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Intra-industry effects of bank privatization: A clinical analysis of the privatization of the Commonwealth Bank of Australia

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Abstract

This paper provides a comprehensive analysis of the effects of the privatization of the Commonwealth Bank of Australia (CBA) on the Bank's performance and that of the rival banks. First, we find that the major rival banks reacted negatively to the privatization announcements although the initial (partial privatization) and the final (full) privatization announcements elicited stronger stock market reaction from the rival banks. Second, we find that the CBA's long-term stock market performance improved markedly as the proportion of government ownership decreased, with the Bank's cumulative abnormal returns being 50% more than those of its rivals three years after the Bank had been fully privatized. Also, the CBA has not only been very efficient in reducing cost and improving its profitability in the post-privatization period, it has outperformed its rivals on almost all the operating performance measures and has become the most profitable bank in Australia. A particularly noteworthy finding is that the improvements in the CBA's operating and stock market performance and the rival banks' reaction to the partial and full privatization announcements were strongest after the Bank had been fully privatized. The implication of the results for governments contemplating privatization of state-owned enterprises is that full privatization is necessary in order to achieve strong gains in efficiency, profitability and stock market performance.

JEL classification: G21; G32; G14
Keywords: Bank; Privatization; Rivals' reaction; CAMEL; Operating performance

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1. Introduction

Prior studies including Boycko et al. (1996) have shown that state-owned enterprises (SOEs) are not efficient because they are often used to address political and social objectives, rather than profit and efficiency maximization goals. Other studies have also shown that the efficiency and profitability problems can be alleviated through privatization. [1] As a result, for the past two decades, privatization has become a notable feature of restructuring former SOEs. The popularity of privatization programs arises in part from governments' hope that operating performance of SOEs can be improved by the discipline of private ownership and the stock market. Governments of all persuasions in both developed and developing countries continue to privatize SOEs. In Australia, the Federal government privatized the only federal government bank, the Commonwealth Bank of Australia (CBA) in 1991.

Studies by Megginson et al. (1994), and Eckel et al. (1997) have also found that privatization of SOEs improves efficiency and competitiveness at the organization and the industry level. Eckel et al. (1997) argue that the market's expectation of the efficiency of the privatized firm can be inferred from the rival firms' stock price effects following the privatization announcement. If privatization creates a new competitive environment and incentives for better performance for the privatized firms, then the operating and financial performance of the privatized CBA is expected to improve. Also, rival firms could react negatively to the privatization announcement if the market believes that there is now a more efficient, aggressive and rejuvenated competitor in the industry whose operations can lead to falls in product prices and, hence, erode the profitability of the rival banks. The purpose of this study is to examine the effects of the privatization of the CBA on the operating and stock market performance of the Bank and its rivals.

This study differs from previous studies on privatization in a number of ways. First, unlike privatization of non-financial firms where a reasonably large number of research exists (see Megginson and Netter (1998) for a survey of this literature), very little research exists on bank privatization. [2] Second, and more importantly, this is the only study that examines rival firms' reaction to privatization announcements and the impact of the privatization on the operating performance of industry counterparts. [3] Third, the CBA is one of the few privatized banks where state ownership is eliminated after two subsequent offerings following the initial partial privatization. A partially privatized firm may continue to pursue non-commercial goals or the government may interfere with the operations and management of the company. Hence, partial privatization of an inefficient SOE may not produce the catalyst needed to

[1] For example, Boardman and Vining (1989), Galal et al. (1994), Megginson et al. (1994), and Boubakri and Cosset (1998) have shown that privatized firms increase sales, capital investment, operating efficiency and profitability in the post-privatization period.

[2] The only exception is Verbrugge et al. (1999) who analyze the financial performance of privatized banks.

[3] Eckel et al. (1997) primarily examine the stock market reaction of rival airlines to the announcement of the privatization of the British Airways.

improve its efficiency. Consequently, the rival firms may react differently to partial and full privatization announcements, with the latter announcement expected to elicit stronger market reaction from the rivals since it is likely to be more informative about the competitiveness and efficiency of the privatized firm. That the CBA was privatized in three phases allows us to analyze the effects of full and partial privatization on both the bank's performance and that of its rivals. Furthermore, previous studies that have analyzed the performance of privatized firms examine either accounting data (e.g. Megginson et al., 1994; Boubakri and Cosset, 1998) or stock market returns (e.g. Eckel et al., 1997). In this paper, we analyze both accounting and stock market data.

The results are summarized as follows. The rival banks, especially the major banks, reacted negatively to the privatization of the CBA. The number of rivals that reacted negatively to the privatization announcement is inversely related to the level of government ownership of the CBA, as more rivals reacted negatively to the final privatization announcement than to the initial and second announcements. Similarly, more firms reacted negatively to the announcement of the sale of the second tranche of shares than the initial privatization announcement. However, in terms of the magnitude of the wealth loss, the first (partial) and final (full) privatization announcements were more informative about the competitiveness of the CBA than the announcement of the second (partial) privatization.

Also consistent with our expectation, the CBA's long-term stock market performance improved significantly after the Bank had been fully privatized. As compared to its rivals, the CBA's cumulative abnormal returns were 50% more than those of its rivals three years after the Bank had been fully privatized. Moreover, our results indicate that since becoming a fully privatized bank, not only has the operating and stock market performance of the Bank become better than its performance when the government was the (part) owner, it has also outperformed its rivals. These improvements in operating performance have been achieved in light of significant rationalization of branch network and staff reduction. However, the aggressive pursuit for business, profits and cost cutting has significantly increased the CBA's problem loans in the post-privatization period.

The rest of the paper is organized as follows. In Section 2, we present a brief discussion of the privatization of the CBA. Section 3 describes the data. The research design and results are presented in Section 4. Section 5 provides a summary and conclusion.

2. Privatization of the CBA

The privatization of the Commonwealth Bank was one of the earliest in Australia, with the first sale (through the public float of shares) starting in the 1991–1992 financial year and the final sale being completed in 1996 (Reserve Bank of Australia, 1997). [4] The privatization was the culmination of a number of changes that had

[4] In Australia, the financial year begins in July and ends in June.

taken place in the economy including deregulation of the banking sector, political motivation for privatization and the increased level of competition that accompanied deregulation (Balfour, 1993). A major development that compelled the government to privatize the Bank was that changes in capital adequacy guidelines for the banking industry required increases in the CBA's equity base which in turn would have involved continuing calls on the Federal government budget (Reserve Bank of Australia, 1997). The relatively poor performance of the bank was also a major contributing factor. As a government bank, the CBA seemed to be over staffed and non-aggressive, particularly when compared to its rivals. A number of studies including Davies (1981), Coughlin (1987) and Balfour (1993) that examine the performance of the CBA and the private banks in Australia find that the CBA was relatively inefficient and less profitable as compared to the private banks. The under-performance was attributed, inter alia, to the following reasons. First, capital was inefficiently used. Managers of the Bank held a large proportion of the bank's assets in low-risk and low-paying investments than did their private counterparts. Second, like most government enterprises, there was over-employment at the CBA as it had relatively larger staff than its private counterparts. Third, managers of the Bank organized work and monitored workers less efficiently than did private bank managers (Balfour, 1993).

Moreover, Coughlin (1987) who analyzes the Bank's performance relative to that of the private banks prior to CBA's privatization finds that from 1979 to 1985, the cumulative value of income tax concessions granted to the CBA exceeded the dividends paid by the Bank to the Federal government. The net income received from the CBA (dividends less tax concession) was less than the income tax received from each of the three major private banks namely the ANZ, NAB and Westpac. Furthermore, the CBA lagged behind the three major private banks in terms of profitability, efficiency and growth. The government therefore decided to privatize the CBA with a view to improving the Bank's efficiency and profitability. The initial privatization occurred in 1991. The sale of the second and third (final) tranches was completed in 1993 and 1996 respectively, with the privatization raising A$8.1 billion (Reserve Bank of Australia, 1997). Since its privatization, no detailed analysis has been done to ascertain whether the expected efficiency and profitability gains have materialized. More importantly, the impact of CBA's privatization on its rivals has not been analyzed. As argued above, if CBA is expected to become more efficient, competitive and an aggressive firm whose actions can lead to falls in product prices, then rivals banks may be negatively affected. We analyze these issues.

