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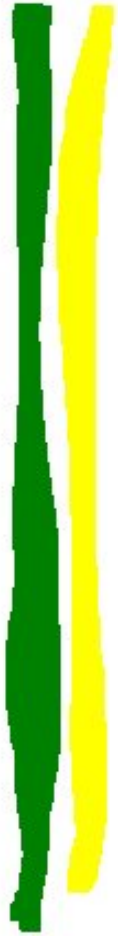
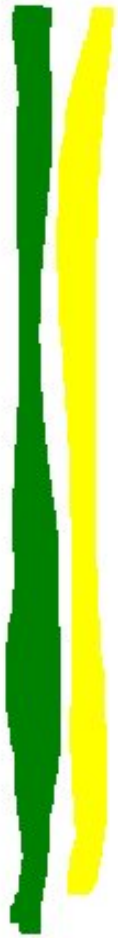


Major developments and challenges for ABS' productivity statistics

Carl Obst

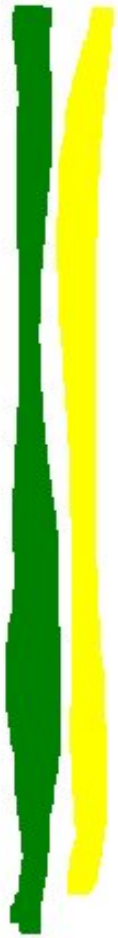
National Accounts Branch, ABS

Introduction



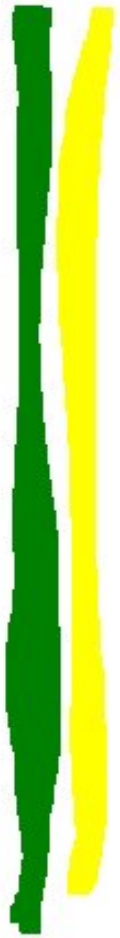
- Many developments in economic measurement over the last 10-15 years
- Most impact directly or indirectly on MFP
- Consider the developments and challenges that lie ahead in three parts
  - Labour component
  - Capital component
  - Output / value added component

Human capital: The motivations



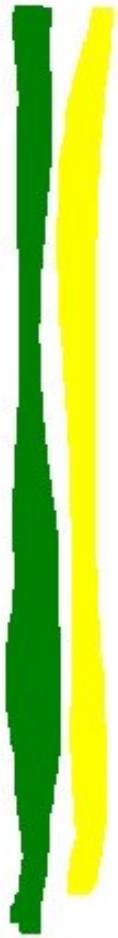
- Human capital is recognised as one of the most important assets of a country
- It is a key concept for research and policy development
- Lack of systematic measures in official national statistics
- Estimates of human capital provide useful inputs for improving and expanding other official statistics - for example productivity
- It has long been an active area of economic research that deserves progression in economic measurement

