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How Do We Know Where We Are Going,
When We Don't Know Where We Have
Been, Let Alone Where We Are?

by

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1. A Question of Questions?

1.1 The range of comprehensive econometric studies of output, employment and price behaviour is only matched by shorter term forecasting efforts based upon models of differing complexity. Frequently, this work bears directly upon the analysis of circumstances necessary for the enlightening of decisions about economic policy. Reservations arise over the robustness of the theoretical constraints when providing testable hypotheses in circumstances where the specification of the dynamic adjustment processes in the economy is elusive.

1.2 The remarkable energy devoted to the development of models and their use in policy appraisal and forecasting may be compared with the relative lack of attention to the data used in the great bulk of this work. The difficulties and the shortcomings in assessments of contemporary economic trends owes as much to the stability and quality of data as to the theoretical interpretations at the heart of most forecasting models.

1.3 The question posed for this paper is central to the making of economic policy. It is not an analysis of what might have been, given all the advantages of hindsight. Those responsible for major decisions cannot enjoy and scope for "jobbing backwards". What was the available information at the time decisions were taken? How good was, and is, that information?

The main instrument for the announcing of economic policy measures is the Federal Budget. Hence the main thrust of this study is an examination of the available information about domestic economic performance during the period of budgetary planning. The most significant estimates are those bearing upon quarterly announcements on national income and expenditure. Thus trends revealed in the publication of those series for the March quarter in any year provide the basis for linking prospective policy measures to the contemporary experience.

2. Some Recent History

2.1 Estimates are provided in Table 1 for the annual rate of growth of real Non-Farm Gross Product since 1969-70. These estimates are shown initially at the time of first announcement, in effect the annual series disclosed for the fiscal year when the estimates for the June quarter are announced. Subsequent columns show the revisions in these estimates a year and then two years later so giving a broad indication of shifts in the relative direction of the economy. The extent of some of these adaptations can be spelt out to show the relative changes taking place. Two features may be noted:

- a) The extent of the decline in real output in 1971-72 appears to have been much exaggerated. But an even stronger re-interpretation is emerging for the fiscal year 1974-75 where what was treated initially as an historically severe decline in real activity now features as a more modest stagnation.
- b) For most years the initial calculations fail to measure the real gains in the economy with implications not only for the informing of policy decisions and their repercussions but also calculations of productivity. The most spectacular set is that for 1974-75: this requires a re-interpretation of immediate past adjustments and turning points.

Table 1: Rate of Growth of Real Non-Farm Gross Domestic Product

	%			
	Initial Estimates	Estimates Lagged 1 Year	Estimates Lagged 2 Years	Latest Estimates
	(1)	(2)	(3)	(4)
1969-70	6.85	+	6.99	7.19
1970-71	4.41	4.53	4.46	4.83
1971-72	2.87	2.89	3.71	3.95
1972-73	5.22	5.58	6.42	6.29
1973-74	5.46	5.69	5.95	5.94
1974-75	-2.62	-1.17	-0.15	#0.14
1975-76	0.82	1.96	*2.43	*2.43
1976-77	3.53	*4.23	-	*4.23
1977-78	*1.30	-	-	*1.80

Note: + - Constant Price estimates were published initially in the estimates for the June Quarter 1971. On one interpretation the estimates for 1969-70 are the same for columns 1 and 2.

* - Based upon the revised 1974-75 constant price estimates.

- Constant 1974-75 price estimates appear to show a rise of 1.04 per cent.

2.2 These revisions are not paltry substitutions between fiscal years. What emerges between 1971-72 and 1976-77 is a stronger real growth than first appreciated. The initial estimates show a total real growth of about 16 per cent over the six years. Revised calculations based upon the estimates lagged two years, apart from 1976-77, record real gains of some 23 per cent: a recalculation showing an upward shift in the order of 43 per cent. With these sorts of revisions there must be some reappraisal of productivity gains in the economy.

2.3 An examination of the confusions for policy making may best be illustrated by events in the 1976-77 and 1977-78 fiscal years. It will be recalled that the 1976-77 Budget was directed to a gain of 4 per cent in real Non-Farm Gross Product during that year. Yet as the estimates for that series in Table 1 show the initial results recorded a failure to attain this target. But one year later revised estimates bear witness to a successful outcome. This experience is well worth a considered examination.