3. Data

This study uses data from 1986 to 1999 to examine the operating and stock market performance of the CBA and its rivals. A longer study period is necessary because as Verbrugge et al. (1999) argue, privatization is a process whose outcome unfolds over a relatively long period of time, especially if government ownership is reduced in stages (which is the type we are analyzing in this study). For such cases,

analysis of the operating performance in the years immediately after the initial privatization may produce an incomplete picture. Moreover, given the difficulty of turning around a hitherto bureaucratic and under-performing SOE, the newly privatized bank may not show any significant improvements in efficiency and profitability in the early years of privatization. However, the firm may exhibit an increasing trend towards better performance in the post-privatization period as the managers begin to overcome the initial resistance to change. Hence a longer study period is necessary.

Rival firms included in the study are banking and insurance firms that were listed on the Australian Stock Exchange at the time of the privatization announcements. Monthly and daily stock prices from 1988 to 1999 and annual reports from 1986 to 1999 for the firms must also be available. The initial sample consisted of 13 banks and 8 insurance companies but only 11 banks and 5 insurance companies satisfied the selection criteria. Of the final sample, three banks are classified as major banks (on the basis of their size and geographical spread of branches) and the remaining 8 banks are classified as regional banks. The final sample is listed in Appendix A. The announcement dates for the three share offers were identified from Reuters News Service. We also checked the Reuters News archives to ensure that none of the firms made significant announcements during the event periods. Only rival firms that had complete stock price data during the sale of each tranche of share were included in the analysis of the privatization announcements. Ten rival banks and insurance companies were included in the analysis of the initial privatization, 14 rivals in the second privatization and 16 rivals were included in the analysis of the third and final sale of shares. The adjusted daily stock price for all the firms and the all ordinary index (AOI), the Reserve Bank of Australia official cash rate and the annual reports for the firms were obtained from IRESS and Findata. Monthly stock price for the sample firms and the all ordinary accumulation index were also obtained from the Australian Graduate School of Management database. The CBA's pre-listing annual financial statements were obtained from the Bank's prospectus.

4. Research design and results

4.1. Rival firms' short-term reaction to the CBA's privatization announcements

4.1.1. Research design

Conventional event studies usually examine the stock market response to an event by focusing on the significance of the residuals (abnormal returns) in the event period using the event study method. However, such a methodology is inadequate in cases where changes in both risk and return might occur as a result of the event. Besides, the problem of violation of the assumption of independent and identically distributed residuals is exacerbated when the securities are clustered along a further dimension such as industry (Saunders and Smirlock, 1987; Strong, 1992). The method assumes that the residuals are independent and identically distributed, but this assumption is likely to be violated when firms have contemporaneous event days in

calendar times or when a regulatory event like privatization affects a number of firms contemporaneously.

To overcome these problems, we employ Zellner's (1962) seemingly unrelated regression (SUR) method to analyze the rival firms' reaction to the privatization announcements. [5] The major advantage of the SUR methodology is that contemporaneous dependence of the disturbance terms is explicitly incorporated into the hypothesis tests. Additionally, the approach allows simultaneous consideration of both systematic risk and return effects due to an event. We use the following SUR model to estimate the rivals' reaction to the CBA's privatization announcements:

$$\begin{aligned}
R_{1t} &= \alpha_1 + \beta_{11}R_{mt} + \beta_{12}R_{mt-1} + \beta_{13}R_{mt+1} + \tau_1 I_t^{\mathrm{u}} + \lambda_{11}D_{1t} + \lambda_{12}D_{2t}R_m + e_{1t} \\
R_{2t} &= \alpha_2 + \beta_{21}R_{mt} + \beta_{22}R_{mt-1} + \beta_{23}R_{mt+1} + \tau_2 I_t^{\mathrm{u}} + \lambda_{21}D_{1t} + \lambda_{22}D_{2t}R_m + e_{2t} \\
&\vdots \quad \vdots \quad \vdots \quad \vdots \quad \vdots \quad \vdots \quad \vdots \quad \vdots \\
R_{it} &= \alpha_i + \beta_{i1}R_{mt} + \beta_{i2}R_{mt-1} + \beta_{i3}R_{mt+1} + \tau_i I_t^{\mathrm{u}} + \lambda_{i1}D_{1t} + \lambda_{i2}D_{2t}R_m + e_{it}.
\end{aligned} \tag{1}$$

The SUR model consists of i equations estimated from days −100 and +100 surrounding the announcement date. R_{it} is the return of firm i on day t, R_{mt} is the return on the market index on day t, I_t^{u} is the unanticipated change in interest rates orthogonalized with respect to the market returns (and is described in detail below), D_{1t} is a dummy variable that equals one during the event period and zero otherwise, D_{2t} is a dummy variable that equals one on the day of the initial privatization announcement and all post-event days and zero otherwise. The dummy variable, D_{1t}, captures abnormal returns of rival firms while D_{2t} captures possible changes in risk as a result of the event.

Eq. (1) includes control and event variables and parameters that are used to capture the rival firms' reaction to the privatisation announcement. The control portion consists of two factors, R_m and I^{u} and is represented by $\alpha_i + \beta_{i1}R_{mt} + \beta_{i,2}R_{mt-1} + \beta_{i,3}R_{mt+1} + \tau_i I_t^{\mathrm{u}}$. The first variable ($R_{mt}$) is used to control for general stock market movements and we include its lag and lead variables as independent variables to correct for non-synchronous trading. [6] The market returns are obtained from the AOI. We include interest rate as the second control variable because there is evidence that unexpected changes in interest rates are significant determinants of the returns of financial institutions even after controlling for general market movements (Yourougou, 1990). The unexpected interest rate is measured using the Reserve Bank of Australia's daily official cash rate. The percentage change for any day t, denoted I_t is defined as $I_t = \ln(\mathrm{CR}_t/\mathrm{CR}_{t-1})$, where $\ln \mathrm{CR}_t$ is the log of the cash rate on day t. The interest rate variable, I_t, is then orthogonalized with respect to market returns

[5] A number of studies including Saunders and Smirlock (1987), Cornett and Tehranian (1990), Amoako-Adu and Smith (1995) and Eckel et al. (1997) have used a similar model to analyze the effects of regulatory and firm specific events on rival firms.

[6] Non-synchronous trading might not be a problem for the major banks, but it is likely to be a problem for some of the regional banks and insurance companies whose stocks may not be traded frequently.

(to avoid multicollinearity) by regressing I_t on R_{mt}. The residuals from this equation, denoted I_t^{u} are used as the second explanatory variable in Eq. (1).

The remainder of Eq. (1) is the event portion and consists of variables and parameters that measure changes in risk and return. The event parameter λ_{i1} captures the rival firm i's reaction (abnormal returns) to the privatization announcements. The coefficient is expected to be less than zero if the privatization has negative effects on the rival firm's future profitability. The coefficient λ_{i2} is expected to be significantly greater than zero if the privatization affects the competitive position and risk of the rival banks. A five-day event window (day − 2, +2) is used for the first and second tranches while an 11-day (−5, +5) window is used for final privatization announcement. [7] We hypothesize that rival banks would react negatively to the privatization announcement and that this reaction would be greater and more significant when the CBA is fully privatized than when it is partially privatized.

To examine the effects of the privatization announcements on the industry, a Wald test is carried out to examine whether the sum of the abnormal returns for the industry is significantly different from zero by imposing the following restriction, $\sum_{i=1}^{I} \lambda_{i1} = 0$ where I is the number of rivals. If after privatization the CBA closes down some of its economically unprofitable but politically attractive regional branches, then the regional banks that hitherto competed with the CBA in these markets may benefit from the CBA's privatization. We thus examine whether the rival firms' reaction to the privatization announcement is heterogeneous (differential information effects) by testing whether $\lambda_{11} = \lambda_{21} = \lambda_{31} = \cdots = \lambda_{I1}$. The Wald test statistic is distributed in χ^2. If the announcement has industry and/or heterogeneous effects, the χ^2 statistic will reject the null hypothesis of no industry abnormal returns or homogeneous reaction among the rivals.

