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EXPERIMENTAL PRICE INDIXES FOR FINANCIAL SERVICES

Invited paper submitted by the Australian Bureau of Statistics[*]

I.   INTRODUCTION

1.   For some years now there has been considerable community interest in Australia in the charges levied for financial services by financial institutions (in this paper referred to simply as "banks"). Financial services are not currently included in the Australian CPI. A review in the late 1990s led to the Australian Bureau of Statistics (ABS) commencing a research program aimed at adding a major new commodity group "financial services" to the CPI. The objective was to include in the CPI, all those services acquired by households in relation to the acquisition, holding and disposal of financial and real assets. To be consistent with the principal purpose of the Australian CPI as a measure of price inflation for the household sector as a whole, the price measures were to be constructed on an acquisitions basis and therefore were to cover both those fees and charges levied directly on households and those

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paid indirectly via differences in interest rates on deposits and those on loans (interest margins).

2.   This paper is confined to a discussion of the issues related to the construction of price indexes for those services acquired in respect of deposit and loan facilities provided to households by banks (though they will continue to be referred to here as simply "financial services").

3.   Although the ABS could have moved quickly to includ direct fees and charges for financial services in the Australian CPI this option was rejected on the grounds that it was likely to lead to an upwards bias in the CPI. This view was based on an assessment that the Australian financial services sector was embarking on a long-term restructuring that would result in a shift towards direct fees and charges at the expense of the indirect. In other words, it was believed that the "prices" of direct fees and charges would increase more rapidly than the "prices" of indirect fees. According to the Australian national accounts, the direct charges currently comprise more than 40% of total financial institutions' charges, up from just over 30% in the mid 1990s (this is based on data for all institutional units rather than just households but it is indicative of the change in the significance of the direct charges and the overall importance of the indirect charges). The work done so far in trying to estimate the weights of the direct charges and the interest margins for the CPI target group indicates that they are currently likely to be of the order of 30:70 for the direct charges versus interest margins.

4.   Constructing a measure of price change that includes both the direct and indirect charges is not a straightforward process. However the ABS believes that it has now solved this methodological problem and presents the techniques in this paper.

II.   EMPIRICAL DATA

5.   Since 1997 the Reserve Bank of Australia (RBA) has undertaken an annual survey of fees and charges and interest margins for Australian banks[1]. This survey provides a useful background against which to consider the ABS estimates.

Direct fees and charges paid by households

6.   Table 2 in the RBA Bulletin article shows the average percentage change from 1997 to 2002 broken down into fees on deposit products, fees on three groups of loan products, and all other fees. The largest average change shown is for credit cards (25 per cent), followed by deposit products and personal-loan products (23 per cent each), and housing products (16 per cent). The average percentage change over this period for all deposit and loan products used by households is shown as 18 per cent.

Interest margins on consumer products

7.   The first thing to note is that the Reserve Bank does not calculate interest margins in the same way as the ABS. The Bank either uses the spread between the average interest rate

received by banks and the average interest rate paid; or the difference between an indicator lending rate and the cash rate. On both of these measures the Bank finds that banks' interest margins have fallen over recent years.

8.   Using the first measure the Bank notes that over the past decade, the spread "..... *has fallen from 4 percentage points to around $2^3/_4$ percentage points.*"[2] Using the second measure the RBA says "*The fall in the margin between rates for residential mortgages in Australia and short-term money-market rates has been even more pronounced, with a decline from over 4 percentage points to around $1^3/_4$ percentage points.*"[3]

9.   "*One question that has been of interest over recent years is whether the increase in fees has offset the benefits to bank customers from the reductions in banks' interest margins that have occurred over the past decade. The Reserve Bank's analysis of this in past years has concluded that the increase in fees has offset only a small part of the effect of the reduction in margins. The latest data do not change this conclusion*"[4].

Comparison of results

10.   The data available to the ABS and the RBA indicate that bank fees and charges have risen substantially over recent years. However it is not possible to directly compare the two sets of results for interest margins as the methodology required to construct the ABS composite measure does not enable decomposition between the direct and indirect fees.

III.   CONSTRUCTION OF THE ABS MEASURE

11.   The first step was to classify the banks' products (or their customers' accounts) to identify those relevant to households.

