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### **Author**

Liu, Benjamin, Huang, Allen

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## **Goods and Services Tax and Mortgage Costs of Australian Credit Unions**

**Benjamin Liu**

*Department of Accounting, Finance and Economics,  
Griffith University, Queensland 4111, Australia*

Email: b.liu@griffith.edu.au

**Allen Huang**

*Department of Accounting, Finance and Economics,  
Griffith University Queensland 4111, Australia*

**Abstract:** Since Australia implemented a new tax system of Goods and Services Tax (GST) in July 2000, research attempted to examine the impact of the GST on general price levels, but a little effort has been directed at investigating the impact of the GST on mortgage costs. Using proprietary data of 79 credit unions in Australia over 36 months with 2805 observations, this paper examines the effect of taxation incidence on mortgage yield spreads of credit unions in the pre- and post-GST periods. We find that the mutual lenders significantly increased their mortgage charges in the post-GST period.

**Keywords:** Australian GST, Mortgage Costs of Credit Unions, Lender Pricing Behavior

**JEL Classification Number:** G21; G12; H25; G14

### **1. Introduction**

In the past decade, Australia has experienced significant rises in mortgage costs and sharp declines in housing affordability, which has caused alarms in the society. This period corresponds with the implementation of a new tax system in the nation, the core part of which is the Goods and Services Tax (GST), introduced in July 2000. To what extent the new tax system has impacted the housing mortgage costs in Australia remains a question. This paper investigates the impact of the GST on the mortgage costs of Australian credit unions.

Since the introduction of the GST in Australia, studies have been conducted to examine various issues pertinent to the GST. Some of the studies investigate the GST's effects on the general price level of goods and services (e.g., Commonwealth Treasury, 2000; Australian Competition and Consumer Commission, 2000 and 2003; Valadkhani and

Layton, 2004). Other studies estimate the compliance costs of the GST (e.g., Commonwealth Treasury, 1998; Tran-Nam, 1999 and 2000). As the research on price levels only provides general information with limited usefulness, the estimated compliance costs of the GST are based on different assumptions, using different survey techniques with varying sample sizes and lumping the GST-related and normal upgrading computer and system costs together. Consequently, Tran-Nam (2000) concludes that those estimates are either baseless or difficult to justify.

To our best knowledge no previous study has examined the GST's effects on mortgage costs of credit unions. There are two questions to be answered: (1) Has the introduction of the GST in Australia impacted the mortgage costs charged by credit unions? (2) To what extent did the GST contribute to the increase in mortgage costs for the cooperative lenders? To answer the research questions, we collected the monthly mortgage data of 79 Australian credit unions over 36 consecutive months from January 1999 to December 2001: 18 months before and 18 months after the implementation of the GST on July 1, 2000. We employ *t*-tests to test the data of both nominal and effective mortgage yield spreads, the latter of which considers all origination and ongoing service fees of the lenders.

This paper contributes to the literature in several ways. Although the GST and the VAT have been implemented over a number of years in several countries, such as Canada and New Zealand, to our best knowledge, there has been little research that examines the effects of the GST or the VAT on the mortgage costs of financial institutions. Only recently did Huang and Liu (2009) and Liu and Huang (2010) investigate the mortgage yield spreads of Australian banks and building societies, respectively, in the pre- and post-GST periods. No research has done so far for credit unions. This paper is intended to fill the knowledge gap.

## **2. Data**

The data for analysis is extracted from the Cannex's monthly survey of Australian lenders, which includes monthly information on mortgage interest rates, mortgage fees and charges, credit criteria and other data of all credit unions operating in the country. Other data (i.e. 90-day bank bill rates) is from the Statistics of the Reserve Bank of Australia (RBA). The time period selected for the analysis covers 36 consecutive months from January 1999 to December 2001 (that is, 18 months before and 18 months after the GST came into effect on 1 July 2000). The selection of the time period is mainly determined by the key research question this study addresses, that is, the impact of the introduction of the GST on mortgage yield spreads. Hence, inclusion of both pre- and post-GST periods in the analysis would allow comparisons to be made on the mortgage

costs before and after the implementation of the GST. In addition, during the research period there was no significant market-wide event that could have caused abrupt alterations in the Australian mortgage market, and this would lead to a more reliable finding.