4.1.2. Results

To examine the announcement effects associated with the sale of each tranche of shares, Eq. (1) is run separately for all the banks, the major banks, the regional banks, and the insurance companies. [8] The results are reported in Table 1. The figures in column 2 are the abnormal returns that accrued to rival firms' shareholders following the initial privatization announcement. The abnormal returns associated with the second and final privatization announcements are presented in columns 3 and 4 respectively while column 5 shows the changes in risk. The results in column 2 show that the major banks reacted negatively and significantly to the initial privatization announcement, with the NAB (the largest rival bank) losing 1.44% and the ANZ bank also recording abnormal returns of −1.12% around the 5-days surrounding the announcement of the initial privatization of the CBA. For the regional banks and insurance companies, only SME and IMW had negative (albeit insignificant)

[7] We use a longer event window to capture the information effects of the full privatization on the rival firms because there was a newspaper publication of the privatization prior to the official announcement of the sale of the last parcel of shares.

[8] The estimated coefficients for the 'all banks' portfolio are the same as those estimated for the major banks and regional banks sub-samples.

Table 1
Rival Banks' share price response to CBA's privatization announcements

Firm code		First tranche λ_1	Second tranche λ_1	Third tranche λ_1	Change in risk[a] λ_2
Panel A: Firm-specific (SUR) parameter estimates for major rival banks					
ANZ		−0.0112**	−0.0075***	−0.0062**	0.5554
NAB		−0.0144**	0.0046	−0.0065**	0.2864
WBC		−0.0095*	−0.0086**	−0.0059**	0.3517
χ^2 statistics	$\sum_{i=1}^{I}\lambda_{i1}=0$	7.9196*	2.7061***	8.6972*	
	$\lambda_{11}=\lambda_{21}=\ldots\lambda_{I1}$	0.5977	8.2829**	0.0308	
Panel B: Firm-specific (SUR) parameter estimates for regional banks					
ABA		0.0133***	−0.0053	−0.0029	−0.2653
BML		0.0069	−0.0064	−0.0020	−0.0764
BQD		0.0061	−0.0011	0.0023	0.4509
SME		−0.0003	−0.0130***	0.0006	0.2790
ADB			0.0006	−0.0086**	
BEN			−0.0086***	0.0013	
SGB			0.0005	−0.0012	
BWA				−0.0057***	
χ^2 statistics					
Regional banks	$\sum_{i=1}^{I}\lambda_{i1}=0$	2.0130	4.1408**	1.3880	
	$\lambda_{11}=\lambda_{21}=\ldots=\lambda_{n1}$	3.2676	4.3552	6.6094	
All banks	$\sum_{i=1}^{I}\lambda_{i1}=0$	0.1695	5.7065**	5.0917**	
	$\lambda_{11}=\lambda_{21}=\ldots\lambda_{I1}$	13.6731**	13.7075	10.9092	
Panel C: Firm-specific (SUR) parameter estimates for insurance companies					
IMW		−0.0009	−0.0006	−0.0002	0.0037
OMP		0.0252	−0.0008	−0.0031	0.1831
QBE		0.0002	−0.0089**	−0.0034	−0.6961
HIH			−0.0217**	−0.0018	
RAC				0.0054	
χ^2 statistics	$\sum_{i=1}^{I}\lambda_{i1}=0$	1.1979	3.7674***	0.4185	
	$\lambda_{11}=\lambda_{21}=\ldots\lambda_{I1}$	1.4926	3.6666	2.1862	

The coefficients are estimated based on $R_{1t}=\alpha_1+\beta_{11}R_{mt}+\beta_{12}R_{mt-1}+\beta_{13}R_{mt+1}+\tau_1 I_t^{u}+\lambda_{11}D_{1t}+\lambda_{12}D_{2t}R_m+e_{1t}$. For brevity, we omit the estimated coefficients for alpha and the control terms (the beta terms and the orthogonalized interest rate variable). The betas for the major banks were all greater than one and significant. The χ^2 statistics show the result of the hypotheses that there are no intra-industry information effects ($\sum_{i=1}^{n}\lambda_{i1}=0$) or that there is homogeneous reaction by the rivals ($\lambda_{11}=\lambda_{21}=\ldots=\lambda_{n1}$).

*, **, *** Significant at the 1%, 5% and 10% level respectively.

[a] Change in risk is measured for the rival firms that had data when CBA was first listed on the stock exchange.

abnormal returns following the initial privatization announcement. Consistent with our conjecture that the privatization of the CBA could be good news for the regional banks that compete with the CBA in the regional areas, we find that most of the regional banks reacted positively to the initial privatization announcement. However, only the returns of the ABA were statistically significant. The hypothesis that there was homogeneous reaction by the rival banks to the initial privatization announcement is rejected at 5% ($\chi^2=13.67$). The insurance companies, however, did not react

to the initial privatization announcement. Also, the privatization did not significantly affect the risk of the rival banks.

The results of the second partial privatization (that resulted in the percentage of government ownership reducing from 71% to 51%) reported in column 3 of Table 1 show that most rivals, including the insurance companies, reacted negatively to the second announcement, although half of the coefficients are not significant. As compared to the initial sale where only 57% of rival banks reacted negatively to the announcement, 70% of the rival banks reacted negatively to the second privatization announcement, with shareholders of the ANZ and Westpac banks (two of the major rival banks) losing 0.75% and 0.86% of their wealth respectively. However, the size of the negative abnormal returns recorded by the major banks is small as compared to that of the initial privatization announcement. The small regional banks and insurance companies also recorded negative abnormal returns, although only BEN, SME, HIH and QBE insurance experienced significantly negative abnormal returns. The hypothesis that there is no intra-industry or inter-sector information effect associated with the second privatization announcement is rejected for all sub-samples. The χ^2 statistics of 2.71, 4.14, 5.71 and 3.77 for the major banks, regional banks, all banks and insurance companies are significant at 10%, 5%, 5% and 10% respectively. However, the reaction of rival firms in the various sub-samples is similar except for the major banks where the homogeneous effect test is rejected at 1% (χ^2 statistics = 8.28).

The rival firms' reaction to the announcement of the final (full) privatization is reported in column 4 of Table 1. As expected, all the major rival banks reacted negatively and significantly to the full privatization announcement. For the regional banks, only ADB and BWA experienced significantly negative abnormal returns. Not surprisingly, the hypothesis that the industry effects are not significant is rejected at the 1% (5%) level for the major banks (all banks). Although almost all the insurance companies reacted negatively, none of the coefficients is significantly different from zero.

In summary, the results show that the privatization announcements significantly reduced the wealth of the rival banks' shareholders especially that of the major rival banks, thus suggesting that the major rival banks were significantly affected by the changes occurring in the banking sector. This negative reaction is consistent with the hypothesized effects of the threat of increased competition from the privatized CBA. However, the insurance companies were not significantly affected, as the joint hypothesis of no reaction by firms in the insurance sector cannot be rejected except for the second privatization announcement where the two largest insurance companies were adversely affected. The number of rivals that reacted negatively to the privatization announcements was inversely related to the level of government ownership of the CBA as more firms reacted negatively to the final privatization announcement than the initial and second announcements. Similarly, more firms reacted negatively to the announcement of the second privatization than the initial privatization. However, in terms of the magnitude of the wealth loss to shareholders of the rival firms, the first (partial) and final (full) privatization announcements elicited stronger market reaction from rivals than the second (partial) privatization.

4.1.3. Alternative explanations for the rival firms' reaction

There could be other plausible reasons why the rival firms' stock price reacted negatively to the privatization announcement. For example, the newly private firms could attract investors who would otherwise have invested in the existing firms. A related argument is that fund managers who track sector indices could move some of their investment to the newly privatized firms. These actions can cause a decrease in the price of the existing firms' shares. Alternatively, as Subrahmanyam and Titman (1999) argue, the presence of newly publicly traded firms in an industry can attract more information gathering about the industry, thus making the prices of all firms in the industry more efficiently priced. While tests of the latter conjecture are beyond the scope of this paper (although the banking sector in Australia is well followed by analysts), we examine the possibility that capital flows account for the rival banks' stock price reaction.

Investors may move their capital to the newly privatized CBA if they believe that the CBA's prospects are better than that of the rivals. If this is the case, then the attendant decrease in price of the rival banks share will be consistent with our hypothesis that investors' expectation about the efficiency and competitiveness of the privatized CBA can be inferred from the rival firms' stock price effects following the privatization announcement. Second, if fund managers who track indices move part of their investments in the rival banks to the newly privatized CBA in order to maintain their exposure to the sector, portfolio re-balancing and the attendant price pressure will cause the share price of the rival banks to decrease and that of the CBA to increase. However, this does not appear to be the case as the CBA's shares continued to under perform industry counterparts' in the period following the initial public offering and the second partial sale. Hence, our evidence does not support institutional portfolio re-balancing (price pressure hypothesis) as the cause of the rival banks' reaction. While institutional portfolio re-balancing could explain the Bank's abnormal returns immediately following the full privatization of the CBA, price pressure hypothesis cannot explain the Bank's spectacular performance three years after the event (see Fig. 1).