Classification

12.   Banks sell their products to people in their domestic capacity (*personal customers*), people in their business capacity as the owners of unincorporated businesses, corporate customers, and governmental bodies. For the purposes of the CPI we want to measure price changes affecting personal customers only. So the first thing to do is to classify a bank's products or accounts to separate the truly personal ones from the others. There are alternative ways of doing this. One way is to classify the whole product as personal or business depending on which is predominant. Another way is to classify the accounts within each product based on whether the account manager is a so-called personal banker or business banker. The ABS thoroughly investigated both of these ways and decided that the classification of products based on predominance is the better approach.

Calculating the weight

13.   For many items in the CPI the ABS's Household Expenditure Survey is used to calculate the weight. But this survey is of no use for calculating the weight of deposit and loan facilities because annual household expenditure on interest margins is not obtainable

from households. Also it is too onerous for the ABS to ask households to calculate their annual expenditures on the various fees and charges and indirect taxes they pay on deposit and loan facilities. Weights - as well as measures of price change - can only be calculated from information supplied by the banks themselves. The total "price" paid by consumers for individual deposit and loan products may be broken down into four broad elements:

- implicit expenditure on interest margins,
- loan-establishment fees,
- other fees and charges, and
- indirect taxes.

Implicit expenditure on interest margins

14.   To work this out the ABS needs to know three things:

- the yields on individual consumer products,
- a suitable reference rate of interest, and
- the average balances of the individual consumer products.

15.   The ABS calculates product yields from detailed average balance sheet and related interest statements. At least for the bigger banks, such statements are routinely prepared monthly, classified by product.

16.   For this project the reference rate of interest is specific to each bank. It is calculated as the mid-point of the average interest rate received on all loans (including business loans) and the average interest rate paid on all deposits (including deposits by businesses). Estimating the reference rate from these series minimises the problem of negative margins encountered by other statistical agencies that have used bill or cash rates as their reference rates of interest.

17.   The difference between the reference rate and the product yield is the interest margin on the product. Applying the margins to the average product balances provides the measure of households' implicit expenditure on interest margins.

Loan-establishment fees

18.   These fees are usually payable by customers establishing or applying for housing loans though they may be payable in respect of other loan types. They are recorded separately in the banks' books. Household expenditure on establishment fees is the annual value of these fees recorded against loan products.

Other fees and charges

19.   In Australia most of the bigger banks routinely record their revenue from fees and charges by both type of fee and product. So household expenditure on other fees and charges is estimated by summing the annual values recorded against the products previously classified as personal ones.

Indirect taxes

20.   In contrast to fees, the ABS has found it difficult to obtain good estimates of annual household expenditure on indirect taxes by individual deposit and loan product. Therefore we have had to make the best estimates we can with the data that are available.

Estimating changes in price

21.   Banks have so many personal products that in practice it is not feasible to estimate changes in price for all of them. So, in common with the practice employed generally in the CPI, the ABS selects representative products from each major group of products and prices only those. The remainder of this part discusses estimating changes in price for the representative products.

22.   For this project six groups of products were chosen, three on each side of the balance sheet. The liability (deposit) groups used are: (i) current accounts, (ii) savings and investment accounts, and (iii) retirement accounts. The asset (loan) groups used are: (i) housing and home-equity loans, (ii) personal loans and overdrafts, and (iii) credit cards. So, for example, rather than estimating price changes for all the many home-loan products offered by a bank, the ABS estimates as accurately as possible the price changes in a representative home-loan product. This estimate will have a weight reflecting all the housing and home-equity loans offered by this bank.

23.   As already discussed, the total price of any individual product may comprise up to four elements: (i) interest margins, (ii) establishment fees, (iii) other fees and charges, and (iv) indirect taxes. Of course it is important that the method used to estimate price changes allows for equitable treatment of shifts between these elements. For example, were a decline in interest margins to be exactly offset by an increase in other fees and charges then it is crucial that the price measure for the product shows no change. As you can see from this example, these four elements of price change are inextricably mixed in the total price paid by consumers for a product. For this reason the ABS prefers to concentrate on the total price rather than its components. However, for the purpose of exposition, the following discussion is based on the simplifying assumption that they can be calculated separately at all times.