Human capital: Measurement framework



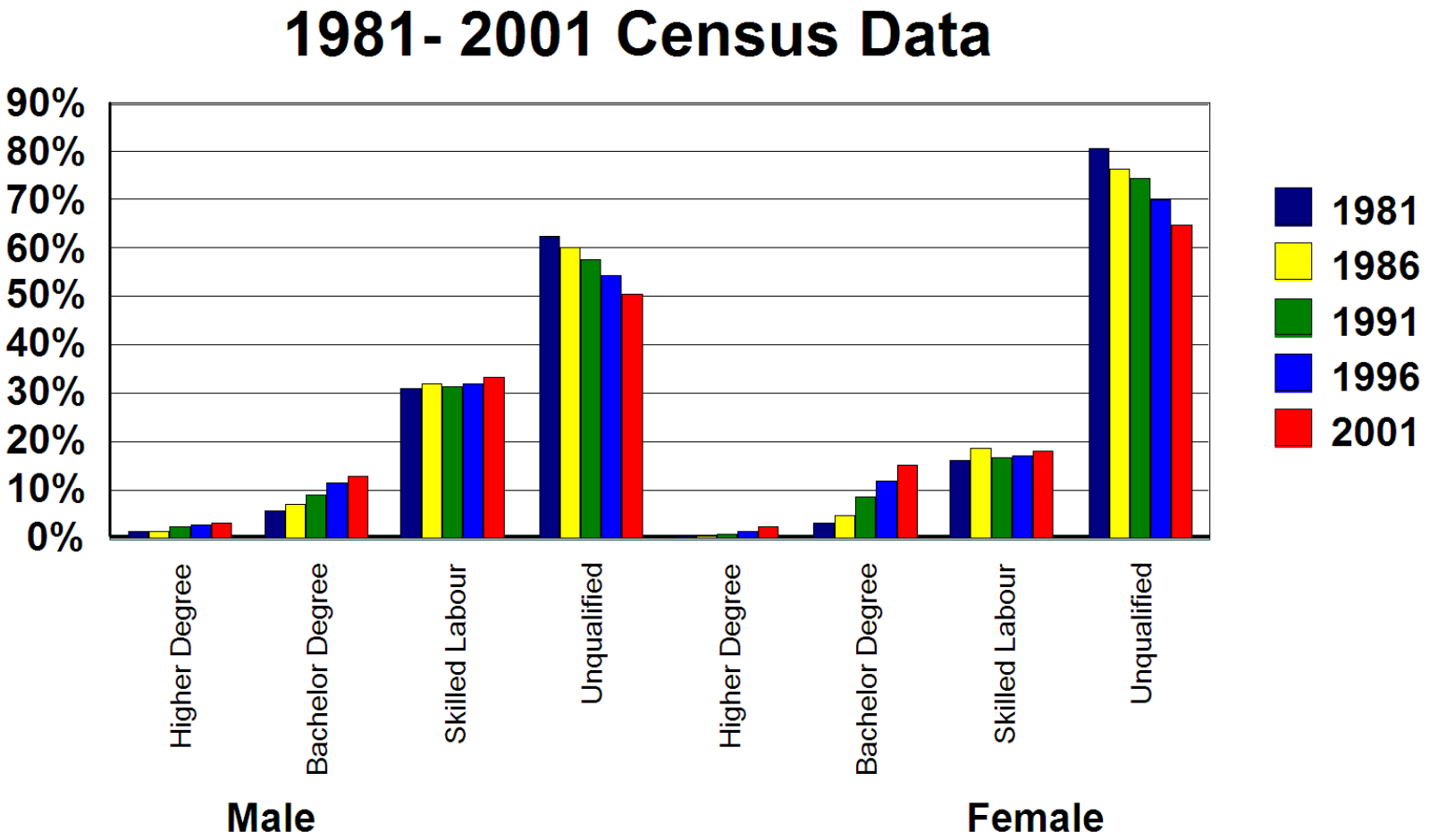
- Use the "lifetime labour income approach of Jorgenson and Fraumeni (1989, 1992)
    - Human capital measured as present value of lifetime income streams
- Tangible and intangible aspects of human capital are included
- Stocks and flows are integrated through accumulation accounts

Human capital: Basic method

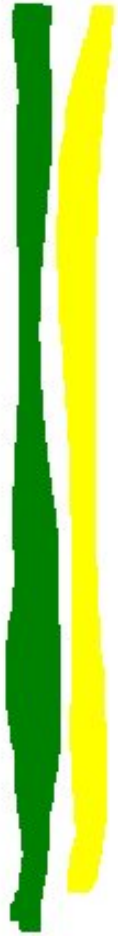


- Construct a database showing economic value of market labour activities for groups of people classified by sex, age and education level.
- Determine per capita income measures in each group using information on wage and salary earners.
- Compute the discounted income streams for wage and salary earners to obtain per capita within each group.
- Apply the per capita measures to all individuals in each group in the working age population and then aggregate all groups.