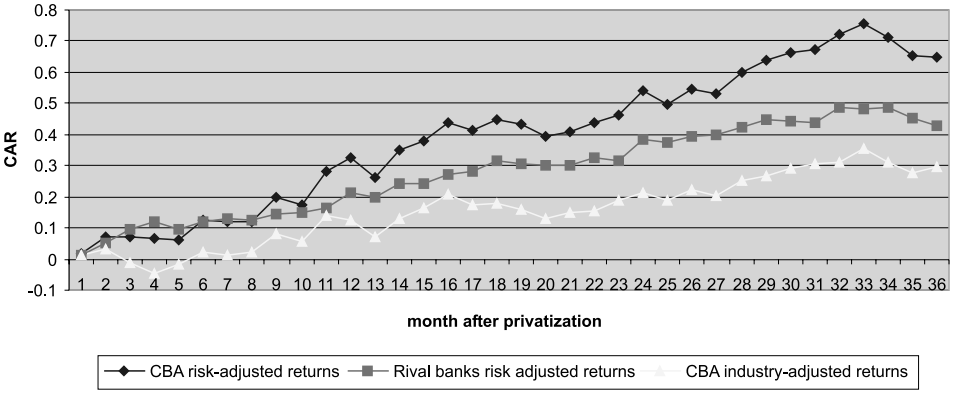

Fig. 1. Cumulative abnormal returns of CBA and its rivals.

4.2. Long run returns to investors in CBA share issue privatization

4.2.1. Research design

The effects of privatization unfold over a relatively long period of time so the examination of the long run returns of the CBA relative to those of the rival banks is an appropriate measure of post-privatization performance of the Bank. To the extent that privatization promotes entrepreneurship, former SOEs will have the incentive and the means to invest in growth options (Megginson et al., 1994). We hypothesize that the privatization of the Bank would give its management the leverage to pursue growth-oriented strategies and policies that will allow the firm to generate higher returns for the investors. Second, to the extent that a partially privatized CBA may not be able to pursue certain economically profitable but politically unpopular projects because of interference from the government, the performance of a partially privatized CBA may not be as good as that of a fully privatized CBA. To examine these conjectures, we use the event study method (based on the market model) to estimate the abnormal returns and then compare the abnormal returns of a portfolio of bank rivals with the returns of the CBA. Since the CBA did not have stock market data prior to the initial privatization date, we use the regression parameters of the ANZ Bank to estimate the CBA's expected returns because it had market capitalization similar to that of the CBA in the first two months after privatization. For the second and third sale, the CBA's own α and β are used to estimate its expected returns. The regression parameters are estimated from day -150 to day -30 and the all ordinary accumulation index is used as the market index.

Given the concern expressed by researchers including Barber and Lyon (1997), Fama (1998), Mitchell and Stafford (2000) and Brav (2000) relating to long-term event studies based on the market model, we also calculate industry-adjusted abnormal returns for the CBA as the difference between the returns of the CBA and the returns of an equally weighted portfolio of the rival banks' stocks. [9] The industry-adjusted returns are better measures of performance because they control for banking industry events that are unrelated to the privatization. We calculate $CAR_{(1,12)}$, $CAR_{(1,23)}$ following the initial privatization announcement, $CAR_{(1,12)}$, $CAR_{(1,24)}$ and $CAR_{(1,30)}$ for the second privatization, and $CAR_{(1,12)}$, $CAR_{(1,24)}$ and $CAR_{(1,36)}$ following the final privatization announcement. [10]

[9] The fundamental problem relating to long run abnormal return studies is that one should be able to precisely measure long-term expected returns. The studies cited above show that thus far, there is no convincing way of doing this and that expected returns can only roughly be estimated, hence, long-term abnormal returns from the market model are imprecise and are also the results of a joint test of stock market efficiency and a model of equilibrium. A related concern is the statistical test of long run abnormal returns. Also, an implicit assumption underlying the statistical test is that the abnormal returns are independent. However, common industry factors affect returns of firms in the same industry. In the context of this study, part of the CBA's abnormal returns from the market model could be due to industry factors if for example, there is a contemporaneous upward trend in the banking industry stock returns.

[10] The period between the initial and second privatization and between the second and final privatization is 23 and 30 months respectively, hence we calculate the cumulative abnormal returns for these periods.

4.2.2. Results

The cumulative abnormal returns calculated using the two methods are summarized in Table 2. The results show that the CBA under-performed the market in the years following the initial (partial) privatization and the second (partial) privatization. The Bank's cumulative market-adjusted abnormal returns for the first year of its partial privatization are −14.28% and are significant at 1%. Although the rival banks also underperformed the market (with a CAR of −5.80%, significant at 1%), the CBA under-performed its rivals, with the difference in CAR of −8.47% being significant at 1%. This under-performance is also confirmed by the CBA's industry adjusted cumulative abnormal returns of −9.10%. The cumulative abnormal returns of the CBA after the sale of the second tranche of shares are −16.36%, −2.90% and −5.44% for $CAR_{(1,12)}$, $CAR_{(1,24)}$ and $CAR_{(1,30)}$ respectively, but both $CAR_{(1,24)}$ and $CAR_{(1,30)}$ are not significantly different from zero. While the Bank also under performed the market and its rivals in the second year after the sale of the second tranche of shares, its cumulative abnormal returns were better than those realized after the initial privatization. The under-performance may be a refection of the difficulties inherent in improving the performance of a partially privatized bank whose major shareholder was the government.

The long-term cumulative abnormal returns of the CBA and the rival banks following the final (full) privatization announcement are reported in Panel C of Table 2. After the CBA had been fully privatized (and perhaps after organizational inertia encountered by the newly privatized CBA management and the initial resistance to change have been overcome), its performance improved significantly, as it outperformed both the market and the industry rivals. The CBA realized cumulative abnormal returns where 32.51% in the first year after the full privatization as compared to the rival banks' returns of 21.10%. The Bank's market adjusted cumulative abnormal returns increased from 32.51% to 54.12% in the second year and to 64% in the third year of full privatization, while the rivals' cumulative abnormal returns increased from 21.10% to 38.54% and 42.72% in the second and third years respectively. [11] Similar results are obtained when returns are calculated using the industry-adjusted returns method with the CBA's industry-adjusted cumulative abnormal returns of 12.34%, 21.39% and 29.86% in the first, second and third year of privatization being significant at 1%. Hence, the spectacular performance recorded for the CBA is robust and does not depend on how abnormal returns are calculated. [12]

[11] The difference in returns is significant at the 10% (one-tailed test). However the difference is broadly similar in statistical terms based on a two-tailed test. This broadly similar performance in the three years following the full privatization of the bank compared with the CBA's under-performance in the years preceding the full privatization (as shown in Panels A and B of Table 2) is consistent with the argument that the CBA has significantly improved its performance (at least in line with the industry average) in the post-full-privatization period.

[12] Though not reported here, we also document similar results when we compare the CBA's performance with that of the major banks.

Table 2
Cumulative abnormal returns of the CBA and the rival banks calculated using risk-adjusted and industry-adjusted returns

	CBA	Rival banks	Difference	CBA's abnormal returns
Panel A: Cumulative abnormal returns after the initial (partial) privatization				
$CAR_{(1,12)}$	−0.1428	−0.0580	−0.0847	−0.0910
	(−3.42)*	(−2.69)*	(−4.37)*	(−2.82)*
$CAR_{(1,23)}$	−0.0193	0.0748	−0.0941	0.0405
	(−0.41)	(3.84)*	(−5.28)*	(1.00)
Panel B: Cumulative abnormal returns after the sale of the second tranche of shares				
$CAR_{(1,12)}$	−0.1636	−0.0531	−0.1105	−0.0611
	(−3.15)*	(−2.82)*	(−13.81)*	(−2.19)**
$CAR_{(1,24)}$	0.0290	0.1381	−0.1091	−0.0009
	(0.58)	(7.20)*	(−10.42)*	(−0.03)
$CAR_{(1,30)}$	−0.0544	0.1506	−0.2049	−0.0543
	(−1.13)	(7.28)*	(−11.89)*	(−1.46)***
Panel C: Cumulative abnormal returns after the sale of the third and final tranche of shares				
$CAR_{(1,12)}$	0.3251	0.2110	0.1141	0.1234
	(7.83)*	(12.26)*	(1.38)***	(3.23)*
$CAR_{(1,24)}$	0.5412	0.3854	0.1557	0.2139
	(12.42)*	(21.91)*	(1.22)	(6.06)*
$CAR_{(1,36)}$	0.6473	0.4272	0.2201	0.2986
	(15.06)*	(24.75)*	(1.40)***	(8.94)*

The figures in parenthesis are *t*-statistics.
*, **, *** Significant at the 1%, 5% and 10% level respectively (based on one-tailed test).