2.4 During the budgetary planning "season", in essence June and July of any one year, the most important series available on the performance and direction of the economy is quarterly estimates up to the March quarter. In 1977 those estimates were made public on 10 June, 1977. At that time the estimates for the fiscal year 1975-76 had not been revised to any extent from the calculations published with the Budget Speech in August, 1976. On balance the results for the nine months of the 1976-77 fiscal year were suggesting a substantial gain over the budget calculations of a 4 per cent real growth in non-farm output. Data presented in Table 2 summarises the results for 1975-76 and the revised results for that year along with an estimate of the expected performance for the nine months and the full year based upon the Budget Speech and attached statements of August 1976. The final columns reflect an upward revision of the estimates for 1976-77 in light of the actual performance recorded in the first three quarters. It would be reasonable to claim that this somewhat optimistic view of economic trends bore upon policy determinations.

2.5 The main sources of weakness at the time were the shortfalls in real private consumption spending, the net position on foreign transactions, and public capital outlays. But the relative weakness in real private consumption was hardly surprising as official expectations had always seemed inflated. On this point it is well worth reviewing budget estimates during

the past five years, perhaps longer, for the way in which expectations on real consumption outlays are always strong: a feature appearing to reflect a doctrine about the primacy of consumption-led recoveries.

2.6 Yet the results announced with the Budget Speech on 16 August, 1977 brought startling changes. The performance in 1976-77 was much less than anticipated because of sharp downward revisions of estimates for national income and expenditure throughout the year and not just a weak final quarter. Some part of this could be explained by the customary aberrations of the statistical discrepancy which on this occasion matched the shortfall in expected consumption outlays. These features are illustrated in Table 3; see columns 5 to 7. But the same influences came from the balance of payments. In contrast domestic spending other than consumption outlays were stronger than anticipated. However, the problems generated by these revised estimates did not apply to the 1976-77 fiscal year alone. There were drastic revisions to the estimates for the previous year 1975-76, so giving a markedly different impression of the trend in growth of real output over the two fiscal years. As is shown in Table 1 this revision raised the estimated real growth of non-farm gross domestic product more than a full percentage point. It is well to see what this means for a policy-making stance:

- a) Early in June 1977 the real growth in 1975-76 was considered to have been about 1 per cent while the prospects for 1976-77 were favourable to a rapid acceleration in this rate to between 4 and 4.5 per cent.
 - b) But in the August estimates the outcome for 1975-76 had doubled to nearly 2 per cent while the real gain for 1976-77 was below expectations at about 3.5 per cent.
- The rapid acceleration was not nearly so evident.

2.7 These two experiences - the general upward revisions of estimates for the seventies and the specific policy environment of mid-1977 - point to worries about the basis for entering judgements on measures appropriate to economic circumstances. The application of economic policies has to be taken in the context of the time as it is then perceived. What is clear is the uncertainty as to what has taken place in the economy during the past and the even greater uncertainty as to what is taking place at the time critical policy measures are being explored and determined. It is well to recall that these

Table 3: Gross Domestic Product; Expectations, Revisions
and Outcomes 1975-76, and 1976-77
(1966-67 constant prices)

	1975-76		1976-77		Contribution to GDP in 1976-77		
	Initial 17.8.76 (1)	Revised 16.8.77 (2)	Actual 16.8.77 (3)	% on 1975-76 (4)	Expected 22.9.76 (5)	Actual 16.8.77 (6)	Margin (7=6-5)
1. Gross Domestic Product	32,876	33,599	34,751	+3.43	+1248	+1152	-96
2. Farm Product	3,018	3,028	3,102	+2.44	+60	+74	+14
3. Non-Farm Product	29,858	30,571	31,649	+3.53	+1189	+1078	-111
4. Private Consumption	21,401	21,505	22,096	+2.75	+909	+591	-318
5. Public Consumption	4,220	4,140	4,350	+5.07	+100	+210	+110
6. Private Fixed Investment -	4,883	4,875	5,037	+3.32	+80	+162	+82
a) Dwellings	1,416	1,391	1,520	+9.27	+114	+129	+15
b) Other Buildings, etc.	878	881	765	-13.17	-145	-116	+29
c) Other	2,589	2,604	2,752	+5.72	+111	+148	+37
7. Public Fixed Investment	2,901	3,030	2,956	-2.38	-150	-74	+76
8. Changes in Stocks							
a) Private Non-Farm	-286	-93	600	-	+474	+693	+219
b) Farm	14	-52	23	-	-114	+75	+189
9. Statistical Discrepancy	-70	341	85	-	+70	-256	-326
10. Exports Less Imports	-187	-148	-398	-	-120	-250	-130

same issues permeate the determinations in the wages sphere; all the more noteworthy when quarterly hearings mean a near continuous review of government economic policies.