Australian Adult Population, Classified by Education Attainment and Gender (%)



Labour Force Participation Rates (%)



		1981	1986	1991	1996	2001
Male	**Higher Degree**	94.3	93.6	93.8	92.5	92.2
	Bachelor Degree	94.9	94.7	94.2	93.1	92.2
	Skilled Labour	92.2	90.3	90.8	88.8	87.5
	Unqualified	85.3	81	80	75.6	72.3
Female	**Higher Degree**	78.1	80.4	84	84.9	86
	Bachelor Degree	75.9	80.1	82.1	82.8	82.5
	Skilled Labour	62.7	67.1	73.2	73.6	74.4
	Unqualified	42.8	46.1	52.6	53.8	54.2
Overall		67.8	68.5	71.8	71.5	71.6

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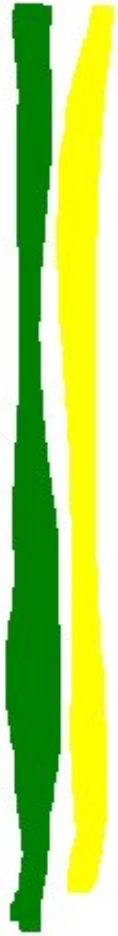
Lifetime Labour Income Per Capita for 25 Year Olds

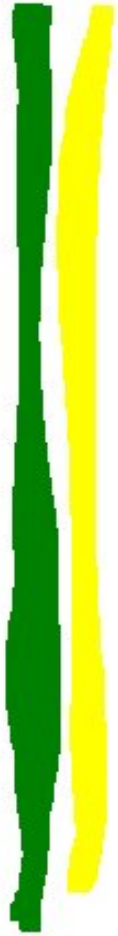
(thousands of 2001 dollars)



		1981	1986	1991	1996	2001
Male	Higher Degree	1,313.94	1,400.77	1,345.92	1,424.41	1,529.29
	Bachelor Degree	1,237.97	1,305.02	1,221.54	1,273.43	1,396.91
	Skilled Labour	861.92	912.96	863.41	886.82	991.23
	Unqualified	703.65	754.92	728.44	755.92	832.68
Female	Higher Degree	1,008.92	1,075.65	1,042.87	1,090.70	1,217.25
	Bachelor Degree	898.30	947.90	867.17	897.93	1,012.79
	Skilled Labour	632.56	658.69	633.94	648.07	709.54
	Unqualified	481.51	503.31	479.10	529.01	595.14

Human Capital in Australia

Billions of 2001 Dollars



		1981	1986	1991	1996	2001
Male	Higher Degree	15.15	29.40	67.82	109.73	160.27
	Bachelor Degree	77.71	164.80	300.73	461.47	659.28
	Skilled Labour	250.77	452.89	662.91	827.02	1,104.18
	Unqualified	378.91	651.66	941.76	1,133.31	1,351.96
	Sub Total	722.54	1,298.75	1,973.21	2,531.53	3,275.69
Female	Higher Degree	3.34	7.58	21.77	45.38	88.70
	Bachelor Degree	31.42	78.99	192.13	337.94	570.21
	Skilled Labour	100.25	194.72	266.89	342.22	463.99
	Unqualified	331.10	538.15	777.47	996.05	1,177.07
	Sub Total	466.11	819.44	1,258.26	1,721.60	2,299.97
Total		1,188.65	2,118.18	3,231.47	4,253.13	5,575.66

Accumulation Accounts: Males (millions of current dollars)

