ESTIMATES OF PRIVATE SECTOR WEALTH

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ABSTRACT

This paper provides quarterly estimates of private non-human wealth at market prices in Australia over the past decade. These estimates are based on the methodology set out in Piggott (1987), although improvements have been made in several important areas.

The estimates suggest that private non-human wealth stood at $1,428 billion in the June quarter 1990. The dwelling stock accounted for 52 per cent of the total, business assets for 37 per cent, with the remainder being made up of consumer durables, holdings of government bonds and holdings of currency.

The paper also introduces an index of asset prices, based on the wealth estimates.

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1. INTRODUCTION

This paper provides quarterly estimates of private non-human wealth at market prices in Australia over the past decade. These estimates are based on the methodology set out in Piggott (1987), although improvements have been made in several important areas. The first part of the paper sets out the basic methodology used and discusses the concepts involved in calculating the components of the wealth series. In the second part, the results are discussed, particularly the contributions of the individual components to total wealth. These estimates are then used to construct an index of asset prices.

The two main areas where the methodology employed differs from that of Piggott are in the calculation of dwelling wealth and business assets. For dwelling wealth, Piggott used a price series based on prices in four capital cities (Sydney, Melbourne, Adelaide and Brisbane). This paper uses a weighted average of capital city and other area prices. Because prices in other areas are lower than in capital cities, this lowers the estimated market value of the dwelling stock. For business assets, the approach used here is to obtain separate estimates for the market value of plant and equipment and non-residential structures, with each estimate based on a sample of companies grossed up by ABS estimates of the respective capital stocks. Piggott calculated business wealth directly from the market valuation of a sample of corporate enterprises. This procedure ignored financial companies altogether. Furthermore, it probably resulted in an under-representation of commercial property. Given the boom in commercial property prices in recent years, this would cause a further understatement of the market value of total business wealth in recent years.

The estimates suggest that the dwelling stock accounted for 52 per cent and business assets 37 per cent of total private non-human wealth in the June quarter of 1990. The remainder is made up of consumer durables, holdings of government bonds and holdings of currency. In the June quarter of 1980,

the proportions were 51 per cent for the dwelling stock and 33 per cent for business assets.

2. ESTIMATING PRIVATE SECTOR WEALTH

Five separate components of total private sector wealth are identified and estimated. These are the stock of dwellings, the stock of consumer durables, business assets (which are adjusted for overseas holdings of domestic assets and Australian holdings of foreign assets), non-official holdings of government bonds and non-official holdings of currency.

(a) The Dwelling Stock

Data for the outstanding number of dwellings are available for June 1981 and June 1986 from Census results. These figures are combined with the quarterly ABS series on the number of new dwellings completed and with estimates of demolitions and sales by housing authorities to the private sector to obtain a quarterly series on the number of dwellings.[1]

The market value of the stock of dwellings is then obtained by multiplying the number of dwellings by a suitable price series. The series used here is a weighted average of established dwelling prices in capital cities and other areas. This approach differs from most previous studies, where a series relating to the price of established dwellings in capital cities has been used. The latter is likely to overestimate the values: for instance, according to the Commonwealth Bank/Housing Industry Association (CBA/HIA) figures, the median price of an established dwelling in capital cities in June 1990 was $133,400 while outside capital cities it was $92,900.

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[1] The stock of outstanding private dwellings in any period is equal to the previous stock plus the number of new dwellings completed plus sales to the private sector by housing authorities less demolitions. Data on sales by housing authorities and on demolitions are not readily available. Instead, they are derived as a residual to keep the census data consistent with the completions data, i.e. the residual is calculated to keep the June 1981 census estimate of the number of existing dwellings plus the number of completions over the period consistent with the stock of dwellings estimated in the June 1986 census. The residual is assumed to be constant each quarter and to apply outside the June 1981 to June 1986 period.

The price series used here has been spliced together from series calculated by the CBA/HIA and the Real Estate Institute of Australia (REIA). The CBA/HIA publish a series on the median price of established dwellings in capital cities from 1984.[2] They have also recently started to publish information on the median price of established dwellings in other areas. This, however, is only available from December 1989. To calculate the series back to 1984, it is assumed that the growth rate of prices in other areas is the same as that for capital cities. For the period 1980 to 1984 the growth rates in the REIA series for capital city prices are used to backdate the CBA/HIA series.

To determine the appropriate weightings for capital cities and other areas in the overall dwelling price series, information was obtained on the number of outstanding dwellings in each capital city from the 1986 census. The weights calculated were 62 per cent for capital city prices and 38 per cent for other area prices. This gave a value for the dwelling stock of $741 billion in the June quarter 1990.[3]

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[2] The use of a median rather than a mean dwelling price will bias downwards the estimate of the value of the stock of dwellings. However, a time series on mean dwelling prices is not available as far as I know. Piggott's estimates used a mean price but this covered prices only in Sydney, Melbourne, Adelaide and Brisbane. Conversations with the sources he quoted suggest that such a series could no longer be constructed. The extent of the bias depends on the skewness in the distribution of dwelling prices. The more skewed to the left the distribution is, the greater the mean relative to the median. Yates (1991), using information from the 1988/89 Household Expenditure Survey (HES), calculated the mean value of owner-occupied dwellings at $136,367, while the median was $100,000.

[3] Yates (1991) has made use of information contained in the 1988/89 Household Expenditure Survey to make an estimate of housing wealth. She estimated owner-occupied housing wealth to be $537 billion in 1988/89. To obtain a figure for total housing wealth this needs to be grossed up by the proportion of non-owner occupiers. The HES estimates the owner-occupation rate to be 72.7 per cent. Using this figure gives an estimate of $739 billion for the value of the total dwelling stock. As she points out, a number of assumptions need to be made to obtain this figure. The most important is that the quality of the owner-occupied stock is the same as that of the rental stock. It is more likely that the owner-occupied stock is of a better quality and better located than the rental stock, implying this estimate is overstated. It is difficult to make a direct comparison of the figures presented here and the Yates' estimate because the HES is compiled over a whole year, not at any particular point in time. Assuming the HES applies to June 1989 then the estimate here is lower by some $40 billion. If an average of the June 1988 and June 1989 estimates are used, the estimate here is $125 billion lower than Yates' estimate. An alternative way to gross

Foreign ownership of the dwelling stock should be deducted from the total to obtain domestic ownership. However, because no data are available on foreign ownership of dwellings, no adjustment is made.

(b) Consumer Durables

The stock of consumer durables is defined as the sum of the stock of household durables and the stock of motor vehicles. Piggott took these data from the Reserve Bank RBII model database. This database is available only up until the June quarter of 1988. From then, the figures are updated as follows. The constant price stock is calculated each period by adding the constant price estimates of expenditure in these categories (taken from the National Accounts) to the previous period's depreciated stock. The previous period's stock is depreciated according to the depreciation rates in the Treasury NIF10 model.[4] These are 25 per cent per annum and 28.6 per cent per annum for consumer durables and motor vehicles respectively. The current period's stock is then converted to current prices by use of the relevant price deflator.