Interest margins

24.   The same sources and methods that are used to calculate the households' implicit expenditure on interest margins are used to estimate the price changes in interest margins. But for the purpose of calculating price changes it is, of course, important to have series that are free from accounting anomalies such as posting effects and adjustments of various types. The ABS uses moving averages to remove the effects of such peculiarities in the series. Also, to preserve the underlying quantities, each quarter the base period value of the margins is adjusted by movements in the CPI.

Loan-establishment fees

25.   Loan-establishment or application fees present special measurement problems because lenders compete in the market for loans by waiving and discounting the establishment fees. To overcome this problem the ABS measures the price change in the average fee paid by consumers each month. Generally speaking the ABS has found that the banks keep good records of fee waiving and discounting, so it has not been difficult to prepare a monthly time series of average loan-establishment fees.

Other fees and charges, and indirect taxes

26.   Most banks do not store detailed price and quantity information about their other fees and charges. This makes it impossible to calculate a price index for other fees and charges using what might be called a "census approach". So the ABS has used a random sample of customers' accounts for this purpose.

27.   To facilitate the sampling of accounts, the ABS provided detailed instructions to the banks. The main ones are:

- Each of the accounts selected in a particular sample must be subject to exactly the same fees and charges i.e. should be chosen from the same sub-product.
- They should disregard dormant accounts and then randomly select from the remainder. (The ABS defined a dormant account as one that has no customer-initiated transactions in a six-monthly period.)
- They may use either bank branch codes or postcodes as the filter to restrict account selection to residents in the eight Australian capital cities (the scope of the Australian CPI). For those banks wishing to use postcodes the ABS provided a concordance between postcodes and capital-city statistical divisions.
- To avoid bias, they should read the whole file during the selection process.
- They should supply details of customers' banking transactions - and running balances - over a twelve-monthly period.
- They should make the selected accounts anonymous by deleting the customers' names and addresses, and replacing their account numbers with other identifiers.

28.   To process the sampled accounts the ABS built a computer model that emulates the banks' charging systems. The transactions in the randomly selected confidentialised accounts are the input data for this model. Each quarter the values of these transactions are revalued to current period prices using a four-quarter moving-average of the CPI. The ABS creates charging, tax, and rebate rules for each sampled product for each month. These rules are then applied to the file of revalued transactions month by month. The outputs of the system are the other fees and charges and indirect taxes paid in a year by each sampled account in each month.

IV.   ISSUES WITH DEVELOPING THE PRICE INDEX FOR BANKING SERVICES

Sampling customers' accounts

29.   There are several issues associated with sampling customers' accounts. The first is the frequency of sampling. The older the sample the greater the chance that the transactional behaviour captured in it is out of date. The ABS believes that annual re-sampling of customers' accounts is essential to capture, in a timely manner, changes in consumer behaviour. These changes may be triggered by such things as changing fee structures and the introduction of more convenient and more powerful transactional channels.

30.   The second issue is whether we should sample more products from the same bank. Presently we sample between six and ten products for each sampled bank. We consulted with the banks before choosing which of their products to sample. Arguably the more products the ABS samples the better the result. But sampling products is neither a trivial nor inexpensive exercise for any of the parties concerned. The ABS believes that choosing one representative product for each balance-sheet category (for example, home loans, retirement accounts) is practicable and provides reliable results of price change over time.

31.   Third, we could sample more accounts within the same products. For these experimental estimates the ABS has sampled about eight thousand customers' accounts in all. This translates into a database of about 2.9 million records each quarter. The ABS believes that this is large enough for statistical purposes and we are reluctant to increase the numbers of accounts sampled.

32.   Last, the ABS could sample more banks and other deposit-taking institutions. Presently the ABS is sampling all the major banks in Australia. We have considered extending the sample to include second-tier institutions but we think that the increased coverage would not lead to noticeably better results. Of course the cost of compliance for the business community would be substantially more than at present.

Credit cards

33.   There are several issues with credit cards. The first is interest volatility, which is especially a problem with cards having interest-free periods. Interest-free periods lead to spikes in card yields because the card issuer does not know whether the customer will incur interest charges until the interest-free period is over. The ABS is smoothing these series by averaging the monthly data. We believe that this gives a truer picture of the interest flows than the raw data reported to us.