Seventy nine credit unions operating in the mortgage market during the period are included in the analysis. The data selection results in a total of 2805 monthly observations. To make the comparisons between the pre- and post-GST periods more valid, only the standard products of residential mortgages, that is, the owner-occupied home loans with adjustable interest rates (with which about 80 per cent of Australian home loans are originated), are examined. Loans for other purposes are excluded from the paper.

We use both the nominal interest rate and the annualized average percentage rate (AAPR); the latter includes the nominal interest rate and all other fees and charges (e.g., upfront fees for documentation, valuation and application, and ongoing service fees) levied on mortgages, that is, the effective rate. The AAPR adopted in this study is computed using the standard calculations required under the Australian Uniform Consumer Credit Code (UCCC) and is considered to be a benchmark for comparing mortgage products in Australia. When analyzing and comparing mortgage costs, however, we use mortgage yield spreads, rather than the interest rates (either the nominal or effective rate). Two types of mortgage yield spreads are derived: the nominal yield spreads (the differences between the standard adjustable nominal rates and the 90-day bank bill rates) and the effective yield spreads (the differences between the AAPR rates and the 90-day bank bill rates). The 90-day bank bill rates are often used as the benchmark in the banking industry to measure relative or margin costs.

The use of yield spreads is a standard approach in measuring mortgage costs as it helps overcome the impact of inflation and adjustments of monetary policy over time on the interest rates. This approach is, therefore, often used by the RBA, the banking industry, and most mortgage pricing studies (e.g., Ambrose *et al.*, 2004; Liu and Skully, 2005 and 2008). To answer the three research questions, employ a univariate model (*t*-tests) to directly compare the means of mortgage yield spreads on quarterly data (there are 12 quarters from the beginning of 1999 to the end of 2001) and, more specifically, the two grand means of the yield spreads before and after the introduction of the GST. Quarterly means of both nominal and effective yield spreads are compared and a matrix of *t*-tests is developed for each of the two sets of the tests, that is, the nominal and effective yield spread differentials.

### **3. Results**

Table 1 and 2 present the matrixes of *t*-tests on credit union nominal and effective yield spreads over the 12 quarters, respectively. Later quarter average yield spreads are each compared with (deduct) earlier quarter average yield spreads using the nominal data (Table 1) and the effective data (Table 2). The comparisons result in the nominal/effective yield spread differentials that are expressed in percentage points, comparable to annualized interest rates. As shown in Tables 1 and 2, a positive figure means an increase in the yield spreads while a negative figure (figures in parentheses) represents a decrease in the yield spreads.

Table 1 reports the results of pair-wise comparison matrix of credit union nominal yield spreads for 12 quarters from 1999 to 2001. In July 2000, Australia implemented the Goods and Services Tax (GST). The *t*-test results are presented to specially demonstrate the quarterly average yield spread differentials in the pre- and post-GST periods, which is the central issue addressed in this paper. The figures indicate increases or decreases (in parentheses) in the nominal yield spreads (i.e., mortgage costs) from one quarter to the next and the two grand means of the pre- and post-GST periods.

Table 2 reports the results of pair-wise comparison matrix of credit union effective yield spreads for 12 quarters from 1999 to 2001. In July 2000, Australia implemented the Goods and Services Tax (GST). The *t*-test results are presented to specially demonstrate the quarterly average yield spread differentials in the pre- and post-GST periods, which is the central issue addressed in this paper. The figures indicate increases or decreases (in parentheses) in the effective yield spreads (i.e., mortgage costs) from one quarter to the next and the two grand means of the pre- and post-GST periods.