(c) Business Assets

The estimates for business assets derived here differ from those made by Piggott in several ways. Firstly, Piggott excluded the wealth of financial enterprises. Second, the companies in his sample held a disproportionately low amount of commercial property. Given that the market value of commercial property rose particularly quickly in the late 1980s, estimates of the market value of business assets based on Piggott's sample would be increasingly understated over those years. Third, although he subtracted

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up the estimate of owner-occupied housing wealth is to use the national income estimates of imputed and monetised rentals. This gives an estimate for the value of the total dwelling stock of $707 billion. This is only $10 billion higher than the estimate made here for June 1989. This method should overcome the problem of assuming that the owner-occupied and rental stocks are of the same quality. (I would like to thank John Piggott for suggesting this method to me.)

[4] Note that durables are depreciated whereas the housing stock is not. This is because the housing price reflects the price of the existing, depreciated stock whereas the durables price is for **new** durables only.

the foreign ownership of domestic business assets, he did not include the domestic ownership of foreign business assets in his estimates of business wealth (although such an adjustment was made to total wealth).

The estimates of domestically-owned assets of incorporated and unincorporated business, whether domiciled in Australia or abroad, presented here consist of five components. These are: non-rural equipment and inventories; non-rural non-dwelling construction (NDC), including the land on which the structures are built; rural business assets; domestic ownership of business assets domiciled abroad; and (minus) foreign ownership of business assets domiciled in Australia.

(i) Non-rural equipment and stocks

The first step was to calculate the ratio of the market value to historical value of the assets of a sample of large, non-financial, non-mining companies.[5]

The second step was to multiply this by ABS estimates of the historical value of all equipment (whether held by incorporated or unincorporated enterprises but excluding that held by the rural sector) plus the historical value of all non-rural inventories.[6] There are two implicit assumptions in this procedure. The first is that the ratio of market to historical values for unincorporated enterprises is the same as that for corporations. The second is that the sample companies' holdings of equipment are representative of the total business sector's holdings.

These assumptions seem reasonably plausible. However, the sample companies' holdings of NDC are likely to under-represent commercial

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[5] The market value is calculated as the market value of equity plus the book value of debt. The historical value is calculated for each company in the sample by subtracting the asset revaluation reserve from the book value of the capital stock.
The market value of this sample forms the numerator of Tobin's q as calculated by Dews (1986). Financial and mining companies are excluded from the sample because their asset portfolios are significantly different. The former hold a disproportionately high amount of property and financial assets. The latter have large investments in exploration and it is not clear how these should be treated in capital stock estimates.

[6] Data on the historic cost capital stock were obtained from the ABS. For inventories it was assumed that the historic cost is equal to the book value.

property. For this reason, the aggregate market value of NDC is calculated separately as follows.

(ii) Non-rural NDC

There are major differences across industry categories in both the type of NDC held and the value of the associated land. For this reason, the aggregate market value of NDC was derived as the sum of that for three categories: banking, finance and property; retail and wholesale; and all other non-rural.

The holdings of NDC of the sample used above was assumed to be representative of the holdings of the second and third categories. Hence, the sample ratio of market to historical values referred to above was used to calculate the total market value of NDC for each of these categories. For banking, finance and property, however, a disproportionately high amount of the holdings of NDC is in the form of office buildings. For this reason, the sample ratio used above is inappropriate and another ratio, based on a sample of companies which hold office buildings almost exclusively was used.[7] This then gives three component estimates of the market value of NDC but with each excluding the value of the land on which the structure is built.

This will obviously lead to an underestimate of the value of non-dwelling construction and will underestimate the share of business wealth in the total estimates. Hence each of the components needs to be grossed up by an estimate for land.

Obtaining a value for land proved difficult and any attempt at incorporating it is somewhat arbitrary. Data were obtained from the NSW Valuer-General's (VG's) Department on site values and rental values for representative office, industrial and retail buildings in Sydney, Newcastle and Wollongong. These data were used in conjunction with data on yields on office, industrial and retail buildings in Sydney obtained from Baillieu,

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[7] This sample consisted of 10 property trusts in 1990 although unfortunately only 4 of these existed in 1980.

Knight, Frank.[8] Using the data on yields and rent, a price for each structure was calculated and the site value as a proportion of this price was obtained. A simple average for all the areas listed in the VG's Department report was then calculated.[9]

In 1989, land represented 26 per cent, 33 per cent and 31 per cent of the value of the property for retail, office and industrial structures respectively. These are proportions of the market value and hence should be added to the market value of non-residential construction. It was assumed that office buildings were representative of the banking, finance and property sector, retail of the retail and wholesale sector and industrial for the remainder in grossing up the value of non-dwelling construction to incorporate land. These proportions were assumed to hold throughout the sample period.

The total market value of non-rural equipment, inventories, NDC and associated land can thus be written as:

$$
\begin{aligned}
&(\text{Total equipment and inventories at historical cost})_t * \text{sample 1 ratio}_t \\
+\ &(\text{Retail and wholesale NDC at historic cost})_t * \text{sample 1 ratio}_t * (1/(1-0.26)) \\
+\ &(\text{"Other" NDC at historic cost})_t * \text{sample 1 ratio}_t * (1/1-0.31)) \\
+\ &(\text{Banking, finance and property NDC at historic cost})_t * \\
&\quad \text{sample 2 ratio}_t * (1/1-0.33))
\end{aligned}
$$

(iii) Rural wealth

In the rural sector, nearly all enterprises are unincorporated and of a completely different nature to those covered by the samples. In this case, Piggott's approach of estimating rural wealth separately was followed. Piggott's estimates of rural wealth are used and are updated from information from the "Farm Surveys Report" carried out annually by ABARE.[10] Rural wealth is calculated as the product of average farm capital

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[8] The yields obtained were for prime office, industrial and retail buildings in Sydney. They may therefore not be applicable to all the areas covered by the Valuer-General's Report.

[9] No information is available on the number of structures in each area so a weighted average could not be calculated.

[10] This survey is published annually. Quarterly observations are linearly interpolated from the annual ones.

and the number of farms in each sector.[11] The series that can be constructed from recent surveys is not directly comparable to that calculated by Piggott, so growth rates are used to update the Piggott series.[12]

(iv) Domestic ownership of foreign business assets

This series should be added to total business wealth as the profits from these assets are recorded in the national accounts as domestic income. The series used is calculated from the ABS publication Foreign Investment, Australia.

(v) Foreign ownership of domestic business assets

Finally, foreign ownership of domestic business assets needs to be deducted from the total value. This series is obtained from the same ABS release referred to above.

Summing the first four categories and subtracting the fifth gives an estimate of the total market value of business assets. The figure of $525 billion in June 1990 compares with the Treasury's estimate of $229 billion.[13] There are four reasons why the estimate here is higher. Firstly, it includes a value for land in non-residential construction. Secondly, property held by the banking, finance and property sector is valued from a sample of companies which hold a high proportion of office buildings rather than from the non-mining, non-finance sample. Thirdly, rural wealth is estimated separately rather than from the non-mining, non-finance sample. Fourthly, Australian holdings of overseas assets are included in business wealth.

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[11] ABARE estimates of farm capital include land.

