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SOFTWARE INVESTMENT IN THE NEW ZEALAND NATIONAL ACCOUNTS

**PROGRESS REPORT ON REVISED ESTIMATES BASED ON THE RECOMMENDATIONS OF THE
2002 OECD TASKFORCE ON SOFTWARE MEASUREMENT**

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PROGRESS REPORT ON REVISED ESTIMATES BASED ON THE RECOMMENDATIONS OF THE 2002 OECD TASKFORCE ON SOFTWARE MEASUREMENT

1. The New Zealand national accounts adopted the SNA93 standard on the capitalization of software expenditure in 2000. The existing methods are entirely based on a demand approach. The discussion below is restricted to the derivation of annual, current price estimates of software expenditure. Quarterly and constant price series are not discussed. The revised series, based on the OECD recommendations¹ are work-in-progress and further refinement is expected over the next few months – however, they are sufficiently advanced to indicate the likely size of possible revisions when they are adopted

Existing software investment series

2. For the private sector, the key data source is the Annual Economic Survey, which is a sample survey of almost all businesses in NZ classified to non-agriculture industries. The survey collects a full range of data on financial performance (profit and loss, fixed asset purchases and sales and balance sheet). Since 1997 the fixed asset section of the questionnaire has asked respondents to provide data on purchases of software. It is not possible to distinguish between the three components of software: off-the-shelf, customized and own account.

3. Respondents will generally base their replies on their financial accounts prepared for the Inland Revenue Department (the taxation authority) and accordingly will conform to taxation guidelines. These define computer software as “an intangible asset and depreciable property. Software is defined as copyright in software, the right to use software, and the right to use copyright in software.” The definition is further expanded to include all programs, routines, documentation and training materials. The classification of “research and development of software” (which will include own account software) is less specific and would allow certain research expenditures to be written off. The treatment of databases is not mentioned.

4. While we expect that most businesses will capitalise high-value purchases of off-the-shelf software and (possibly) customized software, small /medium value purchases and own account developments are likely to be expensed. Nevertheless, the survey responses have been used in the national accounts, largely unadjusted.

5. Central and local government software purchases are estimated from their financial accounts, either directly for central government via access to accounting records or indirectly for local government via an annual economic census (similar to the Annual Enterprise Survey above). In NZ, both levels of government have adopted accrual accounting and identify and depreciate assets in their balance sheets.

¹ Report of the OECD Task Force on Software Measurement in the National Accounts, STD/NA(2002)2, OECD Statistics Directorate

Nevertheless, not all software expenditure will be capitalized and even identifying this expenditure separately in the accounting records is not straightforward as it is often included in an “other assets” category. The accuracy of the capitalized software estimates for government would be similar to that derived for the private sector.

6. The published series for software investment are given below. These are at the very low end – as a percent of GDP – of the national figures provided in the OECD report.

Year	Software GFCF (\$m)	as a % of GDP
1999	542.1	0.53
2000	641.0	0.59
2001	689.2	0.60
2002	666.9	0.54
2003	699.5	0.54

Revising the Published Series using the OECD Supply Approach

7. Given our concerns regarding the completeness of the existing software statistics, the opportunity has been taken to adopt and adapt the OECD recommendations on estimating gross fixed capital expenditure on software using a supply approach.

Purchased software

8. The OECD approach is summarized in the following table:

Value of sales of capitalisable software services (SIC 73.71 + 73.72; CPA 72.20.2 + 72.20.31 + 72.20.33 + 72.20.34), incl. royalties and license fees, incl. games	A
Inclusion of imports	B
Inclusion of trade margins and taxes on domestic supply and imports	C
Exclusion of software embedded by hardware industry (50% of purchases of pre-packaged software by hardware industry), treated as intermediate consumption	D
Exclusion of sub-contracting flows between “software companies”	E
Exclusion of household consumption in games and other pre-packaged software	F
Exclusion of exports	G
Exclusion of maintenance (CPA 72.20.34, 10-15% of SIC 73.71)	H
Total GFCF in purchased software	A+B+C-D-E-F-G-H

9. A key supply side source used for the revised estimates is the Information Technology (IT) Survey. The IT survey is an annual survey first conducted in 1994. The survey population is not restricted to specific ISIC codes (ANZSIC in the NZ context) and covers units engaged in computer wholesaling, telecommunication services, data processing services, information storage and retrieval services, computer maintenance services and computer consultancy services. Sales data is broken down into a number of categories including software and computer services, and these are further analysed into: (i) sales to NZ end-users (ie excludes sales for on-selling); (ii) sales to other NZ customers; and (iii) exports.