The month-by-month cumulative abnormal returns of the CBA and those of the rival banks after the CBA had been fully privatized are presented graphically in Fig. 1. By inspection, one observes that the CBA began outperforming its rivals almost 9 months after it had been fully privatized. The lack of improvement in the first 9 months of full privatization perhaps reflects the difficulty of running a hitherto relatively low performing government–private bank. Since then, the CBA has progressively outperformed its rival. The industry adjusted cumulative abnormal returns of the CBA also exhibit a similar pattern of better performance over the rivals. Given that several papers document significantly negative long run returns to initial public offerings (see for example, Ritter, 1991; Loughran et al., 1994), the significantly large positive abnormal returns earned by investors who bought shares in the CBA privatization issue show how spectacular the Bank's performance has been since privatization. [13]

[13] It should be noted that the IPO studies use a larger sample size but our study is based on only one announcement. Nonetheless, positive long-term abnormal returns have also been documented for privatization IPOs in other studies (e.g. Levis, 1993; Menyah and Paudyal, 1996).

4.3. Determinants of the rival banks' reaction and long-term stock market performance

In this section, we examine whether market share, size and type of operations, and the proportion of government ownership of the CBA explain the rival firms' abnormal returns following the privatization of the Bank. First, we expect the performance of regional (small) banks to be significantly different from that of the major rival (large) banks. This is because as the CBA becomes more competitive after privatization, it could win customers from other banks, especially the small regional banks, as they may not be able to offer lower transaction cost and/or lower mortgage rates to their customers. Alternatively, the CBA could reduce services in previously subsidized areas where it may have been competing with the regional banks.

Bank size serves as a proxy for similarity in the type of business as the large banks are usually involved in wholesale activities in addition to retail banking, while the small banks focus primarily on retail banking. Also, if government ownership is high, the CBA may not become as competitive as expected and therefore the rival banks' operations (especially that of the major banks) may not be significantly affected. To examine whether government ownership of the CBA affected the Bank's competitive position and therefore the rival firms' short-term reaction to the announcements and their long-term performance, we include an interaction term, (the product of market capitalization and percentage of shares privatized) in the regression. [14] We also include in the regression the change in the proportion of the mortgage and deposits owned by the rivals to ascertain whether these indicators of market share explain the reaction or performance of the rival banks. The short run abnormal returns or the 3-year average cumulative abnormal returns of the rival banks following each privatization announcement are used as dependent variables. The following model is estimated for the rival firms:

$$\overline{\mathrm{CAR}}_i = \alpha_i + \beta_{1i} \ln(\mathrm{Size}_i * \%\mathrm{privatized}) + \beta_{2i}\mathrm{Mort}_i + \beta_{3i}\mathrm{Dep}_i + e_i \qquad (2)$$

where $\overline{\mathrm{CAR}}_i$ is the short run cumulative abnormal returns following the privatization announcements or the average cumulative abnormal return of firm i for the period up to 3 years after the partial or full privatization of the CBA, Size is the market capitalization of firm i, Mort is the change in the mortgage market share and Dep is the change in the customer deposit market share for the event period following the privatization announcement.

The short-term regression results reported in Panel A of Table 3 show that the interaction term and Dep are significant for the initial and final privatization. This suggests that the rival banks, especially the large ones, were negatively affected by the initial privatization announcement and also when the government ownership was completely sold out. These results are consistent with those reported in Table 1 where most of the major rivals reacted strongly and negatively to the initial and final

[14] The percentage of government ownership reduced by 29% to 71% after the initial privatization and to 51% after the second sale of shares and then to zero after the third sale. Since the proportion of government ownership variable is the same for all the firm in the regression, we use the product term to capture the effects of government ownership on the rival firms' performance.

Table 3
Regression of the rival banks' returns on firm specific variables

	First sale ($N = 8$)	Second sale ($N = 8$)	Final sale ($N = 8$)
Panel A: Short run abnormal returns as dependent variable			
Intercept	0.0393	−0.0251	0.0268
	(4.62)*	(1.76)	(1.93)
Ln(Size * % privatized)	−0.0006	0.0002	−0.0003
	(5.04)*	(1.50)	(2.10)***
Market share-mortgage	0.4478	0.8163	0.3025
	(1.90)	(1.81)	(1.70)
Market share-deposits	−0.4133	−0.7936	−0.4311
	(2.94)***	(1.70)	(2.15)***
Adjusted R^2	0.91	0.15	0.40
Panel B: Three year average CAR as the dependent variable			
Intercept	0.8616	−0.6630	−1.1.57
	(1.85)	(1.31)	(0.75)
Ln(Size * % privatized)	−0.0112	0.0063	0.0137
	(1.85)	(1.15)	(0.90)
Market share-mortgage	−6.1283	−40.140	23.144
	(0.47)	(2.52)***	(1.22)
Market share-deposits	8.3193	33.620	4.0502
	(1.02)	(2.04)	(0.19)
Adjusted R^2	0.20	0.61	0.27

t-Statistics are in parenthesis.
*, **, *** Significant at the 1%, 5% and 10% level respectively.

privatization announcements. [15] The results suggest that investors correctly anticipated a fall in the market share of the rival banks at the time of the privatization announcement. The results presented in Panel B also suggest that abnormal returns of rival banks that lost market share in the mortgage business reduced following the second partial privatization. The foregoing results should, however, be interpreted with caution given the small sample size.

4.4. Analysis of operating performance

4.4.1. Design

We examine the pre- and post-privatization operating performance of the Bank relative to that of the rivals' using the CAMEL criteria. CAMEL, as used in this paper, is an acronym that stands for capital adequacy, asset quality, management efficiency, earnings ability, and labor (employment) levels. [16] The capital adequacy ratio we analyze is the total of Tier 1 and Tier 2 capital and is measured as the ratio of capital to risk-adjusted assets and off balance sheet exposures determined on a risk-weighted basis of at least 8%. A higher ratio reflects a bank's ability to absorb

[15] Though not shown here, the market share of the major rival banks (except that of the NAB) reduced after the initial and final privatization announcement whereas that of the CBA increased.

[16] CAMEL has been used by the Federal Deposit Insurance Corporation and previous studies to assess the performance of banks (see for example Thomson, 1991; and Persons, 1999).

unanticipated capital losses. Asset quality relates to the impairment of asset value and since bank loans are assets with the highest probability of deterioration, we analyze provisions to total loans, the ratio of impaired assets (non-performing loans) to total loans, and net impaired assets to total loans. The degree to which provisions are made in anticipation of, or concurrent with, actual impairment in the loan portfolio reflects credit quality. We recognize however that, banks can smooth income by making higher provisions than necessary when credit quality and net income are high. As a result, bank managers may not increase provisions as much if credit quality is deteriorating. As Gunther and Moore (2000) argue, this form of income smoothing will ensure that banks with asset quality problems can raise net income and retained earnings, thereby boosting Tier 1 capital. We therefore use the ratio of impaired assets to total loans and net impaired assets to total loans as other measures of asset quality. Higher ratios reflect poor asset quality.

Although management quality is likely to reflect in the other performance measures, we use operating efficiency measures such as cost-to-income ratio and expense-to-asset ratio as proxies for management quality. Lower ratios reflect higher management quality. We also use return on assets (ROA) and net interest margin as measures of profitability. However, as argued by Rhoades (1998), ROA is biased upwards for banks that earn significant profits from off-balance sheet operations such as derivative activities that generate revenue and expenses but not assets. Hence, we employ return on equity (ROE) as an alternative measure of profitability. Finally, we analyze bank branches and number of employees to ascertain whether the Bank has been rationalizing its branch network and/or reducing its staff levels since privatization. Details of the ratios grouped under the CAMEL criteria are listed in Appendix B. For each of these ratios, we expect the Bank's performance to be better in the post-privatization period.