[12] Piggott used the results from the Bureau of Agriculture survey of the rural sector. This survey is now published by ABARE. However, the coverage of the survey has changed and hence estimates calculated from recent surveys are not comparable to those from the earlier years. This is why growth rates are used to update the original estimates made by Piggott. In 1988/89, ABARE changed the method of valuation of farm properties. Prior to this, they had used valuations from the Commonwealth Development Bank. Now they use the farmer's own valuation. This may cause a step change in rural wealth in June 1989.

[13] See Treasury (1990).

While the estimate presented here is substantially higher, it should be noted that it is more consistent with national accounts estimates of gross domestic product. The ratio of business wealth to dwelling wealth is 0.71, compared to 0.28 in the Treasury's estimates. If one thinks of GDP as the return on wealth (including human wealth), business wealth should be about 2.5 times as large as dwelling wealth. This follows from the observation that the gross operating surplus of corporate and unincorporated business is about 2.5 times as large as imputed and actual rent, which can be thought of as the return on the dwelling stock. It may be that the preferential taxation of owner-occupied housing causes its required pre-tax rate of return - as reflected by national accounts rent data - to be much less than the required pre-tax rate of return on business assets. But it is difficult to believe that this fully reconciles the observed multiple with the implicit (national accounts) multiple of 2.5. Hence, it is likely that, despite being large relative to previous estimates, the estimate of business wealth presented here still understates its true share of total wealth.

(d) Non-Official Holdings of Government Bonds

As noted by Piggott, it is debatable whether the private sector considers holdings of government bonds as net wealth (see Barro (1974)). However, to be consistent with previous authors an estimate is provided.

The private sector has two main claims on the public sector; their holdings of Commonwealth Government securities (CGS) and their holdings of Local and Semi-Government securities. Data on CGS at face value classified by holder are available in the Reserve Bank Bulletin. Private holdings at face value are calculated as total holdings less holdings by the RBA, major commonwealth trust funds and other public authorities. To obtain an estimate of the market value of this stock a market/face value ratio needs to be applied. It is assumed that this ratio is a constant of 0.9 for ease of calculation. [14]

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[14] Piggott actually calculated the market/face value ratio from the outstanding stock of CGS. This series has not been updated beyond June 1987. The ratio of 0.9 used here is the average over the period June 1984 to June 1987. The market/face value ratio varies inversely with the yield so 0.9 may be an overstatement of the ratio in times of high interest rates.

Data on Local and Semi-Government securities at face value are available on an annual basis from the Reserve Bank Bulletin.[15] The holdings of securities (as opposed to borrowings) are again taken to a market value by assuming a market/face value ratio of 0.9.

Finally, foreign ownership of government bonds are deducted. Foreign ownership is taken from the ABS publication Foreign Investment, Australia.

(e) Notes and Coin in Circulation

This represents private sector holdings of currency. It is calculated as the sum of notes and coin in circulation (notes and coin on issue less holdings by the RBA).

3. TRENDS IN AND CONTRIBUTIONS TO PRIVATE SECTOR WEALTH

Quarterly estimates of private non-human wealth at market prices are set out in Table 1. These show that at the end of the June quarter 1990, private wealth was $1428 billion. This compares with a figure of $405 billion in the June quarter 1980. Private wealth is plotted in Chart 1. Wealth has grown strongly throughout the 1980s. This growth was particularly strong between mid-1985 and mid-1989. The stock market fall of October 1987 was the only major negative factor over this period. The four-quarter-ended growth in wealth has slowed from a high of 28 per cent in the December quarter 1988 to 8 per cent in the June quarter 1990. This is due to the levelling off in dwelling prices and the poor performance of the stock market over this period. Chart 2 shows the four quarter ended growth in real per capita wealth. This has grown almost continuously since the beginning of 1984 and averaged 4.7 per cent per annum between 1984 and 1989.

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[15] Quarterly observations are linearly interpolated from the annual ones.

Tables 2 and 3 show the estimates of business wealth and dwelling wealth respectively.[16] These two series are plotted in Chart 3. The rapid growth of dwelling wealth during 1988 is apparent; so is the strong performance of business wealth from 1983 until the stock market fall.

The contributions of dwelling wealth and business wealth to total wealth fell slightly between June 1980 and June 1985 (51 per cent to 50 per cent and 33 per cent to 32 per cent respectively). Between June 1985 and June 1990, the contribution of dwelling wealth rose to 52 per cent and that of business wealth to 37 per cent.

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[16] The sample of large non-mining, non-finance companies holds both equipment and NDC. The aggregate market value to historic cost ratio is essentially a weighted average of ratios for each type of asset. If the individual ratios for the two asset types differ, then the split between columns 1 and 2 of Table 2 will be incorrect. For example, if the ratio for NDC is higher than that for equipment, then the estimate of equipment will be overstated and that of NDC understated. However, the total of the two columns should not be affected.

Table 1: Private Wealth ($ billion)

	Dwellings	Household Durables	Business Assets	Non-Official Holdings of Government Bonds	Notes and Coin in Circulation	**Total Personal Wealth**
Mar 1980	194.9	31.4	119.0	29.4	4.9	**379.6**
Jun 1980	205.1	31.9	135.4	28.0	5.0	**405.4**
Sep 1980	212.4	32.8	146.0	29.4	5.1	**425.7**
Dec 1980	220.1	33.5	152.8	30.6	5.6	**442.6**
Mar 1981	235.4	34.3	150.3	31.8	5.4	**457.2**
Jun 1981	245.8	35.1	157.4	30.3	5.6	**474.2**
Sep 1981	245.6	36.2	144.9	32.6	5.8	**465.1**
Dec 1981	257.2	37.8	153.8	35.7	6.3	**490.8**
Mar 1982	257.4	38.7	145.9	38.9	6.1	**487.0**
Jun 1982	267.4	39.8	147.8	39.8	6.3	**501.1**
Sep 1982	264.9	41.1	156.4	41.3	6.4	**510.1**
Dec 1982	266.2	42.0	156.7	46.7	6.9	**518.5**
Mar 1983	273.7	43.1	164.4	48.3	6.7	**536.2**
Jun 1983	283.5	44.4	182.9	48.7	6.8	**566.3**
Sep 1983	283.0	45.3	204.2	53.6	7.1	**593.2**
Dec 1983	295.7	46.2	218.7	61.1	7.8	**629.5**
Mar 1984	307.4	46.9	216.3	63.2	7.4	**641.2**
Jun 1984	319.2	47.6	209.1	62.5	7.8	**646.2**