	1981-86	1986-91	1991-96	1996-2001
Gross Human Capital Formation				
Investment in education	35,706	57,528	82,158	93,559
On-the-job investment	23,462	22,920	35,814	44,886
New workers	267,159	402,746	442,899	548,719
Migrants	77,047	154,053	130,699	183,501
Less emigrants	63,667	121,545	151,156	211,748
Subtotal	339,707	515,702	540,414	658,917
Depreciation	**144,805**	**245,437**	**381,848**	**493,590**
Net Human Capital Formation	194,902	270,265	158,566	165,327
Changes in inventories	306,075	286,996	219,367	333,147
Revaluation	514,844	528,309	411,592	611,462
Statistical discrepancies	26,936	64,913	76,562	100,243
Total stock changes	1,042,757	1,150,483	866,087	1,210,179

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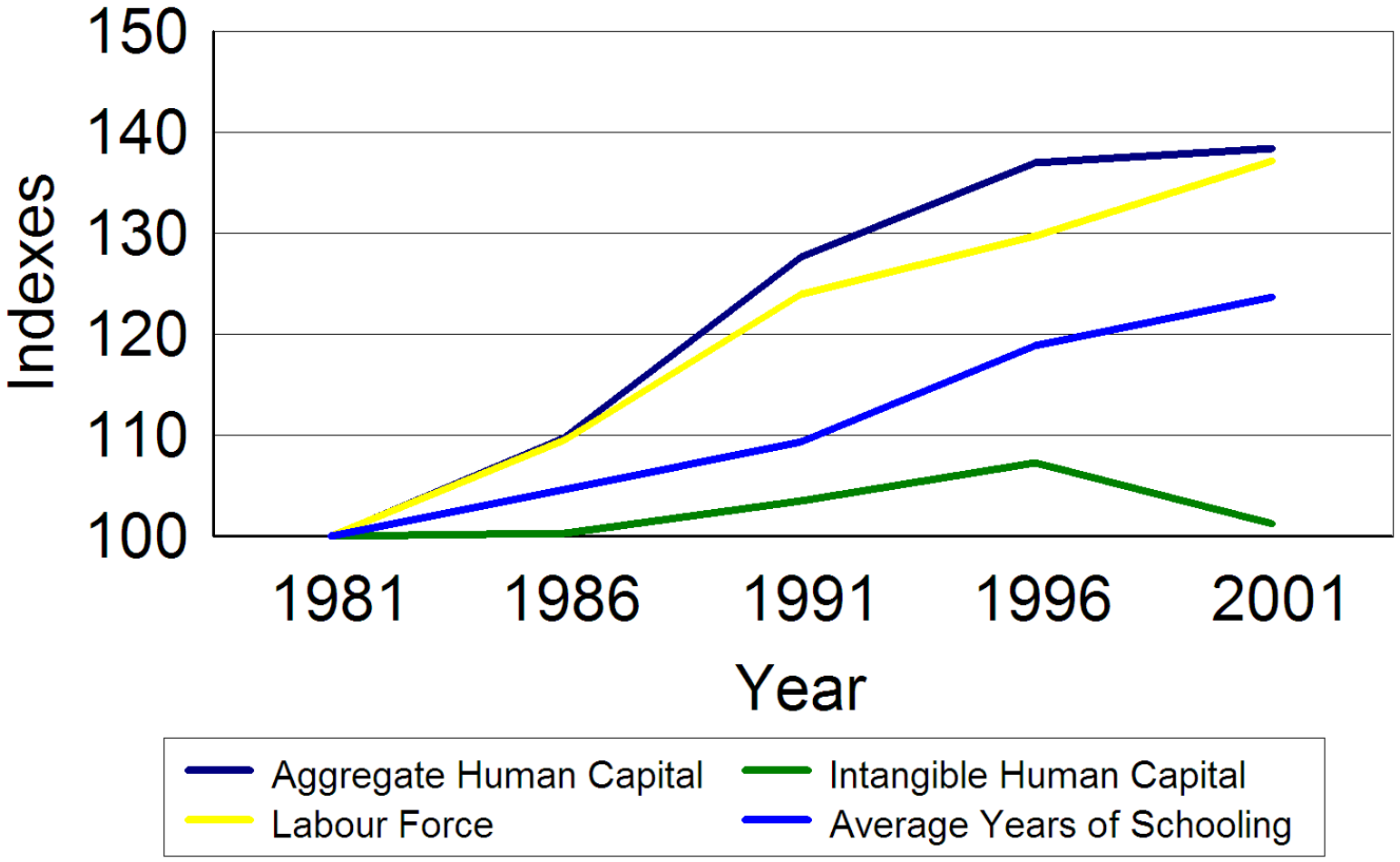
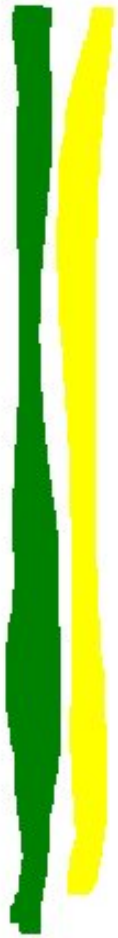
Human Capital Growth Indexes