The operating performance is first examined by analyzing the Bank's ratios from year − 6 to year + 7. The median (mean) ratios of the rival banks also provide a basis for comparing the relative performance of the CBA. The difference in the relative performance from year − 6 to year + 7 is tested using the Wilcoxon signed-rank test calculated as

$$Z = \frac{W - n(n-1)/4}{\sqrt{n(n-1)(2n-1)/24}} \tag{3}$$

where Z is the Wilcoxon test statistics, W is the sum of the positive ranks, n is the number of observations, $n(n-1)/4$ is the mean of W; and $\sqrt{n(n-1)(2n-1)/24}$ is the standard deviation of W. Also, we examine the significance of the change in the mean pre-privatization (year − 6 to year − 1) and post-privatization (year 1 to year 6) performance by a t-test. The results for the difference in mean tests are presented in Table 4 while the ratios and the univariate Wilcoxon Z-statistics are shown in Appendix B. [17]

[17] In December 1990, the CBA acquired the State Bank of Victoria (SBV). Prior to the takeover, CBA's share of the Victorian market was low. The acquisition provided the Bank with a unique opportunity to overcome this competitive disadvantage it faced in the market. We note later in this section that the takeover affected the operating performance of the Bank immediately before and after the privatization.

Table 4
A comparison of the operating performance of the CBA with that of the rival banks based on the CAMEL criteria

	CBA				Mean difference in CBA and rival banks' performance							
	Mean difference in performance				Pre-privatization				Post-privatization			
Ratio	Post	Pre	Post − pre	*t*-Statistic	CBA	Rivals	Difference	*t*-Statistic	CBA	Rivals	Difference	*t*-Statistic
Capital adequacy	11.43	8.70	2.73	4.41*	8.70	10.11	−1.41	−3.04**	10.92	11.28	−0.36	−1.07
Cost-to-income	62.03	69.65	−7.62	−3.44*	69.65	75.50	−5.85	−2.44**	61.11	60.59	0.52	0.68
Expense-to-asset	2.77	3.28	−0.46	−8.54*	3.28	5.54	−2.26	−4.45*	2.69	2.71	−0.02	−0.31
ROE	15.23	11.61	3.26	1.67***	11.61	12.09	−0.48	−0.36	15.99	14.92	1.07	0.76
ROA	0.93	0.62	0.31	2.92**	0.62	0.79	−0.17	−2.41**	0.95	0.85	0.10	1.18
Net interest margin	–	–	–	–	–	–	–	–	3.70	3.25	0.45	6.70*
Growth in branches	−5.64	7.52	−13.17	−2.53**	7.52	5.49	2.03	0.32	−5.93	0.26	−6.19	−5.51*
Growth in staff	−4.15	6.22	−10.37	−1.93***	6.22	8.76	−2.54	−0.33	−4.98	3.90	−8.88	−6.39*
Provisions-to-loans	0.55	1.02	−0.47	−4.31*	1.02	0.75	0.27	1.61***	0.68	0.63	0.05	0.33
Gross impaired assets to loans	–	–	–	–	–	–	–	–	1.87	1.16	0.71	2.01**
Net impaired assets to loans	–	–	–	–	–	–	–	–	1.14	0.73	0.39	1.83**

*, **, *** Significant at 1%, 5% and 10% respectively.

4.4.2. Results

The results presented in Table 4 show that the CBA's capital adequacy ratio has increased after the privatization; the mean post-privatization ratio of 11.43% is significantly different from the pre-privatization ratio of 8.70% at the 1% level. For most of the pre-privatization period, the CBA had lower capital adequacy ratio than the rival banks. The rivals' mean pre-privatization capital adequacy ratio of 10.11% is significantly different from the CBA's (of 8.70%) at 5% (t-statistic = 3.04). However, the CBA has increased its capital adequacy ratio in line with the industry level after privatization to the extent that the post-privatization ratio of the CBA and the rival banks are not significantly different. This result reflects the implicit withdrawal of any guarantees from the government following the privatization of the Bank.

A comparison of the loan quality ratios of the CBA and its peers' indicates that the Bank's provisions ratio has tended to trend downward after privatization, with the mean provisions ratio decreasing from 1.02% in the pre-privatization period to 0.55% in the post-privatization period (the difference is statistically significant at 1%, t-statistic = 4.31). The Bank's post-privatization provisions ratio has also improved significantly over that of its peers, with the ratio decreasing from 1.04 in 1992 (the year of privatization) to 0.24 in 1999, while at the same time the major rival (all rival) banks' ratio has increased (decreased) from 0.77 (0.60) to 1.12 (0.48) (see Appendix C). Thus, it seems the CBA has become more efficient than the rival banks in managing its loan portfolio. However, the provisions-to-total loans ratios should be seen in light of the limitations of income smoothing. Since banks may smooth incomes by over- or under-providing for problem loans, we analyze the ratio of impaired assets to total loans. The Australian banks started reporting data on impaired assets in 1992; hence, we analyze only the post-privatization ratio. The ratios indicate that while problem loans have been on the decline in the Australian banking industry, the CBA has carried higher non-performing loans than its major peers (all rivals) except in 1998 and 1999 (1999) where the Bank's impaired assets to total loans ratio was lower. The mean gross impaired assets to total loans ratio for the CBA (of 1.87) is greater than that of the rivals (of 1.16) at 5% (t-statistic = 2.01). Also, the net deterioration in asset quality is more pronounced for the CBA whose post-privatization net impaired assets to total loans ratio of 1.14 is significantly greater than that of the rival banks of 0.73 at 5%.

In terms of cost-to-income ratio, the CBA was more efficient than its rivals before the privatization. The Bank's pre-privatization mean cost-to-income ratio of 69.65% is significantly different from that of the rivals of 75.50% at the 5% (t-statistic of −2.44). In the post-privatization period, the Bank has significantly reduced its cost-to-income ratio from the pre-privatization mean level of 69.50% to 62% with the difference being significant at 1% (t-statistic = −3.44). Similar results are obtained for the expense-to-assets ratio. The CBA's mean pre-privatization ratio of 3.28 is significantly different from that of the rivals of 5.44% at the 1% level (t-statistic = −4.45). Also, the Bank's post-privatization mean expense to asset ratio of 2.77% is significantly different from the pre-privatization ratio of 3.28% at 1% (t-statistic = −8.54). While the pre-privatization relative efficiency performance of the

bank may seem contrary to our conjecture, the post-privatization results show that the rival banks have been more efficient in reducing cost than the CBA since the Bank's relatively superior performance in the pre-privatization period has disappeared in the post-privatization period. The Bank's mean expense to asset (cost-to-income) ratio of 2.69% (61.11%) in the post-privatization period is not significantly different from that of the rivals of 2.71% (60.59%).

Consistent with our conjecture, we find that the CBA has improved its profitability in the post-privatization period, with its ROE (ROA) increasing from 8.32% (0.46%) in 1992 (the year of privatization) to 16.27% (1.06%) in 1996 and to 20.54% (1.06%) in 1999 (see Appendix C). The Bank's mean ROE (ROA) in the post-privatization period of 15.23% (0.93%) is significantly different from the pre-privatization ratio of 11.61% (0.62%), with the difference being significant at 10% (5%). The bank's ability to reduce cost and increase profits has resulted in its post-privatization net interest margin of 3.70% being significantly greater than that of the rivals of 3.25% at the 1% level (t-statistic = 6.70). By the end of 1999 (three years after its full privatization), the CBA had not only become the most cost effective bank, it had also become the most profitable bank in the country.