3. The Experience of Measurement

3.1 Few efforts have been made to analyse the "reliability" of estimates bearing upon the directions being taken in the economy. Some years ago the problems of choice of data for testing models in the Australian context was noted. [1] At the same time a comprehensive treatment of important economic series in Australia was offered for appraisal. The final comment in that work read

"On the whole, the extent of the annual data revisions outlined in this section point to the conclusion that the problems of data collection are such as to hinder the fine tuning of the economy that economists would ideally seek to institute" [2, p.34]

3.2 The recent experiences with estimates of national income and expenditure suggest a need for reviewing the extent and pattern of revisions to major series. The two previous studies dealt with data estimated for periods of much greater price and exchange rate stability than in recent times. But what sort of changes might be examined? All revisions can be explained by access to basic data used in compiling series, changes in definition, concept and terminology. Yet this helps little if at all in a policy context. It would be possible to examine successive changes in a specific item for one quarter. However, the greatest interest attaches to the interpretation of the ways in which the economy is changing. Hence the most useful approach, with a policy orientation, is the analysis of how rates of growth in major series are adapted through revisions in series.

3.3 The approach used is the examining of rates of growth on a quarterly and annual basis with appropriate seasonal corrections. In other circumstances the pattern of adaptation of the seasonal correction would also be of interest because of its potential variability. In this section the estimates are examined for the rate of growth as published initially and then observed for subsequent revisions. Further detailed calculations are incorporated in an appendix.

3.4 The quarterly growth series are observed over thirteen successive periods while the annual data records the same for ten periods. The emphasis is on the quarterly observations rather than the annual series depicted in Table 1. These observations are then measured in terms of the mean rate of growth, the standard deviation and the co-efficient of variation.

3.5 However, interest attaches to the pattern of revision in these growth rates: in effect how far does the initial observation depart from the mean and the "final" estimate in the sense of the tenth or thirteenth observation. With much interest for policy themes in March quarter performance the series of observations are illustrated in four diagrams:

- a) Figure 1 shows the annual growth - March quarter on the previous March quarter - for real non-farm product.
- b) Figure 2 shows the quarterly growth - March quarter on the previous quarter - for real non-farm product.
- c) Figure 3 shows the annual growth for real private consumption spending.
- d) Figure 4 shows the quarterly growth for real private consumption spending.

These observations are for the March quarters in five fiscal years from 1972-73 to 1976-77: in the latter case there are six observations. Moreover, only ten observations are available in the quarterly series for 1975-76.

3.6 Estimates in Figure 1 suggest a pattern of adaptation with downward revisions from the initial observation followed by successive upward revisions on two occasions exceeding the rate initially recorded. The 1976-77 series shows a different adjustment so far as it goes. Estimates in Table 4 are for the four years with ten observations. The variability of the estimates has been increasing in quite clear fashion. The adjustments tend to follow a U-shaped pattern so that two and a half years after the event the economy seems to have been more or less where one thought it was! This conclusion rests upon a view about improving quality with experience.