10. Sales of off-the shelf software. The sales breakdowns in the survey eliminate the need to separately estimate steps A, C, D, E and G in the OECD table. The sales to end-users is the appropriate category and will exclude sub-contracting and sales for embedding in hardware. Margins will be included in the sales values and exports are specifically excluded.

11. Imports. Some NZ businesses will import software directly for their own use. This will enter NZ either (a) as packaged software on CD or DVD or (b) will be downloaded from the internet. For (a) imports of software on disc are included in merchandise trade statistics. Investigation has shown that these correctly capture the value of the content and not just the media. The imports were analysed by industry of importer to eliminate all imports made by wholesalers, retailers and manufacturers likely to be importing to embed in hardware. For years post 1997, the percentage of imports destined for own use has varied between 16-20% of the relevant import codes. This amount has been declining over the years, probably reflecting increasing internet downloads and domestic supply. No information is available on internet downloads and no estimate is yet included in the revised series².

12. Household purchases. Sales of off-the-shelf software need to be excluded from the IT Survey data. Households will often purchase their software from the same outlets as business. Household purchases have been estimated from the 2001 Household Expenditure Survey (HES), which indicates households purchase approx. 5.4% of IT sales to end-users. This will exclude software bundled with hardware. The deduction will be re-estimated with each three-yearly HES.

13. Maintenance. It is assumed that software purchased off-the-shelf will not be used for maintenance.

14. Revised estimates.

NZ Application of OECD Supply Approach : Off-the-shelf Software			
New Zealand	Assumptions	OECD	2002 \$m
IT sales to end-users		A+C-D-E-G	484.2
+ Imports for own use	20% of imports of IT commodities are for own use	B (part)	12.4
	internet downloads for own use – no data and entered as nil in table	B (part)	0.0
	Possible correction to value of direct use imports based on ITSS data on software royalties /licences (still being reviewed)	B (part)	est. 50.0
- Household purchases	5.4% of IT sales to end users	F	25.4
- Maintenance	Assumed nil	H	0
Total		A+B+C-D-E-F-G-H	521.2

Customised software

15. Sales of customized software. The IT Survey includes sales of “computer services” which includes, inter alia: systems analysis; design and programming; systems integration; software

² However, from the balance of payments, data is available on trade in services and royalties. An annual survey (the International Trade in Services Survey, ITSS) collects data on (i) imported computer services and (ii) royalties and licence fees for computer software. The latter will include payments for off-the-shelf software for own direct use, on-selling, or reproduction and will presumably capture the value of imported software included in (a) trade imports and (b) internet downloads. While analysis of (ii) is not yet complete, it is hoped that it will prove a superior source of data and will be used to supplement or replace the estimates currently made for (a) and (b).

maintenance; data entry, processing and time sharing; information network and database services; hardware and systems servicing and repairs; and installation services. Not all of these relate to design and production of customized software – however, it is not possible to obtain a finer breakdown (survey questionnaire changes are planned). In the absence of this breakdown, 50% of sales of “computer services” are assumed to relate to customised software. This is thought to be a conservative estimate, given the known activities of the survey respondents. As with purchased software, the IT survey sales item accounts for A, C, D, E and G in the OECD table.

16. Imports. The balance of payments ITSS collects data on imports of computer services. From a small, follow-up survey it is estimated that 60% of these imports are for customized computer services.