The results presented in Appendix C also show that while most of the major banks (especially the NAB and ANZ) significantly increased their branches and staff levels in 1988, 1989 and 1990, the CBA increased its branches and staff levels in 1991, the year before privatization. The increase in CBA's branch and staff level is, to a large extent, due to the Bank's acquisition of the SBV. After the acquisition in January 1991, the CBA's branches (staff level) increased from 1265 (36,857) to 1792 (46,817), an increase of 42% (27%) (see CBA prospectus, 1991). After privatization, however, the Bank has aggressively rationalized its branch network by closing down branches and significantly reducing staff levels. The number of branches and full time employment have reduced from 1786 and 41,571 respectively in 1992 (the year of privatization) to 1162 and 28,964 by 1999. Although the other banks have also rationalized their branch network and engaged in staff attrition, the mean post-privatization growth in the CBA's branch network of −5.93 is significantly different from that of the rivals of 0.26% at 1% (t-statistic is −5.51). Similarly, the Bank's mean post-privatization growth in staff level of −4.98 is significantly different from that of the rivals of 3.90 at 1% (t-statistic = −6.39). The significant attrition in staff levels and the attendant rationalization of branch network in the period immediately following the privatization can partly be attributed to the Bank's retrenchment program after the acquisition of the SBV, as the merged bank initially contained many duplications including head office functions that were subsequently rationalized as the need for separate administration disappeared under integration.

5. Summary and conclusion

This paper examines the effects of the privatization of the CBA on the Bank's own performance and that of its rivals. We find that all the major rival banks

reacted negatively to the initial and final (full) privatization announcements. The negative reaction is consistent with the hypothesized effects of threat of increased competition from the privatized CBA on the rival banks. These results are generally consistent with those documented by Eckel et al. (1997) on the effects of the privatization of the British Airways on rival airlines. In terms of its long-term stock market performance, we find that the CBA underperformed the market and its rivals during the first 5 years of its initial public offering when the Bank was a partially privatized firm. Especially noteworthy, however, is the strong stock market performance of the Bank after it had been fully privatized. The CBA's market-adjusted cumulative abnormal returns increased significantly from 32.5% in the first year of full privatization to 54.12% in the second year and to 64% in the third year. This compares favorably with the rival banks' cumulative abnormal returns of 21.10%, 38.54% and 42.72% in the first, second and third year of full privatization respectively. The strong stock market performance recorded for the Bank is robust and does not depend on how abnormal returns are calculated since we obtain similar results when we calculate returns using the industry-adjusted method. The poor stock market performance of the Bank in the post-partial-privatization period is consistent with our conjecture that investors perceive a partially privatized firm, with the government as the major shareholder, as not having the freedom to pursue growth oriented and profitable opportunities that can create value for shareholders.

We also find that since becoming a fully privatized bank, not only has the CBA been very efficient in reducing cost and improving its profitability, it has also outperformed its rivals. However, the aggressive pursuit for business and profits has resulted in the Bank's impaired assets increasing significantly in the post-privatization period. A distinct result worth reiterating is that the improvements in the CBA's operating and stock market performance, and even the rival banks' reaction to the various privatization announcements, were stronger after the CBA had been fully privatized. The implication of the results for governments contemplating the privatization of SOEs is that complete transfer of control is necessary in order to achieve gains in productive efficiency, profitability and stock market performance.

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Appendix A. List of firms and their codes

Category	Code	Name
Major banks	ANZ	ANZ Banking Group
	NAB	National Australia Bank
	WBC	Westpac Banking Corporation
Regional banks	ABA	Advance Bank Australia
	ADB	Adelaide Bank
	BEN	Bendigo Bank Limited
	BML	Bank of Melbourne
	BQD	Bank of Queensland
	BWA	Bank of Western Australia
	SGB	St. George Bank
	SME	Suncorp Metway
Insurance companies	HIH	HIH Insurance
	IMW	Insurance My Way
	OMP	Oamps Limited
	QBE	QBE Insurance Group
	RAC	Reinsurance Australia

Appendix B. Ratios

Measures	Ratios	Calculation
Capital adequacy	Total capital adequacy	Tier 1 + Tier 2 Capital
Asset quality	Provisions-to-loans	General provision/total loans
	Gross impaired assets-loans	Gross impaired assets/total loans
	Net impaired assets to loans	Gross impaired assets less provisions/total loans
Management efficiency	Cost-to-income	Operating expenses/operating income
	Expense-to-assets	Operating expenses/average assets
	Net interest margin	Net interest income/average interest earning assets
Earnings ability	ROA	Net profit before interest and tax/average total assets
	ROE	Net profit after tax/average shareholders equity
Labor (Employment)	Growth in staff levels	% change in staff levels
	Growth in Bank branches	% change in number of branches

Appendix C. A comparison of the operating performance of the CBA with that of the rival banks based on the CAMEL criteria

Ratio	Bank	Bank under government ownership							Partial privatization				Full privatization		
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CADR	CBA	–	–	7.33	9.56	9.19	8.73	9.90	10.90	10.97	11.15	12.71	10.89	10.49	9.38
	ANZ	–	–	8.50	8.70	8.60	9.90	9.00	10.80	11.30	10.90	10.50	9.80	10.70	10.70
	NAB	–	–	8.10	11.00	9.30	11.40	11.60	11.10	11.40	11.60	9.30	8.70	9.20	10.40
	WBC	–	–	–	–	–	10.40	9.70	12.30	13.80	13.90	10.80	10.50	9.30	9.20
	Mean of major rivals	–	–	8.30	9.85	8.95	10.57	10.10	11.40	12.17	12.13	10.20	9.67	9.73	10.10
	Median of all rivals	–	–	8.10	11.00	9.30	10.80	10.37	11.50	11.52	11.60	11.46	10.46	10.79	10.61
	Wilcoxon *Z*-statistic	–	–	0.00	−1.21	−0.40	−2.37*	−1.54***	−1.60***	−2.70*	−1.24	1.78**	1.36	−1.24	−2.55*
C-T-I	CBA	76.74	81.37	73.57	61	62.3	62.90	67.70	66.7	66.8	61.30	59.4	59.90	58.10	55.60
	ANZ	68.19	66.57	65.54	64.12	66.3	66.70	72.40	69.7	65.4	64.40	65.8	63.10	60.90	55.20
	NAB	90.49	89.88	86.47	85.71	70.45	69.30	70.34	65.92	58.92	58.48	59.99	58.21	59.70	58.96
	WBC	75.37	71.68	68.73	71.99	77.01	66.49	74.33	58.83	61.1	60.70	64.52	63.39	60.32	59.64
	Mean of major rivals	78.02	76.04	73.58	73.94	71.25	67.50	72.36	64.82	61.81	61.19	63.44	61.57	60.31	57.93
	Median of all rivals	82.93	79.73	68.94	71.99	72.61	68.28	71.37	66.52	63.01	62.37	61.74	62.45	59.70	58.96
	Wilcoxon *Z*-statistic	−0.73	0.73	−0.40	−2.20**	−2.52*	−2.50*	−0.56	0.46	0.76	−1.07	−0.80	−0.30	−0.65	−0.77
E-T-A	CBA	3.62	3.76	3.31	3.00	3.09	2.92	3.60	3.20	3.12	2. 83	2.72	2.43	2.33	2.22
	ANZ	2.94	3.01	3.16	3.02	2.76	3.09	3.16	2.89	2.89	2.77	2.66	2.53	2.30	2.21
	NAB	11.22	11.45	10.13	10.41	3.14	2.99	2.30	3.14	2.88	2.71	2.64	2.29	2.19	2.34
	WBC	3.37	3.13	2.94	2.56	2.86	2.90	3.08	2.51	2.81	2.51	2.51	2.71	2.47	2.45
	Mean of major rivals	5.84	5.86	5.41	5.33	2.92	2.99	2.85	2.85	2.86	2.66	2.60	2.51	2.32	2.33
	Median of all rivals	7.30	7.27	3.16	2.79	2.86	3.16	3.12	3.02	2.85	2.51	2.36	2.48	2.30	2.34