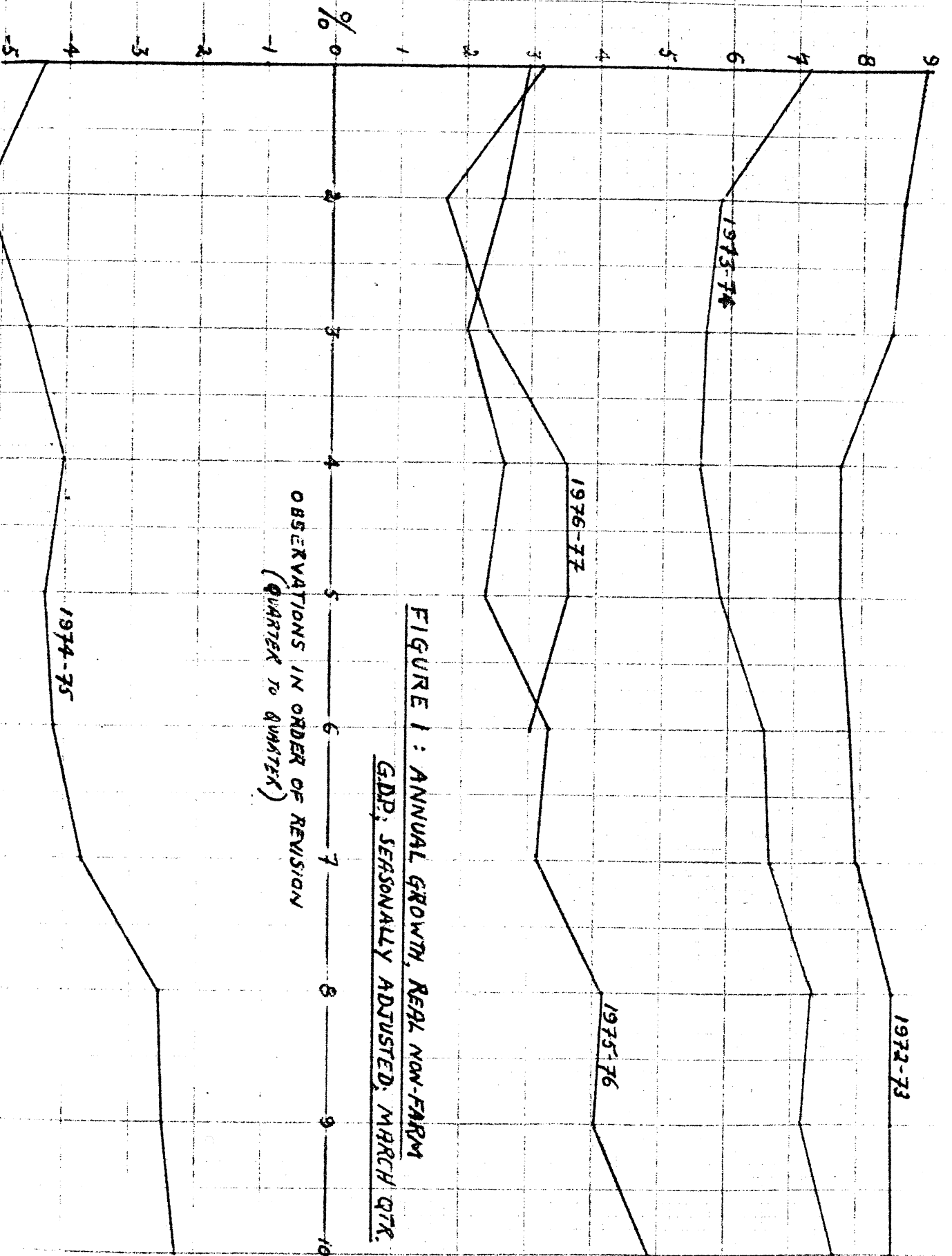
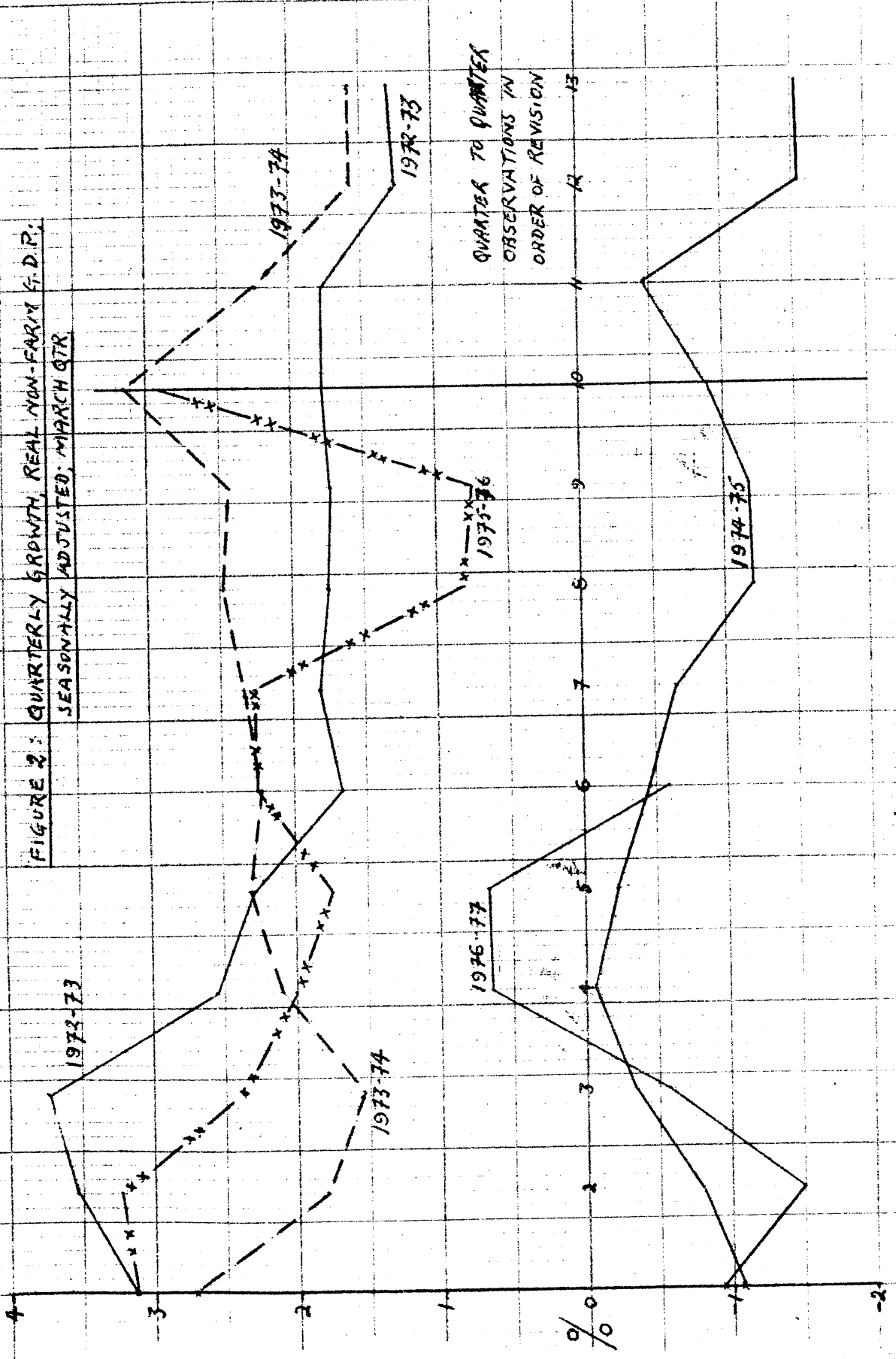