Sep 1984	328.5	48.4	225.8	63.8	8.0	**674.5**
Dec 1984	328.8	49.1	226.6	64.0	8.9	**677.4**
Mar 1985	338.6	50.3	242.1	65.7	8.6	**705.3**
Jun 1985	346.4	51.9	223.6	62.6	8.9	**693.4**
Sep 1985	348.0	53.4	278.5	63.7	9.0	**752.6**
Dec 1985	364.2	55.5	282.5	63.9	9.7	**775.8**
Mar 1986	368.9	57.4	296.3	64.6	9.4	**796.6**
Jun 1986	357.6	59.0	308.6	62.3	9.6	**797.1**
Sep 1986	365.4	61.1	319.1	63.9	9.9	**819.4**
Dec 1986	368.5	63.6	360.1	72.3	10.6	**875.1**
Mar 1987	370.0	64.5	401.2	72.0	10.3	**918.0**
Jun 1987	377.1	66.3	375.6	73.1	10.6	**902.7**
Sep 1987	393.5	66.3	472.2	77.5	10.9	**1020.4**
Dec 1987	417.5	67.7	391.7	74.3	12.0	**963.2**
Mar 1988	488.2	68.8	383.1	74.6	11.7	**1026.4**
Jun 1988	531.2	70.7	420.1	73.6	12.0	**1107.6**
Sep 1988	588.1	72.1	419.0	75.7	12.5	**1167.4**
Dec 1988	643.2	74.1	423.4	74.8	13.6	**1229.1**
Mar 1989	666.9	75.5	436.3	74.9	13.2	**1266.8**
Jun 1989	697.5	77.3	461.8	69.3	13.3	**1319.2**
Sep 1989	702.6	79.0	513.5	70.7	13.5	**1379.3**
Dec 1989	716.3	81.1	504.4	71.3	14.5	**1387.6**
Mar 1990	717.2	83.1	497.9	70.6	13.8	**1382.6**
Jun 1990	741.4	84.4	524.6	63.8	14.0	**1428.2**

Table 2: Business Wealth ($ billion)

	[1] Non-Rural Equipment and Stocks	[2] Non-Rural Non-Dwelling Construction	[3] Rural Wealth	[4] Australian Ownership of Foreign Assets	[5] Overseas Ownership of Australian Assets	**Total Business Wealth [1+2+3+4-5]**
Mar 1980	58.7	31.0	53.3	4.3	28.3	**119.0**
Jun 1980	69.1	35.1	57.2	4.5	30.5	**135.4**
Sep 1980	76.6	38.0	59.3	4.7	32.6	**146.0**
Dec 1980	81.0	40.2	61.4	4.9	34.7	**152.8**
Mar 1981	78.7	39.9	63.5	5.1	36.9	**150.3**
Jun 1981	83.2	42.3	65.6	5.3	39.0	**157.4**
Sep 1981	72.9	38.5	68.0	5.7	40.2	**144.9**
Dec 1981	78.0	40.8	70.5	6.0	41.5	**153.8**
Mar 1982	71.1	38.3	72.8	6.4	42.7	**145.9**
Jun 1982	71.0	38.7	75.3	6.8	44.0	**147.8**
Sep 1982	75.3	42.4	78.2	7.2	46.7	**156.4**
Dec 1982	73.3	44.1	81.1	7.6	49.4	**156.7**
Mar 1983	76.5	47.8	84.1	8.0	52.0	**164.4**
Jun 1983	87.3	54.8	87.0	8.5	54.7	**182.9**
Sep 1983	100.8	63.0	87.9	8.9	56.4	**204.2**
Dec 1983	109.2	69.5	88.8	9.3	58.1	**218.7**
Mar 1984	106.0	70.7	89.7	9.7	59.8	**216.3**
Jun 1984	99.1	70.7	90.6	10.1	61.4	**209.1**

Sep 1984	111.2	75.4	93.6	11.3	65.7	**225.8**
Dec 1984	111.6	75.8	96.6	12.5	69.9	**226.6**
Mar 1985	122.6	80.4	99.5	13.7	74.1	**242.1**
Jun 1985	109.8	74.8	102.5	14.9	78.4	**223.6**
Sep 1985	150.9	93.8	98.8	17.2	82.2	**278.5**
Dec 1985	155.7	98.2	95.1	19.4	85.9	**282.5**
Mar 1986	168.7	106.1	91.4	20.1	90.0	**296.3**
Jun 1986	177.4	113.2	87.6	23.9	93.5	**308.6**
Sep 1986	188.0	119.6	86.7	27.0	102.2	**319.1**
Dec 1986	215.9	133.9	85.7	28.8	104.2	**360.1**
Mar 1987	243.8	147.9	84.7	32.5	107.7	**401.2**
Jun 1987	232.4	146.4	83.7	35.7	122.6	**375.6**
Sep 1987	295.0	174.9	86.3	42.2	126.2	**472.2**
Dec 1987	235.5	149.9	88.9	41.3	123.9	**391.7**
Mar 1988	227.0	147.8	91.5	41.5	124.7	**383.1**
Jun 1988	253.2	162.4	94.2	45.2	134.9	**420.1**
Sep 1988	251.6	162.5	102.4	46.8	144.3	**419.0**
Dec 1988	248.0	162.7	110.7	48.0	146.0	**423.4**
Mar 1989	252.5	165.9	119.0	51.9	153.0	**436.3**
Jun 1989	267.9	174.9	127.3	55.2	163.5	**461.8**
Sep 1989	303.8	196.2	129.2	59.4	175.1	**513.5**
Dec 1989	294.7	198.5	131.1	59.2	179.1	**504.4**
Mar 1990	285.5	200.0	132.9	63.3	183.8	**497.9**
Jun 1990	296.4	212.2	134.8	61.7	180.5	**524.6**

Table 3: Dwelling Wealth

	Number of Dwellings Completed	Residual	Net Change in Stock	Total Stock	Dwelling Prices	**Value of Dwellings $ million**
Mar 1980	27,465	2,400	25,065	5,024,917	38,796	**194,944**
Jun 1980	30,653	2,400	28,253	5,053,170	40,581	**205,063**
Sep 1980	30,890	2,400	28,490	5,081,660	41,793	**212,378**
Dec 1980	34,660	2,400	32,260	5,113,920	43,041	**220,110**
Mar 1981	28,560	2,400	26,160	5,140,080	45,789	**235,357**
Jun 1981	31,370	2,400	28,970	5,169,050	47,548	**245,777**
Sep 1981	34,080	2,400	31,680	5,200,730	47,217	**245,565**
Dec 1981	36,130	2,400	33,730	5,234,460	49,134	**257,188**
Mar 1982	28,450	2,400	26,050	5,260,510	48,938	**257,438**
Jun 1982	30,320	2,400	27,920	5,288,430	50,556	**267,360**
Sep 1982	31,370	2,400	28,970	5,317,400	49,808	**264,852**
Dec 1982	30,300	2,400	27,900	5,345,300	49,808	**266,241**
Mar 1983	30,690	2,400	28,290	5,373,590	50,929	**273,671**
Jun 1983	22,400	2,400	20,000	5,393,590	52,558	**283,478**
Sep 1983	25,620	2,400	23,220	5,416,810	52,245	**283,000**
Dec 1983	29,680	2,400	27,280	5,444,090	54,308	**295,660**
Mar 1984	25,280	2,400	22,880	5,466,970	56,220	**307,353**
Jun 1984	30,130	2,400	27,730	5,494,700	58,096	**319,217**