34.   Second, there is a school of thought which says that credit cards should not be included in the reference-rate calculations at all. The reason appears to be that the interest flows are modelled by the banks and therefore are in some sense artificial. The ABS does not support this view. Another issue is credit-card surcharging. Merchants are now allowed to apply surcharges to credit-card transactions. These surcharges could be classified as a

financial service but the ABS regards them as part of the price of the good or service purchased, e.g. for air travel.

Securitization of home loans

35.   Some sampled banks are known to have sold home loans, which has implications for the calculation of reference rates and product yields. Although these loans leave the banks' balance sheets in a legal sense, in practice the banks can still report for them if we wish. So this makes linking the series straightforward.

Corporate mergers

36.   Mergers between deposit-taking institutions are difficult to deal with. To handle them properly the ABS needs several overlapping months on the same accounting basis to allow us to link the series properly.

Changes in quality

37.   Assessing changes in the quality of financial services is a difficult issue. Quality means different things to different people. For some people, the closure of branches and the consequent congestion at the remaining branches is a decline in the quality of the service they experience. But other people would see the advent of twenty-four-hour electronic channels (such as telephone and Internet banking with BPAY facilities and powerful funds-transfer capabilities) as a definite improvement in quality. Quality change is an important issue but it is impossible to address it adequately at this stage. We will keep it on the agenda for further consideration.

Methods

38.   The methods used to calculate price changes for deposits and loans are illustrated in Appendix 1.

V.   CONCLUSION

39.   During the past decade, the banks in Australia have significantly increased both the range and level of their direct charges. The overall importance of financial services as a share of total economic activity has risen as well. As a result, queries have arisen from time to time as to why the ABS does not include financial charges in the CPI. The ABS has not included the direct charges for financial services in the CPI because they would have resulted in an upward bias in the CPI because of the lower rate of increase occurring in the charges indirectly levied by banks through differentials in their interest rates on deposits and loans.

40.   The ABS has found that measuring changes in the total price of financial services has been a difficult job, both conceptually and in practice. However, the experimental results now available for a 5-year period appear to be plausible, even though it has not been possible to adjust for quality changes in banking services over that time. The ABS expects to be able to include "Financial services" as a new group in the next major update of the Australian CPI, which is scheduled for the second half of 2005.

Appendix 1:   Example of calculating a price index for a deposit product

Table 1: Base period sample account[5]

Date	Dr/Cr	Transaction	Transaction value	Tax	Balance
				$	
					456.23
2-Jan	Dr	Over the counter withdrawal	107.05	0.70	348.48
12-Jan	Cr	Deposit	4000.00	2.40	4346.08
13-Jan	Dr	EFTPOS transaction	50.62	0.30	4295.16
13-Jan	Dr	Over the counter withdrawal	371.00	0.70	3923.46
14-Jan	Dr	Own ATM cash	300.00	0.70	3622.76
14-Jan	Dr	Own ATM cash	100.00	0.70	3522.06
16-Jan	Dr	Own ATM cash	100.00	0.70	3421.36
16-Jan	Dr	Over the counter withdrawal	371.00	0.70	3049.66
16-Jan	Dr	Cheque	90.00	0.30	2959.36
19-Jan	Dr	Own ATM cash	100.00	0.70	2858.66
19-Jan	Dr	Own ATM cash	100.00	0.70	2757.96
19-Jan	Cr	Deposit	4000.00	2.40	6755.56
19-Jan	Dr	Cheque	740.00	1.50	6014.06
20-Jan	Dr	EFTPOS transaction	76.42	0.30	5937.34
21-Jan	Dr	Other ATM cash	20.00	0.30	5917.04
21-Jan	Dr	Cheque	100.00	0.70	5816.34
22-Jan	Dr	Cheque	43.40	0.30	5772.64
22-Jan	Dr	Cheque	302.00	0.70	5469.94
22-Jan	Dr	Cheque	37.00	0.30	5432.64
23-Jan	Dr	Over the counter withdrawal	371.00	0.70	5060.94
23-Jan	Dr	Cheque	72.00	0.30	4988.64
27-Jan	Dr	Own ATM cash	150.00	0.70	4837.94
27-Jan	Dr	Cheque	73.50	0.30	4764.14
27-Jan	Dr	Cheque	260.00	0.70	4503.44
27-Jan	Dr	EFTPOS transaction	51.45	0.30	4451.69
28-Jan	Dr	Over the counter withdrawal	19.95	0.30	4431.44
28-Jan	Dr	Cheque	150.00	0.70	4280.74
29-Jan	Dr	Cheque	140.00	0.70	4140.04
30-Jan	Dr	Over the counter withdrawal	371.00	0.70	3768.34
30-Jan	Dr	Cheque	8.00	0.30	3760.04
30-Jan	Dr	Cheque	60.00	0.30	3699.74
Total Taxes:				**21.10**	