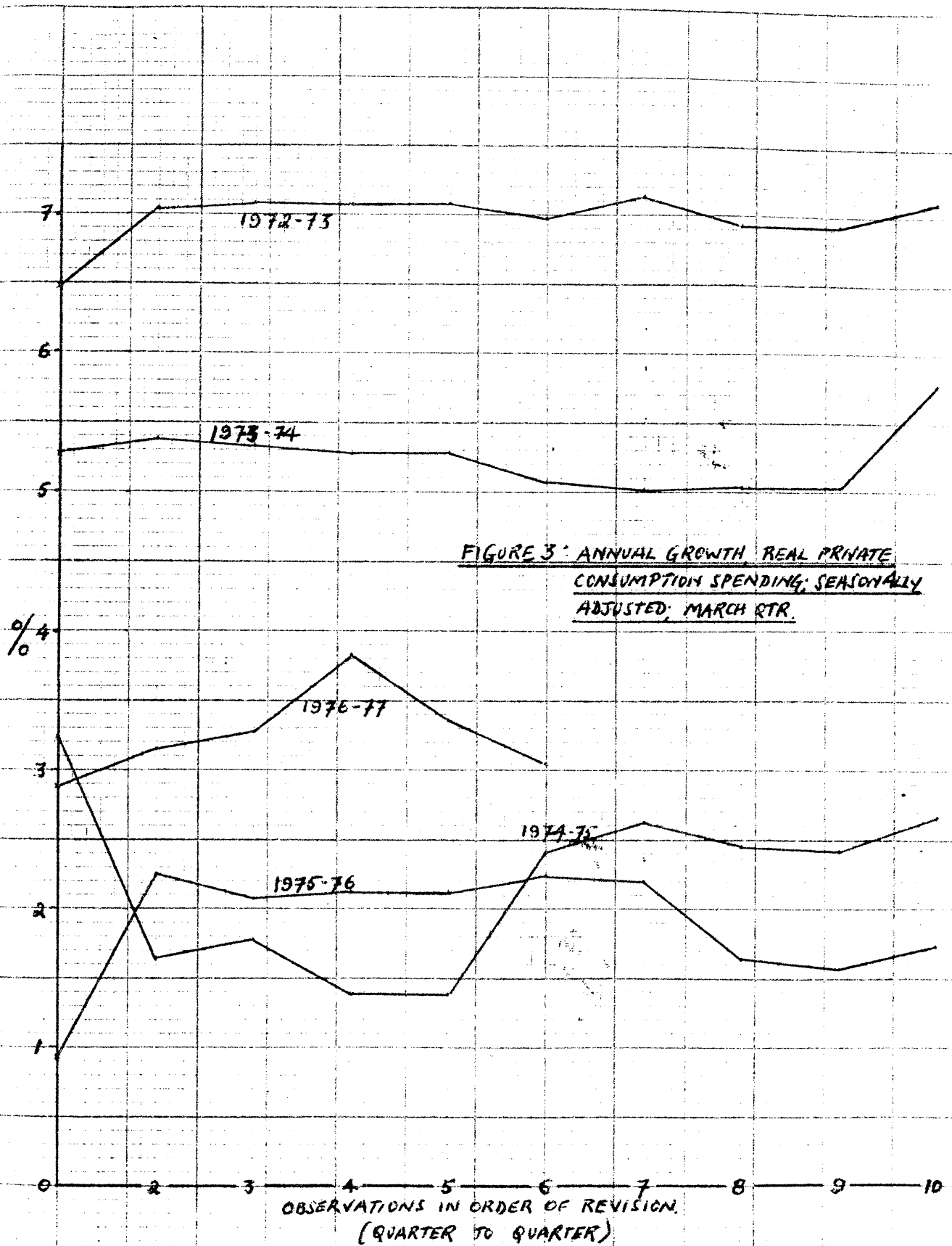