Sep 1984	32,080	2,400	29,680	5,524,380	59,471	**328,540**
Dec 1984	35,630	2,400	33,230	5,557,610	59,166	**328,819**
Mar 1985	29,550	2,400	27,150	5,584,760	60,632	**338,614**
Jun 1985	31,590	2,400	29,190	5,613,950	61,706	**346,416**
Sep 1985	33,900	2,400	31,500	5,645,450	61,651	**348,046**
Dec 1985	36,290	2,400	33,890	5,679,340	64,133	**364,235**
Mar 1986	27,480	2,400	25,080	5,704,420	64,663	**368,868**
Jun 1986	28,880	2,400	26,480	5,730,900	62,406	**357,642**
Sep 1986	28,330	2,400	25,930	5,756,830	63,473	**365,401**
Dec 1986	28,230	2,400	25,830	5,782,660	63,718	**368,458**
Mar 1987	24,350	2,400	21,950	5,804,610	63,744	**370,010**
Jun 1987	25,300	2,400	22,900	5,827,510	64,713	**377,115**
Sep 1987	24,770	2,400	22,370	5,849,880	67,260	**393,462**
Dec 1987	28,450	2,400	26,050	5,875,930	71,058	**417,530**
Mar 1988	25,070	2,400	22,670	5,898,600	82,757	**488,153**
Jun 1988	29,300	2,400	26,900	5,925,500	89,648	**531,211**
Sep 1988	31,530	2,400	29,130	5,954,630	98,759	**588,072**
Dec 1988	38,900	2,400	36,500	5,991,130	107,364	**643,230**
Mar 1989	31,510	2,400	29,110	6,020,240	110,784	**666,946**
Jun 1989	37,450	2,400	35,050	6,055,290	115,184	**697,470**
Sep 1989	39,470	2,400	37,070	6,092,360	115,325	**702,600**
Dec 1989	41,760	2,400	39,360	6,131,720	116,816	**716,281**
Mar 1990	33,020	2,400	30,620	6,162,340	116,388	**717,221**
Jun 1990	33,050	2,400	30,650	6,192,990	119,715	**741,396**

Chart 1: Total Private Wealth

(Log Scale)

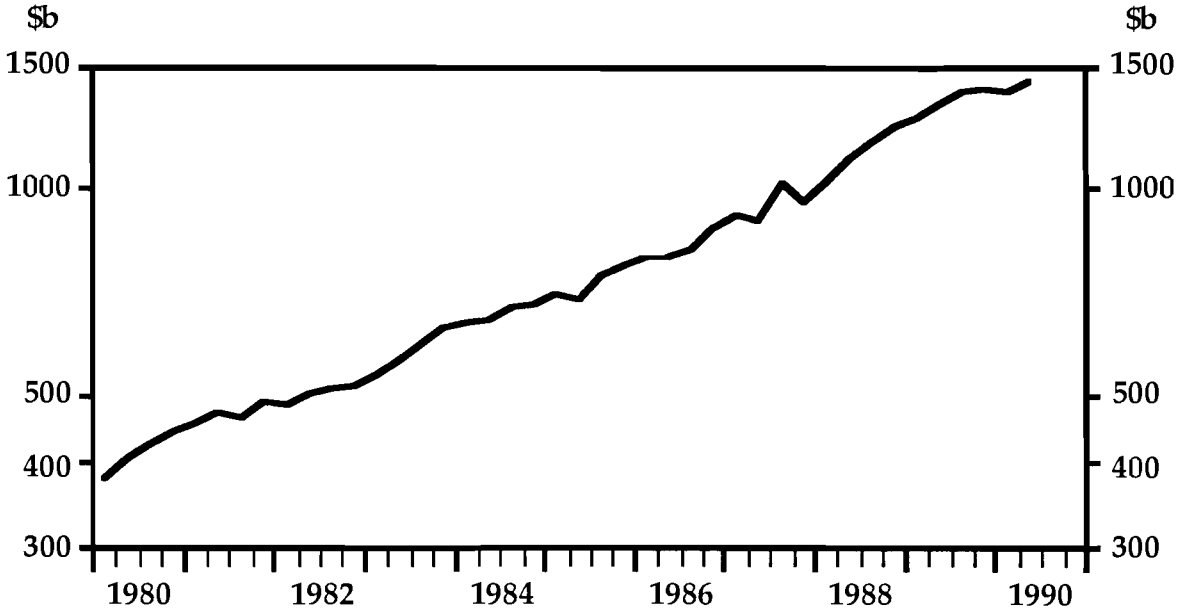


Chart 2: Growth in Real Per Capita Wealth

(Four-Quarter-Ended)

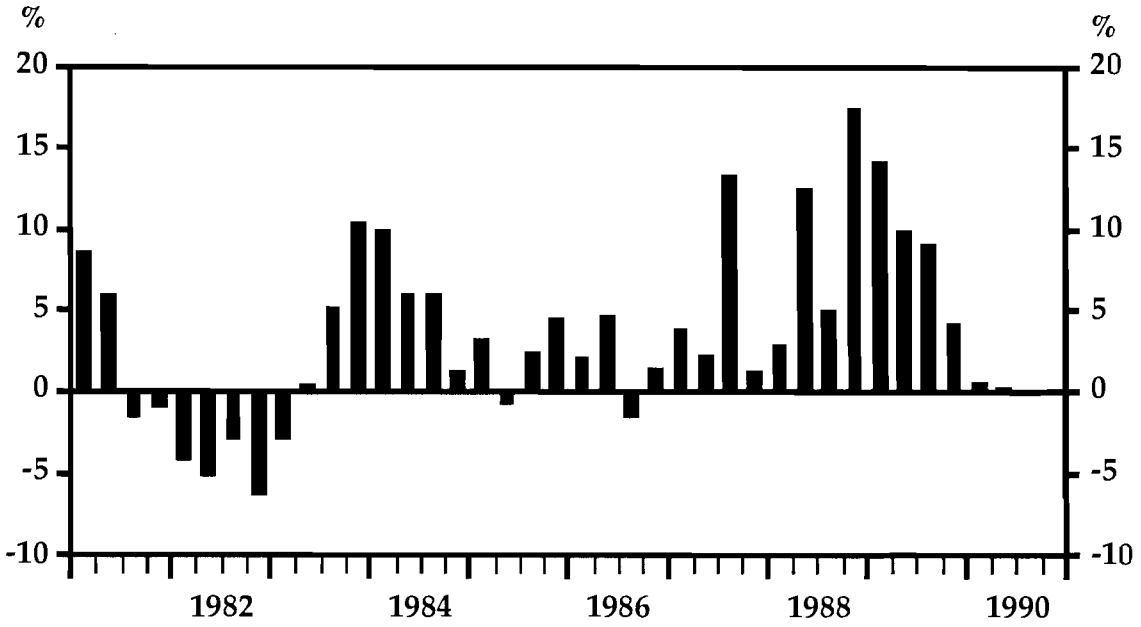
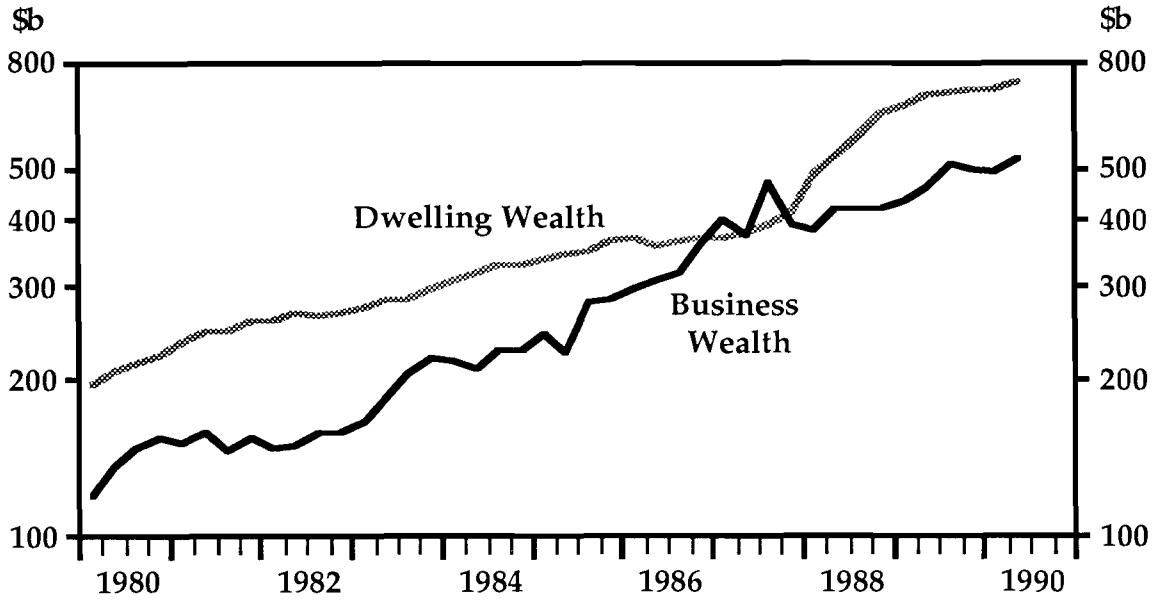