	Wilcoxon *Z*-statistic	−0.73	−0.73	−0.4	−0.31	−0.30	−2.19**	0.76	0.06	0.87	1.16	1.69**	−0.41	−0.06	−0.53
ROE	CBA	13.94	8.46	10.40	16.50	13.9	6.47	8.32	10.50	11.83	16.13	16.27	18.16	18.48	20.54
	ANZ	13.10	13.10	15.10	17.20	5.40	5.80	−11.40	5.00	15.60	17.90	18.30	14.80	14.60	17.20
	NAB	14.60	12.80	15.20	16.50	12.70	10.40	10.00	12.50	17.50	17.80	17.00	16.70	17.80	17.30
	WBC	13.66	13.71	15.50	13.40	10.09	6.68	–	–	9.58	13.40	14.60	17.00	15.50	16.80
	Mean of major rivals	13.79	13.20	15.27	15.70	9.40	7.63	−0.70	8.75	14.23	16.37	16.63	16.17	15.97	17.10
	Median of all rivals	13.38	12.95	15.10	16.18	10.30	9.43	10.76	12.23	16.45	16.87	15.87	15.15	15.37	16.80
	Wilcoxon *Z*-statistic	1.10	−1.46***	−1.83**	0.67	1.96**	−2.43	−1.40***	−1.13	−2.50*	−0.98	0.53	2.52*	2.67*	2.52*
ROA	CBA	0.74	0.47	0.57	0.85	0.77	0.34	0.46	0.65	0.75	1.04	1.06	1.05	1.01	1.06
	ANZ	0.67	0.63	0.73	0.91	0.20	0.30	−0.60	0.20	0.80	0.90	0.90	0.70	0.70	1.00
	NAB	0.70	0.70	1.00	1.10	0.90	0.80	0.70	1.00	1.50	1.40	1.30	1.20	1.10	1.10
	WBC	1.10	1.21	0.87	0.81	0.62	0.43	–	–	0.71	1.04	0.97	1.03	0.96	1.04
	Mean of major rivals	0.82	0.85	0.87	0.94	0.57	0.51	0.05	0.60	0.80	1.11	1.06	0.98	0.92	1.05
	Median of all rivals	0.70	0.70	0.80	0.91	0.62	0.71	0.65	0.69	0.90	0.97	0.97	0.84	0.74	0.94
	Wilcoxon *Z*-statistic	0.13	−1.75**	−2.20**	−0.31	1.01	−2.70*	−1.40***	−0.77	−2.29**	1.36	1.68**	2.24**	2.03**	2.03**
NIM	CBA	–	–	–	–	–	4.60	4.50	4.10	3.80	4.03	4.01	3.53	3.33	3.09
	ANZ	–	–	–	–	–	3.24	3.06	3.15	3.40	3.42	3.34	3.04	2.97	3.05
	NAB	–	–	–	–	–	4.60	4.60	4.40	4.50	4.21	3.93	3.53	3.17	3.00
	WBC	–	–	–	–	–	3.40	2.90	3.00	3.50	3.80	3.72	3.59	3.44	3.27
	Mean of major rivals	–	–	–	–	–	3.75	3.52	3.52	3.80	3.81	3.66	3.39	3.19	3.11
	Median of all rivals	–	–	–	–	–	3.68	3.36	3.19	3.45	3.39	3.34	3.08	2.80	2.74
	Wilcoxon *Z*-statistic	–	–	–	–	–	1.60***	1.46***	1.46***	0.37	2.24**	2.37*	2.20**	2.38*	2.10**

Ratio	Bank	Bank under government ownership							Partial privatization				Full privatization		
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
GIB	CBA	–	−0.003	0.00	0.07	0.03	0.28	0.00	−0.03	−0.07	−0.09	−0.06	−0.04	−0.09	−0.05
	ANZ	–	0.02	0.03	0.20	0.17	−0.03	−0.03	−0.07	−0.05	−0.07	−0.07	−0.16	−0.18	−0.05
	NAB	–	0.00	0.26	0.00	0.14	0.03	−0.01	0.07	−0.09	−0.01	0.07	−0.04	−0.03	0.00
	WBC	–	0.00	0.00	0.00	0.02	−0.01	−0.01	−0.06	−0.12	−0.04	0.16	−0.13	0.18	−0.11
	Mean of major rivals	–	0.01	0.10	0.07	0.11	0.00	−0.02	−0.02	−0.09	−0.04	0.05	−0.11	−0.01	−0.06
	Median of rivals	–	0.01	0.03	0.04	0.02	0.01	−0.01	0.05	−0.01	−0.02	0.00	−0.05	−0.12	−0.04
	Wilcoxon *Z*-statistic	–	−1.60***	−1.07	−0.40	−0.10	2.52*	−0.77	−1.01	−2.40*	−2.80*	−2.19**	0.51	−0.34	−0.85
GIS	CBA	–	−0.01	−0.03	0.06	0.03	0.27	−0.06	−0.08	−0.03	−0.08	0.00	−0.03	−0.08	−0.06
	ANZ	–	0.06	0.03	0.11	0.02	−0.04	−0.05	−0.08	−0.02	−0.01	0.01	−0.07	−0.13	−0.06
	NAB	–	0.03	0.45	0.02	0.18	−0.01	−0.04	0.12	0.01	0.04	0.03	−0.02	0.00	−0.01
	WBC	–	−0.01	0.32	0.03	0.00	−0.07	−0.07	−0.14	−0.04	−0.03	0.08	−0.07	0.05	−0.04
	Mean of major rivals	–	0.03	0.27	0.05	0.07	−0.04	−0.05	−0.04	−0.02	0.00	0.04	−0.05	−0.03	−0.04
	Median of rivals	–	0.01	0.14	0.08	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	−0.01
	Wilcoxon *Z*-statistic	–	0.00	−2.02**	−0.67	−1.36	2.37*	−2.10**	−2.31*	−1.89**	−2.80*	−2.19**	−1.18	−2.38*	−2.38*
P-T-L	CBA	0.55	0.98	1.12	1.36	1.05	1.08	1.04	0.91	0.85	0.80	0.90	0.87	0.18	0.24
	ANZ	0.25	0.44	0.35	0.41	0.75	0.30	0.80	0.80	0.80	0.80	0.80	0.90	1.20	1.10
	NAB	1.05	1.35	1.15	0.74	0.60	0.59	0.52	0.53	0.50	0.49	0.51	0.51	1.15	1.07
	WBC	0.61	0.98	1.04	0.62	0.65	1.62	0.98	1.02	1.20	1.52	1.56	1.55	1.33	1.18
	Mean of major rivals	0.64	0.92	0.85	0.59	0.67	0.84	0.77	0.78	0.83	0.94	0.96	0.99	1.23	1.12
	Median of all rivals	0.42	0.55	0.52	0.53	0.55	0.30	0.60	0.59	0.58	0.52	0.51	0.49	0.50	0.48
	Wilcoxon *Z*-statistic	0.67	1.46***	1.75**	2.02**	2.20**	1.86**	1.96**	1.72**	2.07**	1.48***	1.87**	1.48***	−2.67*	−2.67*

IAL	CBA	–	–	–	–	–	–	–	–	4.22	2.65	1.64	1.08	1.00	0.63
	ANZ	–	–	–	–	–	–	–	–	4.78	2.64	1.70	1.10	1.81	1.53
	NAB	–	–	–	–	–	–	–	–	3.06	1.98	1.33	0.99	0.93	0.93
	WBC	–	–	–	–	–	–	–	–	5.00	2.80	1.40	1.00	0.80	0.60
	Mean of major rivals	–	–	–	–	–	–	–	–	4.28	2.47	1.48	1.03	1.18	1.02
	Median of all rivals	–	–	–	–	–	–	–	–	1.66	1.37	0.93	0.88	0.80	0.85
	Wilcoxon *Z*-statistic	–	–	–	–	–	–	–	–	2.31**	2.40*	2.04**	1.95**	0.89	−1.01
NIAL	CBA	–	–	–	–	–	–	–	–	2.65	1.65	1.03	0.66	0.59	0.24
	ANZ	–	–	–	–	–	–	–	–	3.06	1.66	1.05	0.58	0.97	0.68
	NAB	–	–	–	–	–	–	–	–	2.06	1.42	0.77	0.55	0.68	0.67
	WBC	–	–	–	–	–	–	–	–	3.55	1.94	0.97	0.66	0.52	0.32
	Mean of major rivals	–	–	–	–	–	–	–	–	2.89	1.67	0.93	0.60	0.72	0.56
	Median of all rivals	–	–	–	–	–	–	–	–	1.12	0.72	0.61	0.34	0.52	0.48
	Wilcoxon *Z*-statistic	–	–	–	–	–	–	–	–	2.19**	1.96**	1.96**	2.38*	1.13	−2.31**

*, **, *** Significant at 1%, 5% and 10% respectively.
CADR = Capital adequacy ratio.
C-T-I = Cost-to-income ratio.
E-T-A = Expense-to-asset ratio.
NIM = Net interest margin.
GIB = Growth in branches.
GIS = Growth in staff.
P-T-L = Provisions-to-Total loans.
IAL = Impaired assets to loans.
NIAL = Net impaired assets to loans.

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