FIGURE 1 : ANNUAL GROWTH, REAL NON-FARM
GDP, SEASONALLY ADJUSTED, MARCH QTR.

OBSERVATIONS IN ORDER OF REVISION
(QUARTER TO QUARTER)

FIGURE 2: QUARTERLY GROWTH, REAL NON-FARM G.D.P., SEASONALLY ADJUSTED, MARCH QTR





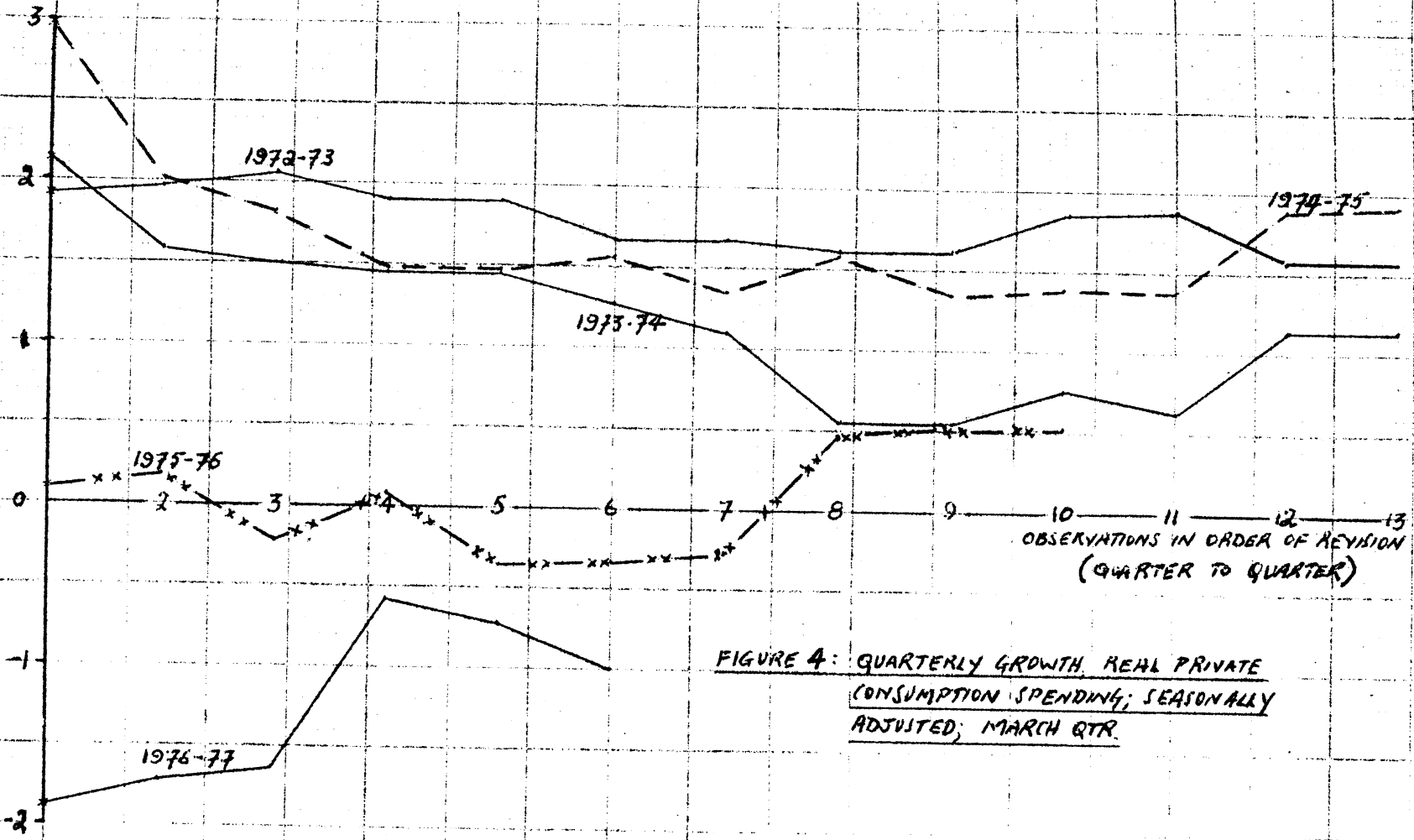


FIGURE 4: QUARTERLY GROWTH, REAL PRIVATE CONSUMPTION SPENDING; SEASONALLY ADJUSTED; MARCH QTR.