Chart 3: Dwelling and Business Wealth

(Log Scale)



4. A COMPARISON WITH PREVIOUS WEALTH STUDIES

This section compares the methodology and estimates presented in this paper to those of Piggott and the Treasury. Since the main areas of difference are in the calculation of business and dwelling wealth, only these categories are detailed. Table 4 sets out the differences in methodology between the three studies. Table 5 compares the estimates of dwelling wealth, business wealth and total wealth.[17]

The estimates presented in this paper are somewhat higher than those published by the Treasury who estimated total private wealth at $1,269 billion for 1989/90. The contribution of dwellings in their estimates is higher (65 per cent in 1989/90) and that of business assets lower (18 per cent in 1989/90) than here. The value of dwellings is higher because of their use of capital city prices rather than a weighted average of capital city and other area prices. The contribution of business assets is lower for the reasons given earlier.

Piggott's estimates of dwelling wealth are higher than those made here due to his use of mean capital city prices rather than the median-weighted average price series used here. The estimates of business wealth in this paper are similar to those made by Piggott. However, it is likely that the importance of financial companies has increased since June 1985 with the likelihood that Piggott's estimates would now be lower than those presented here.

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[17] Piggott's estimates are only available up until 1985.

Table 4: The Differences between the Methodology used in this Study and that used by Piggott and the Treasury

Business

This Study
- included an estimate of the market value of land in estimates of NDC.
- the value of the non-farm business sector is estimated by scaling up ABS capital stock figures by a market valuation ratio. Two ratios were used: the first derived from a sample of large non-mining, non-finance companies, the second from a sample of property trusts. The latter was used to value the NDC of the banking, finance and property sector.
- rural wealth was estimated separately.
- overseas ownership of business assets was deducted, but domestic ownership of foreign assets was included.

Piggott
- derived the market value of a large sample of non-financial companies and grossed this up to be representative of all non-financial companies.
- estimated rural wealth separately.
- overseas ownership of business assets was deducted, but domestic ownership of foreign assets was not included in the estimates.

Treasury
- used the market valuation ratio from the sample of non-mining, non-finance companies to gross up ABS capital stock estimates.
- no separate estimates were provided for rural wealth.
- the value of land was excluded from NDC.
- overseas ownership of business assets was deducted, but domestic ownership of foreign assets was not included in the estimates.

Table 4 (continued)

Dwellings

This Study - used a weighted average of median established dwelling prices in capital cities and other areas.
Piggott - used average established dwelling prices in Sydney, Melbourne, Adelaide and Brisbane.
Treasury - used a median established dwelling prices series for capital cities.

Table 5: A Comparison of Estimates

Total Wealth

	This Study	Piggott	Treasury
June 1980	405	477	391
June 1985	693	794	676
June 1990	1428	-	1269

Business Wealth

	This Study	Piggott	Treasury
June 1980	135 (33)	159 (33)	87 (22)
June 1985	224 (32)	234 (29)	127 (19)
June 1990	525 (37)	-	289 (23)

Dwelling Wealth

	This Study	Piggott	Treasury
June 1980	205 (51)	253 (53)	234 (60)
June 1985	346 (50)	440 (55)	426 (63)
June 1990	741 (52)	-	824 (65)

The figures in brackets are percentages of total wealth.

5. AN INDEX OF ASSET PRICES

Recent work on compiling an asset price index has been carried out at the Treasury based on the private wealth series used in the NIF10 model. This index is restricted to three asset classes (dwellings, commercial property and equities) due to the limited availability of market price data for the other asset classes. This section derives a similar asset price index based on the wealth estimates presented in this paper.[18]

The asset price index constructed here is limited to dwellings and business assets. The weights (calculated in 1989/90) are 59 per cent for dwellings and 41 per cent for business assets. Four components of business assets are used in calculating the index; equipment and inventories, non-dwelling construction, rural and ownership of overseas assets.[19] For the purposes of constructing the index, it is assumed that an index of equity prices captures movements in wealth held in all equipment and inventories, in one half of the NDC held outside the banking, finance and property sector and in overseas assets. Wealth held in NDC by the banking, finance and property sector and in the other half of that held outside this sector is approximated by an index of Sydney CBD commercial property prices.[20] Rural wealth is approximated by an index of rural land prices.[21]

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[18] The index calculated here is a simple fixed weight average. It can be written as,

$$A_t = \sum_{i=1}^{4} W_i PI_{i,t}$$

where W_i is the weight attached to the i^{th} asset class (calculated in 1989/90) and $PI_{i,t}$ is the price index associated with the i^{th} asset class in period t.

[19] In calculating the weights in the business asset index, overseas ownership of Australian assets was ignored as it was not clear which components this should be deducted from.

[20] There is a question as to whether non-dwelling construction should be approximated by commercial property prices or equity prices. Listed companies which own the property are valued by equity prices. However, because unlisted companies also own a significant amount of property, it was decided to use a commercial property price index separately.

[21] The sources for the components of the asset price index are as follows:
Equity prices - all ordinaries index
Commercial property prices - Sydney CBD Capital Value (Series 1) from Jones Lang Wootton.

The weights attached to the equity index, the commercial property index and the index of rural land prices in calculating the index of business wealth, are 62 per cent, 19 per cent and 19 per cent respectively. This gives them weightings of 25 per cent, 8 per cent and 8 per cent respectively in the overall index. Table 6 shows the weights used in calculating the asset price index here and compares them to those used by the Treasury.[22]

Table 6: Weights Used in Calculating an Index of Asset Prices

Component	Weights (per cent)	
	This study	Treasury
Index of Median Dwelling Prices*	59	80
Index of Sydney CBD Commercial Property Prices	8	10
Index of Equity Prices	25	10
Index of Rural Land Prices	8	-

* Treasury use capital city prices, this study uses a weighted average of capital city and other area prices.

