Delta \log(\text{BCAP})] \quad (A2) \]

where \( \text{BCAP} \) is the percentage of firms reporting utilisation below normal.

Thus, the final specification is:

\[ BALPM = b_0 + b_1YTERM + b_2\text{CAPTERM}(-1) + e . \quad (A3) \]

where \( \text{YTERM} \), \( \text{CAPTERM} \) are the square bracketed terms in (A1), (A2) respectively: and where the sign on \( b_2 \) is expected to be negative.

A similar specification may be derived for structures.
Discussion Papers

These papers are available on request (free of charge). Papers marked * are out of print but photocopies are available at a cost of $10.00 per paper copied (payment to accompany order). Enquiries and orders should be directed to The Publications Officer to the above e-mail address/fax/mail address. A list of earlier papers is available on request.

1993
319 Fane, G.
Economic Reform and Deregulation in Australia
320 Booth, Alison L.
An Analysis of Firing costs and Their Implications for Unemployment Policy
321 Kidd, Michael P.
Trends in the Australian Gender Wage Differential over the 1980s: Some Evidence on the Effectiveness of Legislative Reform
322 Harrison, Mark
Government financing of higher education in Australia: rationales and performance
323 Martina, A. and Nigel Rajaratnam
A disaggregated approach to the ranking of social welfare and poverty levels: an application to Australian data
324 Haskel, J.
Skills, technology, employment and unemployment in the UK
325 Gregory, RG and Boyd Hunter
The macro economy and the growth of ghettos and urban poverty in Australia
326 Driver, Claran and Steve Dowrick
Investment intentions and investment realisations in Australian manufacturing
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Women’s relative earnings under enterprise bargaining

1994
302 Chapman, Bruce
Long Term Unemployment: The Case for Policy Reform
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Immigrant Male Wages in Australia: the Role of Education
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The Spatial Structure of the Labour Market
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Income Contingent Charges for Higher Education: theory, Policy and Data from the Unique Australian Experiment. Published in Economics of Education Review, 1994.

19
Mitchell, Deborah and Steve Dowrick
Women's Increasing Participation in the Labour Force: Implications for Equity and Efficiency (Paper prepared for the Taskforce on Employment Options, Department of the Prime Minister and Cabinet.)

Dowrick, Steve and John Quiggin
Convergence in Living Standards: a non-parametric approach.

Hanushek, Eric

Dowrick, Steve
Fiscal Policy and Investment: The new supply side economics

Dowrick, Steve, Yvonne Dunlop and John Quiggin
Social Indicators and Comparisons of Living Standards: A revealed preference analysis

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Asian trade and industry policies - Western economics? Towards a more general approach to trade liberalisation

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The job compact: Reform in the right direction

Gregory, RG

Mitchell, Deborah; Ann Harding, Fred Gruen

King, Stephen P.
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Gregory, RG and AE Daly