Table 4: Variability of March Quarter Non-Farm
GDP Estimates of Annual Real Growth

	Mean Growth (%)	Standard Deviation	Co-efficient of Variation	Ratio Initial to Mean %
1972-73	8.26	.45	5.48	1.08
1973-74	6.55	.77	11.77	1.10
1974-75	-3.78	.99	26.10	1.16
1975-76	3.21	.90	28.07	0.92

3.7 However, the quarterly observations in Figure 2 extend over a longer period with thirteen observations for three of the years. It is well to note the pattern of adjustments following that tenth observation; historical revision looks to have set in with a vengeance! The variability of these estimates is high and the initial estimates are well above the mean. It

Table 5: Variability of March Quarter Non-Farm
aGDP Estimates of Quarterly Real Growth

	Mean Growth %	Standard Deviation	Co-efficient of Variation	Ratio Initial to Mean
1972-73	2.17	.82	37.55	1.43
1973-74	2.19	.47	21.63	1.24
1974-75	-0.80	.48	59.86	1.34
1975-76*	2.15	.86	39.93	1.45

Note: *ten observations.

would be reasonable to think that this outcome would be the experience with quarterly rather than annual series. However, the estimates indicate the great caution needed when examining and interpreting quarterly data.

3.8 What of the experience with real consumption outlays? The significance of this series for the recovery in real output and employment was stressed in earlier paragraphs. The adjustment path was smooth in the earlier years but has revealed a diversity of patterns in recent years.

The shift in experience is clear from Figure 3. Once again the estimates point to the increasing variability of the observations and the difficulties of incorporating a reliable series in forecasting procedures.

Table 6: Variability of March Quarter Real
Private Consumption Outlays; Annual Growth

	Mean Growth %	Standard Deviation	Co-efficient of Variation	Ratio Initial to Mean
1972-73	7.0	.21	3.01	.93
1973-74	5.25	.23	4.46	1.01
1974-75	2.20	.61	27.83	1.46
1975-76	1.89	.42	22.15	0.50

3.9 The quarterly growth series do not differ greatly from the annual series except in the variability of the estimates. Here the series exhibit some startling outcomes found to be present for other quarters in 1974-75 and 1975-76. The highest co-efficient of variation is 4642.05 for the September quarter, 1974-75. The estimates in Table 7 spell out the relationship for the March quarters in ways which re-inforce the strong impression of the increasing variability of the estimates.

Table 7: Variability of March Quarter Real
Private Consumption Outlays; Annual Growth

	Mean Growth %	Standard Deviation	Co-efficient of Variation	Ratio Initial to Mean
1972-73	1.78	.17	9.47	1.08
1973-74	1.17	.47	40.48	1.82
1974-75	1.71	.45	26.38	1.75
1975-76*	0.07	.35	522.05	1.47

Note: *ten observations.

3.10 The dominant impression of the results of the analysis in this section, and the more extensive review in the Appendix, is the increasing difficulty in the handling of important series relevant to policy making. But the analysis goes further to question the extent to which efforts in constructing and testing many econometric models with a shorter term orientation can be fruitful. So long as the data base is open to serious misgiving as to meaning and variability then questions on choice in the use of professional resources should be canvassed. Any whittling away of the resources available to the Australian Bureau of Statistics is misplaced. If policy making is to be illuminated by reasonably reliable data promptly delivered, then a stronger backing to the work on national income work is essential. In the series treated in this section the results for 1972-73 are islands of tranquillity in an otherwise disturbed sea of statistics. Yet in the issue of national income estimates for June 1973 the publication of constant price series on a quarterly basis was suspended because -

"the quarterly estimates do not appear in current circumstances to be giving reliable or useful figures. The usual calculations for seasonally adjusted constant-price estimates of gross non-farm product would result in a figure for June quarter lower than that obtained for March quarter. This appears inconsistent with other economic indicators. Greater uncertainty attaches to the usual calculations in conditions of sharp and diverse price changes. Apart from changes in wool and mineral prices, there would have been wide-ranging changes in price relativities as a result of parity changes in December and February, and since then as a result of the appreciation of some currencies relative to the Australian dollar. Another difficulty appears to be the impossibility of ensuring consistent timing in the estimates of exports, farm stocks and farm product in a time of large and erratic price movements. There are also some uncertainties associated with seasonal adjustment in this area. These factors also affect the current-price figures to some extent but the defects are inevitably aggravated in the constant-price estimates."