Fees		Total	Number	
	Activity	number	charged	Amount ($)
	Over the counter withdrawal	6	2	6.00
	EFTPOS transaction	3	0	0.00
	Own ATM cash	6	0	0.00
	Other ATM cash	1	1	1.20
	Cheque	13	3	3.00
	Deposit	2	2	0.00
Total Fees:				**10.20**

Taxes and fees are calculated using data in tables 3 and 2 respectively

Table 2: Fee schedule[6]

Description	Base period		Current period	
	No. free	Charge	No. free	Charge
Over the counter withdrawal	4	$3.00	4	$3.00
EFTPOS transaction	10	$0.50	9	$0.50
Own ATM cash	10	$0.50	9	$0.50
Other ATM cash	0	$1.20	0	$1.20
Cheque	10	$1.00	9	$1.00
Deposit	0	$0.00	0	$0.00

Table 3: Tax schedule[7]

Bank Accounts Debit Tax (BAD)

Transaction value		Tax	
Min	Max	Base	Current
0	1	$0.00	$0.00
1	100	$0.30	$0.30
100	500	$0.70	$0.70
500	5000	$1.50	$1.50
5000	10000	$3.00	$3.00
10000	+	$4.00	$4.00

Financial Institutions Duty (FID)

Base	Current
0.06%	0.06%

Table 4: Interest data[8]

	Base period				Current period			
	Balance	Interest	Int rate	Margin	Balance	Interest	Int rate	Margin
	$ million		%	.	$ million		%	.
Deposit products								
Personal	22000	740	3.3636	2.4937	23600	775	3.2839	2.3971
Current accounts	6000	68	1.1333	4.7241	6600	75	1.1364	4.5446
Other accounts	16000	672	4.2000	1.6574	17000	700	4.1176	1.5634
Business accounts	25000	920	3.6800	2.1774	28000	1000	3.5714	2.1096
Total deposit accounts	47000	1660	3.5319	2.3255	51600	1775	3.4399	2.2411
Loan products								
Personal	42000	3188	7.5905	1.7331	46000	3400	7.3913	1.7103
Business	28000	2540	9.0714	3.2140	31000	2700	8.7097	3.0287
Total loan accounts	70000	5728	8.1829	2.3255	77000	6100	7.9221	2.2411
Reference rate			**5.8574**				**5.6810**	

Table 5: CPI data[9]

	t-5	t-4	t-3	t-2	t-1
All groups	117.5	121.2	123.4	127.6	129.1
4 term moving average				122.4	125.3
Indexation factor (movement)					1.0237

Table 6: Projected current period sample account[10]