**Table 1: Credit Union Nominal Yield Spread Differentials: Matrix of *t*-tests Using Quarterly Means\***

		1999				2000				2001				Pre GST
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
1999	Q1↑	0.000												
	Q2↑	(0.085) <sup>b</sup>	0.000											
	Q3↑	(0.195) <sup>a</sup>	(0.111) <sup>a</sup>	0.000										
	Q4↑	(0.674) <sup>a</sup>	(0.591) <sup>a</sup>	(0.480) <sup>a</sup>	0.000									
2000	Q1↑	(0.661) <sup>a</sup>	(0.522) <sup>a</sup>	(0.316) <sup>a</sup>	0.031	0.000								
	Q2↑	(0.659) <sup>a</sup>	(0.526) <sup>a</sup>	(0.465) <sup>a</sup>	0.015	0.002	0.000							
	Q3↑	(0.452) <sup>a</sup>	(0.368) <sup>a</sup>	(0.257) <sup>a</sup>	<b>0.222<sup>a</sup></b>	<b>0.209<sup>a</sup></b>	<b>0.207<sup>a</sup></b>	0.000						
	Q4↑	(0.130) <sup>a</sup>	0.05	<b>0.061<sup>b</sup></b>	<b>0.540<sup>a</sup></b>	<b>0.526<sup>a</sup></b>	<b>0.525<sup>a</sup></b>	(0.330) <sup>a</sup>	0.000					
2001	Q1↑	<b>0.541<sup>a</sup></b>	<b>0.625<sup>a</sup></b>	<b>0.736<sup>a</sup></b>	<b>1.210<sup>a</sup></b>	<b>1.202<sup>a</sup></b>	<b>1.200<sup>a</sup></b>	0.346 <sup>a</sup>	0.676 <sup>a</sup>	0.000				
	Q2↑	<b>0.414<sup>a</sup></b>	<b>0.498<sup>a</sup></b>	<b>0.609<sup>a</sup></b>	<b>1.089<sup>a</sup></b>	<b>1.075<sup>a</sup></b>	<b>1.078<sup>a</sup></b>	0.219 <sup>a</sup>	0.545 <sup>a</sup>	(0.127) <sup>a</sup>	0.000			
	Q3↑	<b>0.195<sup>a</sup></b>	<b>0.209<sup>a</sup></b>	<b>0.390<sup>a</sup></b>	<b>0.870<sup>a</sup></b>	<b>0.854<sup>a</sup></b>	<b>0.855<sup>a</sup></b>	0.000	0.330 <sup>a</sup>	(0.346) <sup>a</sup>	(0.219) <sup>a</sup>	0.000		
	Q4↑	<b>0.400<sup>a</sup></b>	<b>0.480<sup>a</sup></b>	<b>0.581<sup>a</sup></b>	<b>1.071<sup>a</sup></b>	<b>1.058<sup>a</sup></b>	<b>1.056<sup>a</sup></b>	0.201 <sup>a</sup>	0.531 <sup>a</sup>	(0.145) <sup>a</sup>	(0.018)	0.201 <sup>a</sup>	0.000	
Post GST														<b>0.557<sup>a</sup></b>
No. of obs		208	213	217	225	228	231	254	240	239	244	254	252	1322

Note: \* A quarter to quarter comparison is made from the left to the top, as the arrow signs indicate. a and b denote the 1% and 5% levels of significance, respectively.