3.11 More recent experiences in the Australian economy would mean even stronger and more sustained difficulties for constructing the estimates. What this implies is a greater application of professional skills to ensure quality in the presentation of data at that time when it is most needed. For the moment one might be forgiven for thinking that "history" is bunk!

4. Some Questions

4.1 The matter treated in preceding sections deal with what has happened or is happening in the economy. Examples relating to the March quarter estimates for recent fiscal years reflect a concern for what the latest information available about the state of the economy means at a critical time in policy making. Instabilities in the relationship between the initial observation and the mean estimate for a given series does not help in any assessment of the confidence to be placed in that initial announcement. Moreover, the variability of the observations for a series has been worsening in recent years. Furthermore, little can be said about the interval between the initial observation and that observation which approximates the mean estimate. Hence, the cautionary note offered regularly by the Australian Statistician about using quarterly series is well understood.

4.2 Yet the question must be asked as to whether this situation is in any way satisfactory. Policy needs are clear: prompt and accurate recording must help illuminate choices of action. But much less than this may hinder much more than help understanding of what is taking place. Were it just a question of the quarterly estimates, the misgivings might be contained: a viewpoint not acceptable to this participant. The same worries attach to the annual series depicted in Table 1. For just how long is the recent past to be moulded in new ways?

4.3 What is now offered in the change to a 1974-75 constant price base is a thorough re-interpretation of events between 1974 and 1976. Reservations about continued reliance on an old price basis in 1966-67 are accepted. Yet the parallel constant price series on the two bases challenge the interpretations of policy efforts and requirements in those past years. Those working with capacity variables have further reasons for checking procedures bearing upon actual and potential outcomes in the economy. This in itself may be handled with the passage of time and revisions in the data. Nevertheless the calculations in the preceding section for the 1974-75 must raise doubts about the suitability of that year for the setting of a constant price base. That is the year showing the biggest adjustment from the initial observation to the most recent; from -2.62 per cent to 0.14 per cent and perhaps higher.

4.4 Implications for the analysis of future prospects using quarterly estimates are serious. Many forecasting models use explanatory variables drawing upon these quarterly figures including rates of change in the immediate

past; lagged relationships are all too familiar. Instability in the measured variability of series from one fiscal year to another may help explain problems of fit beyond the period drawn from with time series.

4.4 However, the use of rates of growth for examining the series has another purpose. What is witnessed in the revisions of Table 1 is not only the obvious upward adjustment of the real growth rates but also the review of output per head whether in terms of productivity or some similar notion. In short the rate of growth necessary for the expansion of employment is itself rising. How far this reflects the substitution effect of replacing labour with capital equipment in response to high real unit wage costs is a matter of vital contention. But the sustained high wage shares and real wages of recent years is impressive for this challenge. What reinforces this position is the possible increase in the rate of obsolescence because of technological progress; this has implications for the productive capacity of the economy. The relatively low profit share may hamper new investment necessarily at an historically higher rate to sustain expansion in output and employment. Thus firms may be restricted in what they can do to meet potential demand.

4.5 The Keynesian response on the real wage rise is seen in terms of lowering aggregate saving and thus adding to total demand. But this income effect is negated by the recent experiences in Australia.

4.6 Accordingly an awareness of the trends in the real growth rate is of the greatest priority. While the real wage issue is central to any policy appraisal in this country, at present as it has been since 1973, the great risk in wrongly interpreting the real gains in performance, is that the efforts to sustain high real growth will be thwarted with all the self-sustaining features of classical unemployment then well to the fore.

4.7 In all these circumstances the understanding of future possibilities can only be sustained by clarifying what the past has really been and where the economy is really going currently. The imperatives for illuminating policy needs must be found in improved sources of data. Forecasters and their fellow travellers may well ponder the materials of their trade rather than the technical wizardry. For many their results may well be treated roughly; perhaps in the way the founder of the Dadaist movement, Tristan Tzura, addressed James Joyce -

Tzara (handing Joyce his folder): Furthermore your book has much in common with your dress. As an arrangement of words it is graceless without being random; as a narrative it lacks charm or even vulgarity; as an experience it is like sharing a cell with a fanatic in search of a mania

- Tom Stoppard: *Travesties* (1974).

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- 2) J.R. Rush & S.B.M. Harrison: "Data Revisions and Some Econometric and Policy Consequences": *A.N.Z.A.A.S.*, 45th Congress; Perth, August 1973: pp. 35.