As was highlighted in the previous section, a feature of the Treasury estimates is the large contribution of dwelling wealth to total wealth. This means that dwelling prices carry a weight of 80 per cent in the Treasury index compared to 59 per cent in the index in this study. Equities carry a much higher weight in the index in this study, commercial property a lower weight and a fourth component, an index of rural land prices, which is not present in the Treasury index, is included with a weight of 8 per cent.

Dwelling prices - the price series derived from CBA/HIA and REIA data as set out in Table 1.
Rural land prices - constructed from data from the N.S.W. Valuer-General's Department.

22 See Urbanski (1990).

Chart 4: Asset Prices

(Log Scale, 1982/83 = 100)

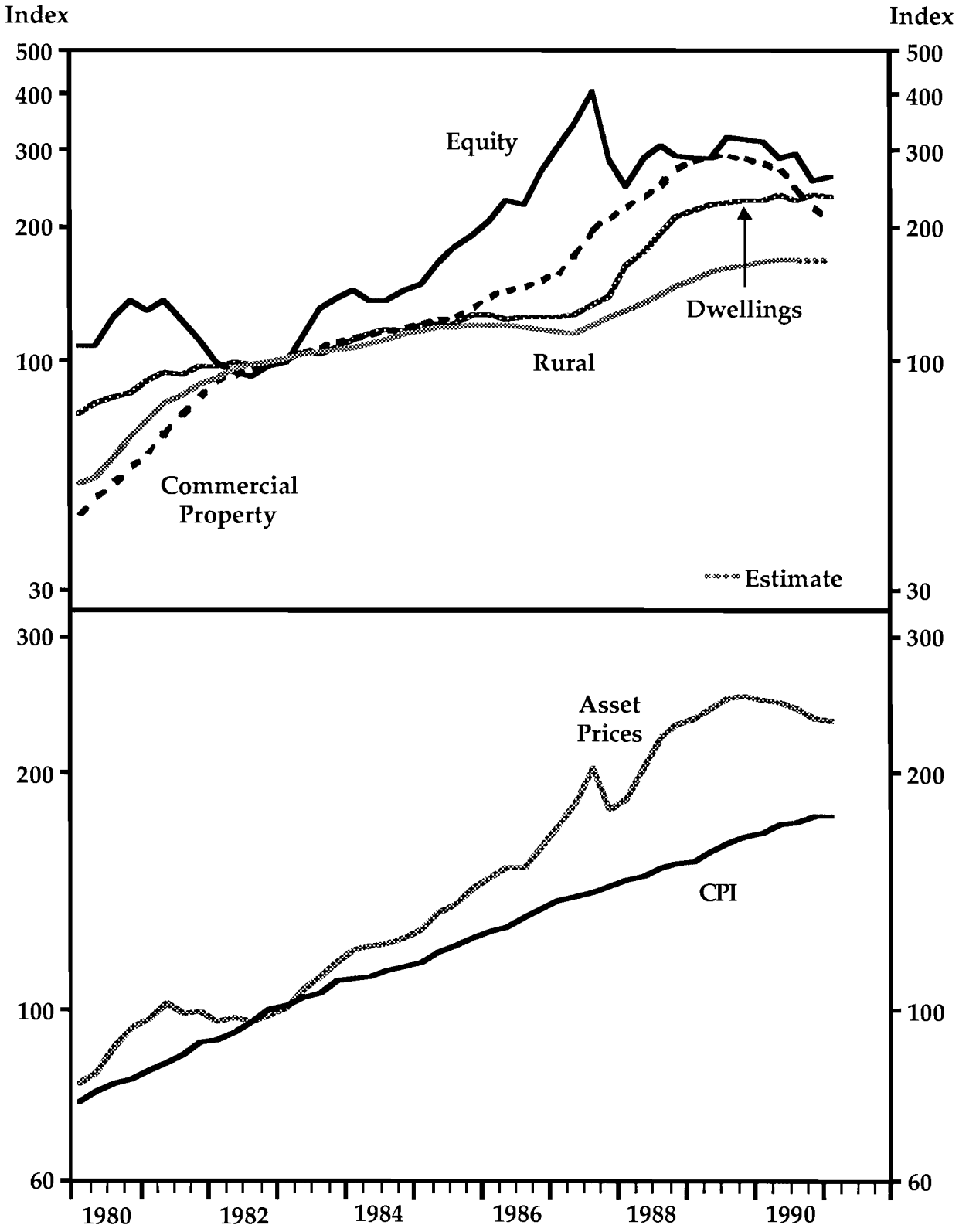

Table 7: An Index of Asset Prices
(1982/83 = 100)

	Dwelling Prices	Commercial Property Prices	Equity Prices	Rural Land Prices	**Index of Asset Prices**
Mar 1980	76.4	44.8	108.3	52.7	**79.9**
Jun 1980	79.9	49.1	108.2	54.5	**82.5**
Sep 1980	82.3	53.4	126.2	60.8	**89.2**
Dec 1980	84.8	57.7	136.0	67.1	**94.0**
Mar 1981	90.2	62.0	129.4	73.4	**96.4**
Jun 1981	93.6	68.9	136.2	79.7	**101.2**
Sep 1981	93.0	75.9	121.8	83.6	**98.1**
Dec 1981	96.8	82.8	111.2	87.5	**98.5**
Mar 1982	96.4	89.7	99.1	91.5	**96.1**
Jun 1982	99.6	92.7	94.0	95.4	**97.3**
Sep 1982	98.1	95.6	91.9	97.2	**96.3**
Dec 1982	98.1	98.6	95.7	99.1	**97.6**
Mar 1983	100.3	101.5	99.0	100.9	**100.1**
Jun 1983	103.5	104.3	113.5	102.7	**106.0**
Sep 1983	102.9	106.9	130.5	104.2	**110.2**
Dec 1983	107.0	109.6	137.8	105.7	**114.8**
Mar 1984	110.7	112.4	144.2	107.1	**118.9**
Jun 1984	114.4	114.4	136.8	108.5	**119.6**
Sep 1984	117.1	116.4	136.1	111.1	**121.3**
Dec 1984	116.5	118.4	143.2	113.8	**123.1**