17. Household expenditure. Unlikely to involve customized software, therefore assumed nil.

18. Maintenance. The IT Survey computer services category includes maintenance receipts and needs to be excluded. In the absence of a detailed breakdown, 15% of IT Survey sales are assumed to be for maintenance. (The OECD approach recommends 15% of SIC 73.71 be deducted for maintenance).

19. Revised estimates.

NZ Application of OECD Supply Approach : Customised Software			
New Zealand	Assumptions	OECD	2002 \$m
IT computer services	50% of IT Survey sales of “computer services”	A+C-D-E-G	920.1
+ Imports for own use	60% of ITSS imports of computer services	B	81.6
- Household purchases	Assumed nil	F	0
- Maintenance	15% of IT Survey sales of “computer services”	H	276.0
Total		A+B+C-D-E-F-G-H	725.7

Own account software

20. The OECD recommendation can be summarized in the following table:

Number of software professionals	
* average compensation	
= Labour cost of software professionals	A
Exclude labour cost linked to the production of software to be sold	C
Exclude labour cost linked to maintenance, management etc.	D
Plus non-labour costs of software professionals producing own-account software	B
Total macro estimate of own-account software	A-C-D+B

21. Earnings of software professionals. The 1996 and 2001 Censuses of Population were used to obtain (a) the number of persons coded to occupations *systems analyst, computer applications engineer and computer programmer* (NSCO codes 21311, 21312 & 21211. Very similar in coverage to ISCO 2131, 2132 & 2139) and (b) median personal income for these occupations. Estimates for non-census years were interpolated using the number of employees in industry Computer Consultancy (L7834 in the ANZSIC) for (a) and earnings data from the annual NZ Income Survey for (b).

22. Labour cost linked to the production of software to be sold. From the IT Survey, software sales were dominated by two industries, F4613 Computer Wholesaling and L7834 Computer Consultancy.

From the two Population Censuses, approximately 35% of software professionals were employed in these industries. In the absence of other information, it is assumed that 35% of software professionals are linked to software sales, rather than the development of own-account software.

23. Labour cost linked to maintenance, management etc. Based on US data, the OECD recommends assuming that 50% of software professionals' time is spent on tasks other than developing software. This assumption is adopted here.

24. Non-labour costs. No data exists on which to base this estimate. For countries in the OECD study, the ratio of non-labour costs to labour costs ranged between 0.46 to 1.02, with Denmark being an outlier at 1.50. For this study, a very conservative ratio of 0.50 has been adopted.³

25. Revised estimates.

NZ Application of OECD Supply Approach : Own-account Software			
New Zealand	Assumptions	OECD	2002 \$m
Number of software professionals	Limited to occupations in NZCO 21311, 21312, 21211		
* average compensation			
= Labour cost of software professionals		A	963.4
Exclude labour cost linked to the production of software to be sold	35% of software professionals	C	337.2
Exclude labour cost linked to maintenance, management etc.	50% of remaining software professionals [0.5* 0.65= .325]	D	313.1
= Labour cost of own-account software production		A-C-D	313.1
Plus non-labour costs of software professionals producing own-account software	50% of labour costs	B	156.5
Total		A-C-D+B	469.6

Summary

26. Adopting a supply approach based on the OECD recommendations leads to a revised estimate of software GFCF of \$1,716.5m. for 2002, compared to the published demand approach total of \$666.9m. The new figure suggests that the amount of software purchases being expensed in business accounts is larger than initially thought. The new estimate is approximately 2.5 times higher than that published and is 1.39 percent of GDP. This is much more in line with other OECD countries and similar (but still below) the Australian percent of 1.5+% (from the OECD report).

27. The share of own-account software to total software development in the revised figures is 27.4%. This is similar to the average of 31.3 % for the countries listed in the OECD report.

³ This ratio is still under review and may be too low. The Annual Economic Survey data for industry L7830, Computer Services, indicates that the ratio of purchases and other operating expenses to salaries and wages is approximately 2.0. However, this may be influenced by purchases of software for resale. Further analysis of individual business accounts is needed before any conclusions on the ratio can be drawn.