Human capital: Conclusions

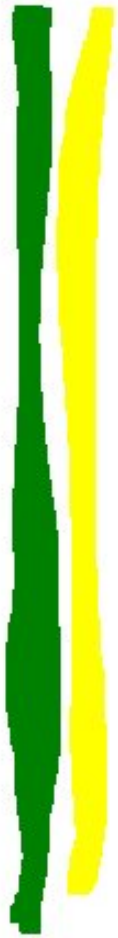
- Provides a quantitative view of human capital for Australia
- Develops a very powerful and comprehensive framework for assessing policy alternatives
- Identifies ongoing investment in training and education as the key policy issue in this area
- Next steps
  - Further refinement of method
  - Develop links into national accounts and productivity work
  - Develop links with labour economics further

Quality adjusted labour input (QALI)



- Basic measure of labour input in terms of persons employed
- Currently use number of hours worked to deal with compositional changes between full and part time work
- Ideally like to adjust for changes in the quality of labour in terms of educational attainment and workforce experience
- Adjusted measures of hours worked (QALI) and related MFP measures have been developed and are now published
- Still experimental estimates and one challenge will be linking with the work on human capital

Labour accounts: A Challenge

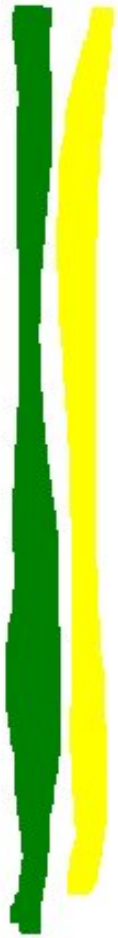


- Basic data source for labour input is the Labour Force Survey collected from households
- Basic data sources for GDP and other economic variables are business surveys
- Reconciling the measures of labour input (largely around employment) based on these two sources can be problematic
- Significant issue for industry based analysis of productivity

Capital services: The development

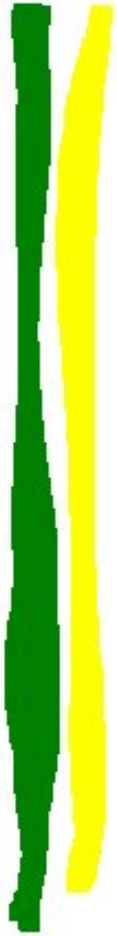
- Traditionally depreciation (consumption of fixed capital) has been used as a measure of capital input
  - Consider flows of capital formation and apply assumptions regarding asset lives and depreciation profiles (age-price profiles)
  - Derives net capital stock : wealth measure
- Now consider that capital services measuring the gross rentals of the owners of the assets is a better measure of capital input
  - Estimated using age efficiency profiles to derive productive capital stock
  - Change in productive capital stock gives capital services