Mar 1985	119.4	120.5	148.5	116.4	**126.5**
Jun 1985	121.5	122.8	165.9	119.0	**132.5**
Sep 1985	121.4	125.1	179.6	119.2	**136.1**
Dec 1985	126.3	132.1	193.0	119.3	**142.9**
Mar 1986	127.4	139.1	204.9	119.4	**147.0**
Jun 1986	122.9	142.9	230.7	119.6	**151.2**
Sep 1986	125.0	146.8	225.2	118.4	**151.3**
Dec 1986	125.5	151.4	265.0	117.2	**161.8**
Mar 1987	125.5	156.0	303.2	116.0	**171.6**
Jun 1987	127.4	173.8	341.9	114.8	**183.8**
Sep 1987	132.5	197.6	401.0	119.8	**203.8**
Dec 1987	139.9	209.4	282.8	124.7	**180.0**
Mar 1988	163.0	221.5	248.1	129.7	**186.3**
Jun 1988	176.6	233.5	286.4	134.6	**205.2**
Sep 1988	194.5	249.8	305.6	140.5	**222.4**
Dec 1988	211.4	272.8	291.0	146.4	**231.0**
Mar 1989	218.2	283.5	286.9	152.3	**235.3**
Jun 1989	226.8	289.8	287.8	158.1	**241.6**
Sep 1989	227.1	292.1	321.0	160.8	**250.5**
Dec 1989	230.1	290.1	317.2	163.4	**251.3**
Mar 1990	229.2	281.7	312.1	166.1	**249.1**
Jun 1990	235.8	271.7	286.6	168.7	**246.0**
Sep 1990	229.8	242.8	292.8	168.7	**241.7**
Dec 1990	235.7	221.1	255.9	168.7	**234.2**
Mar 1991	234.5	210.2	259.5	168.7	**233.5**

Chart 4 plots the asset price index and its components, compared with the Consumer Price Index. The index is plotted up until the March quarter 1991.[23] The asset price index and its components are set out in Table 7.

Asset price growth began to accelerate in mid-1983 and apart from the fall caused by the stock market crash in 1987, it continued until late-1989. The acceleration in asset prices began on the equity market. The rapid growth in commercial property prices began in 1986. The acceleration in dwelling prices at the beginning of 1988 and the continued rise in commercial property prices offset all but the initial impact of the stock market fall on the growth in the asset price index. The growth in the index came to an end in late 1989. Between the December quarter 1989 and the March quarter 1991 the index fell by 7 per cent.

6. CONCLUSION

This paper has provided quarterly estimates of private non-human wealth in Australia for the period between the March quarter 1980 and the June quarter 1990. These estimates were based on the methodology used by Piggott, although improvements were made in several areas.

Private wealth is estimated at $1,428 billion in June 1990. The estimates here suggest that the dwelling stock accounted for 52 per cent and business assets for 37 per cent of total private non-human wealth respectively. These proportions are, respectively, lower and higher than in some other estimates.

The paper also constructed an index of asset prices which showed that asset prices grew strongly between mid-1983 and end-1989. The index has since fallen by 7 per cent.

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[23] Data on the rural land price index is only available up until June 1990. It is assumed that it has remained at its June 1990 level over the three quarters to March 1991. In reality, it is likely that rural land values have fallen over this period. This would depress the asset price index further.

APPENDIX: A DETAILED CALCULATION OF PRIVATE WEALTH

This section goes through the calculation of private wealth for the June quarter 1989 to highlight the methodology used.

Dwelling Wealth

No. of dwellings completed	:	37,450
Residual	:	2,400
Net change in stock	:	35,050
Total stock in March 1989	:	6,020,240
Total stock in June 1989	:	6,055,290
Established dwelling price in capital cities	:	$130,564
Established dwelling price in other areas	:	$90,089
Weighted average established dwelling price (62% capital cities, 38% other areas)	:	$115,184
Value of dwellings = 6,055,290 * $115,184		**= $697,472 m**

Consumer Durables

Stock of household durables in March 1989 (constant prices)	:	$40,442 m
Stock of motor vehicles in March 1989 (constant prices)	:	$14,915 m
Quarterly depreciation rate for household durables	:	0.057
Quarterly depreciation rate for motor vehicles	:	0.065
Constant price expenditure on household durables in June 1989	:	$2,827 m
Constant price expenditure on motor vehicles in June 1989	:	$1,340 m
Price deflator for household durables in June 1989	:	1.281
Price deflator for motor vehicles in June 1989	:	1.621
Stock of consumer durables in June 1989 at current prices	:	
(40,442 * 0.943 + 2,827) * 1.281 + (14,915 * 0.935 + 1,340) * 1.621	=	**$77,252 m**

Business Wealth

Historic cost capital stock for non-dwelling construction (NDC) for Banking, Finance and Property (B, F, P)	:	$24,574 m
Historic cost capital stock for equipment (E) for B, F, P	:	$18,579 m
Historic cost capital stock for NDC for Retail and Wholesale (R, W)	:	$7,786 m
Historic cost capital stock for E for R, W	:	$19,795 m
Historic cost capital stock for NDC for All Other Sectors (except Agriculture)	:	$44,198 m
Historic cost capital stock for E for All Other Sectors (except Agriculture)	:	$68,855 m
Market value to historic cost capital stock ratio for non-finance, non-mining sample	:	1.666
Market value to historic cost capital stock ratio for property trust sample	:	1.41
Book value of stocks (assumes book value = historic cost)	:	$53,557 m
Land as a proportion of structure value for B, F, P	:	32.6%
Land as a proportion of structure value for R, W	:	25.9%
Land as a proportion of structure value for All Other Sectors	:	30.5%

Total non-rural business wealth

= 24,574.4 * 1.41 * (1/(1-0.326))
+ 7,786.2 * 1.666 * (1/(1-0.259))
+ 44,198.4 * 1.666 * (1/(1-0.305))
+ (18,579.4 + 19,795 + 68,854.6 + 53,557) * 1.666

= $442,734 m

No. of farms in Broadacre	:	78,707
Average farm capital in Broadacre	:	$1,013,150
No. of farms in Dairy	:	15,682
Average farm capital in Dairy	:	$780,870
No. of farms in Horticulture	:	4,644
Average farm capital in Horticulture	:	$359,350
Total wealth of sample	:	
(78,707 * 1,013,150 + 15,682 * 780,870 + 4,644 * 359,350)	=	$93,656 m
Total wealth of sample in June 1988	:	$69,263 m
Growth of wealth	=	35.2%
Rural wealth in June 1989 = 94,150 m x 1.352	=	$127,291 m
Total business wealth	=	$570,025 m
Non-official Australian investment abroad	:	$59,917 m
less: accounts receivable/prepayments made	:	$4,673 m
Australian ownership of foreign assets	=	$55,244 m
Non-official foreign investment in Australia	:	$194,994 m
less: public sector	:	$27,647 m
less: accounts payable/prepayments received	:	$3,888 m
Overseas ownership of Australian assets	=	$163,459 m
Total domestically owned business wealth	=	**$461,810 m**

Non-Official Holdings of Government Bonds

Non-official holdings of CGS at face value		:	$33,008 m
times:	market/face value ratio	:	0.9
equals:	non-official holdings of CGS at market value	:	$29,707 m
plus:	non-official holdings of Treasury Notes and Australian Savings Bonds	:	$11,733 m
plus:	non-official holdings of semi and local government securities at market value	:	$18,576 m
plus:	Other borrowings from residents	:	$23,879 m
minus:	Overseas holdings of CGS and semi and local government securities at market value	:	$14,567 m
Total non-official holdings of government bonds at market value		=	**$69,328 m**

Notes and Coin in Circulation

Notes and coin in circulation	:	**$13,318 m**
TOTAL PRIVATE NON-HUMAN WEALTH AT MARKET PRICES	:	**$1,319.2 b**

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