**Table 2: Credit Union Effective Yield Spread Differentials: Matrix of *t*-tests Using Quarterly Means\***

		1999				2000				2001				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Pre GST
1999	Q1↑	0.000												
	Q2↑	(0.083) <sup>b</sup>	0.000											
	Q3↑	(0.194) <sup>a</sup>	(0.111) <sup>b</sup>	0.000										
	Q4↑	(0.672) <sup>a</sup>	(0.586) <sup>a</sup>	(0.478) <sup>a</sup>	0.000									
2000	Q1↑	(0.651) <sup>a</sup>	(0.568) <sup>a</sup>	(0.457) <sup>a</sup>	0.021	0.000								
	Q2↑	(0.647) <sup>a</sup>	(0.546) <sup>a</sup>	(0.454) <sup>a</sup>	0.024	0.003	0.000							
	Q3↑	(0.435) <sup>a</sup>	(0.351) <sup>a</sup>	(0.241) <sup>a</sup>	<b>0.257<sup>a</sup></b>	<b>0.216<sup>a</sup></b>	<b>0.212<sup>a</sup></b>	0.000						
	Q4↑	(0.140) <sup>a</sup>	(0.107) <sup>a</sup>	0.004	<b>0.482<sup>a</sup></b>	<b>0.461<sup>a</sup></b>	<b>0.457<sup>a</sup></b>	(0.330) <sup>a</sup>	0.000					
2001	Q1↑	<b>0.488<sup>a</sup></b>	<b>0.507<sup>a</sup></b>	<b>0.680<sup>a</sup></b>	<b>1.158<sup>a</sup></b>	<b>1.138<sup>a</sup></b>	<b>1.134<sup>a</sup></b>	0.347 <sup>a</sup>	0.677 <sup>a</sup>	0.000				
	Q2↑	<b>0.360<sup>a</sup></b>	<b>0.444<sup>a</sup></b>	<b>0.555<sup>a</sup></b>	<b>1.033<sup>a</sup></b>	<b>1.017<sup>a</sup></b>	<b>1.008<sup>a</sup></b>	0.221 <sup>a</sup>	0.550 <sup>a</sup>	(0.128) <sup>a</sup>	0.000			
	Q3↑	<b>0.140<sup>a</sup></b>	<b>0.223<sup>a</sup></b>	<b>0.333<sup>a</sup></b>	<b>0.811<sup>a</sup></b>	<b>0.793<sup>a</sup></b>	<b>0.787<sup>a</sup></b>	0.000	0.330 <sup>a</sup>	(0.347) <sup>a</sup>	(0.221) <sup>a</sup>	0.000		
	Q4↑	<b>0.344<sup>a</sup></b>	<b>0.427<sup>a</sup></b>	<b>0.537<sup>a</sup></b>	<b>1.015<sup>a</sup></b>	<b>0.994<sup>a</sup></b>	<b>0.991<sup>a</sup></b>	0.204 <sup>a</sup>	0.534 <sup>a</sup>	(0.143) <sup>a</sup>	(0.017)	0.204 <sup>a</sup>	0.000	
Post GST														<b>0.508<sup>a</sup></b>
No. of obs		208	213	217	225	228	231	254	240	239	244	254	252	1322

Note: \* A quarter to quarter comparison is made from the left to the top, as the arrow signs indicate. a and b denote the 1% and 5% levels of significance, respectively.

Table 1 (nominal yield spread differentials) and Table 2 (effective yield spread differentials) show the following results. Comparing the third quarter (Q hereafter) of 2000 (the GST was implemented at the beginning of this quarter) to Q2 of 2000, there were only moderate increases in the yield spreads (20.7 basis points for the nominal and 21.2 basis points for the effective spreads). However, when using the yield spread in Q2 of 2000 as the base quarter and comparing all quarters after Q3 2000 to the base quarter, we found the yield spread differentials were much increased, peaking in Q1 2001 (120.0 basis points for the nominal and 113.4 basis points for the effective yield spreads), all significant at  $p < 0.01$ . In the six post-GST quarters, credit unions recorded mixed moves in their yield spreads, with increases of yield spreads in three quarters and decreases in the other quarters. These findings differ from the results of earlier research on the GST effects on the price level of goods and services that indicate the effects are a one-off price-perturbation in the quarter of the introduction of the GST.

A comparison on the two grand means (the average yield spreads of 6 quarters before and 6 quarters after the GST) shows that the nominal (effective) yield spreads for Australian credit unions increased by 55.7 (50.8) basis points in the post-GST periods (Tables 1 and 2).

#### **4. Conclusion**

The findings show that the introduction of the GST in July 2000 has had a significant impact on mortgage costs and has contributed to the substantial rise in mortgage costs charged by credit unions in the post-GST periods. This finding is consistent with that of Huang and Liu (2009) for Australian banks and Liu and Huang (2010) for Australian building societies. Furthermore, this study also documents that the increases of the mortgage yield spreads by credit unions in the post-GST periods are much higher than those of banks and building societies.

In the new tax system since no output GST is charged on mortgage loan interest, lenders need to recover the input GST they pay through increasing the overall charges to mortgage loans. Although as mutual cooperatives, credit unions are generally not profit seekers, they would need to pass the additional cost brought about by the GST on to their members.

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