Capital services: The challenge



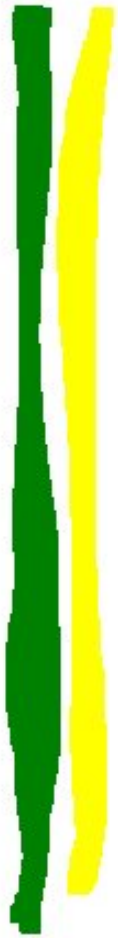
- Range of methodological challenges remain
  - Choice of asset lives
  - Choice of age-efficiency and age-price profiles
  - Treatment of purchases and sales of used assets particularly across industries and across sectors (i.e. privatisations)

Defining the asset boundary



- The asset boundary has changed considerably over the last 10 years
  - SNA93 saw the inclusion of assets such as computer software, mineral exploration and livestock
  - In the calculation of the capital inputs for productivity purposes assets such as land and inventories were included
- Recent international discussion is considering the treatment of expenditure on R&D as capital formation
  - How should pure basic research be treated?
  - Do economic assets need to be individually owned?

The role of intangible assets



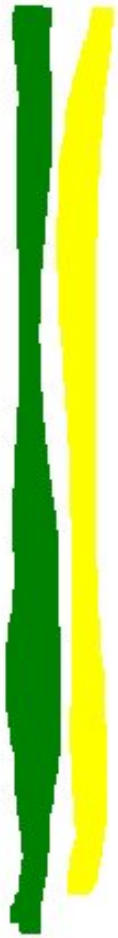
- Increasingly it is recognised that assets such as brand names, trademarks and goodwill contribute to the income generating capacity of a company

- Should such assets be brought within the asset boundary for productivity purposes?

- If so, how might they be valued? How might the capital services they generate be calculated? Do they depreciate over time?

- Does the presence of these assets help explain differences in rates of return on capital between industries and over time?

Improved measures for non-market output



- Historically output for non-market industries has been measured using hours worked

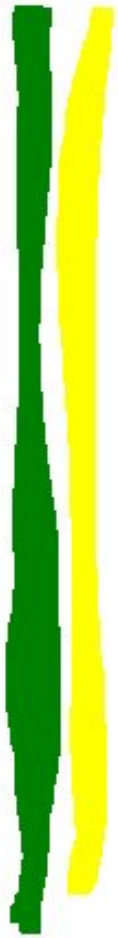
- In more recent years improved measures have been developed for a range of non-market industries including

  - Health - number of attendances (doctors), patient days (nursing homes), cost weighted separations (hospitals)

  - Education - number of students weighted using costs of each level of education

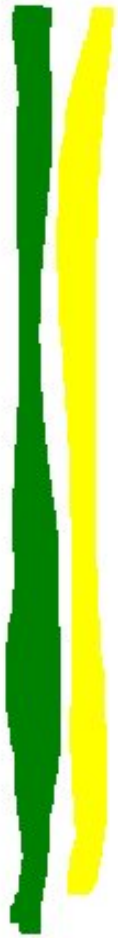
- Investigation has been completed on police, justice services, corrective centres, tax and social security

Improved measures for property and business services



- At present excluded from the market sector MFP estimates
- Problem is the lack of long time series measured on a best practice basis
- Double deflation approach to measuring value added has been in place since 1995-96 with comprehensive price indexes available from 1998-99.
- Need to consider further how this large industry might be incorporated into our MFP statistics

A new industry classification



- ANZSIC is to change with the re-developed structure to be released in 2006
- The application of the new classification throughout economic and other ABS statistics will take some time and has major implications for the national accounts and its productivity estimates
- Liaison on possible levels of compilation will be undertaken in the coming year
- National accounts implementation planned for November 2009
- Information paper - "ANZSIC 2006 Development" (cat no 1294.0) provides the state of play and basic list of changes

Summary

- Many developments have taken place:
  - Human capital
  - QALI
  - Capital services
  - Non-market output measures
- But many challenges remain:
  - Developing further the measures of labour input
  - Defining the asset boundary and dealing with intangibles
  - Implementing ANZSIC changes