Date	Dr/Cr	Transaction	Transaction value	Tax	Balance
			$		
					467.04
2-Jan	Dr	Over the counter withdrawal	109.59	0.70	356.75
12-Jan	Cr	Deposit	4094.75	2.46	4449.05
13-Jan	Dr	EFTPOS transaction	51.82	0.30	4396.93
13-Jan	Dr	Over the counter withdrawal	379.79	0.70	4016.44
14-Jan	Dr	Own ATM cash	307.11	0.70	3708.63
14-Jan	Dr	Own ATM cash	102.37	0.70	3605.56
16-Jan	Dr	Own ATM cash	102.37	0.70	3502.50
16-Jan	Dr	Over the counter withdrawal	379.79	0.70	3122.01
16-Jan	Dr	Cheque	92.13	0.30	3029.57
19-Jan	Dr	Own ATM cash	102.37	0.70	2926.51
19-Jan	Dr	Own ATM cash	102.37	0.70	2823.44
19-Jan	Cr	Deposit	4094.75	2.46	6915.73
19-Jan	Dr	Cheque	757.53	1.50	6156.70
20-Jan	Dr	EFTPOS transaction	78.23	0.30	6078.17
21-Jan	Dr	Other ATM cash	20.47	0.30	6057.40
21-Jan	Dr	Cheque	102.37	0.70	5954.33
22-Jan	Dr	Cheque	44.43	0.30	5909.60
22-Jan	Dr	Cheque	309.15	0.70	5599.75
22-Jan	Dr	Cheque	37.88	0.30	5561.57
23-Jan	Dr	Over the counter withdrawal	379.79	0.70	5181.08
23-Jan	Dr	Cheque	73.71	0.30	5107.08
27-Jan	Dr	Own ATM cash	153.55	0.70	4952.83
27-Jan	Dr	Cheque	75.24	0.30	4877.28
27-Jan	Dr	Cheque	266.16	0.70	4610.43
27-Jan	Dr	EFTPOS transaction	52.67	0.30	4557.46
28-Jan	Dr	Over the counter withdrawal	20.42	0.30	4536.73
28-Jan	Dr	Cheque	153.55	0.70	4382.48
29-Jan	Dr	Cheque	143.32	0.70	4238.46
30-Jan	Dr	Over the counter withdrawal	379.79	0.70	3857.98
30-Jan	Dr	Cheque	8.19	0.30	3849.49
30-Jan	Dr	Cheque	61.42	0.30	3787.77
Total taxes:				**21.21**	

Fees

Activity	Total number	Number charged	Amount
			$
Over the counter withdrawal	6	2	6.00
EFTPOS transaction	3	0	0.00
Own ATM cash	6	0	0.00
Other ATM cash	1	1	1.20
Cheque	13	4	4.00
Deposit	2	2	0.00
Total Fees:			**11.20**

Table 7: Indexes for current accounts[11]

Component	Base period		Current period	
	Value aggregate	*Index*	*Value aggregate*	*Index*
Margins	28344	100.0	27913	98.5
Fees	11904	100.0	13071	109.8
Taxes	14739	100.0	14818	100.5
Total	54987	100.0	55803	101.5

NOTES

[1] The latest survey is published as 'Banking Fees in Australia', *Reserve Bank of Australia Bulletin*, April 2003, pp 1-6.

[2] Ibid.

[3] Ibid.

[4] Ibid.

[5] Only a single month's data is used in this example. In practice, many accounts would be sampled with each account containing data for a full year.

[6] Summary of the information typically available from financial institutions. For each period, the table includes the number of free transactions and the per transaction charge for additional transactions. A zero number free indicates no transactions are free and a zero charge indicates all transactions are free.

[7] Table of tax rates of the type that used to be employed in Australia. The debits tax (BAD) is levied on all debit transactions to eligible accounts, with the amount charged being set for ranges of transaction values (i.e. using a step function). Financial institutions duty (FID) is levied on all deposits with the amount being determined as a percentage of the value of the deposit.

[8] Table presents, in very summary form, balances and annualised interest flows derived by taking moving averages of data reported by financial institutions. Interest rates and margins are calculated from the balances and flows.

[9] Data required to derive the indexation factor. This example follows the Australian practice of a quarterly CPI. If a monthly CPI is produced, 12 term moving averages would be required.

[10] The opening balance and transaction values are derived by applying the indexation factor to the base period amounts. The tax payable is determined by reference to the data in table 3. Fees payable are determined by reference to data in table 2.

[11] This table brings it all together. The current period value aggregates are derived as follows:

For margins – the base period aggregate is multiplied by the product of the indexation factor (Table 5) and the ratio of the current and base period margins for current accounts (Table 4).

For fees – the base period aggregate is multiplied by the ratio of total fees payable on the sample account in the current period (Table 6) and the base period (Table 1).

For taxes – the same procedure is followed as for fees.