

CHAPTER 8

EMPIRICAL ANALYSIS III – PRODUCTION AND EFFICIENCY ANALYSIS

8.1 Introduction

This final analysis looks specifically at the production process of the orchestras, which can be defined as follows: an ensemble of musicians work with a conductor and guest soloists to produce a musical performance; audience members then access this performance in a concert venue with associated technical production support. But this still leaves the question: when musicians come together to perform under the baton of a conductor, what do they actually produce? In its basic form, one would suggest that what is produced is the aural re-creation of a musical composition which is printed as a manuscript, and is read and interpreted by the musicians. Generally speaking this would be defined as a musical performance of the work. However, it may also be suggested that the musical performance is not the intended final product. Instead, the intended output could be the emotional response elicited in an audience member listening to the performance of this work. It is because of these different perspectives on the activity of classical music ensembles that there is some debate as to whether the concert performance or the ‘cultural experience’ (as defined by Gapinski 1980, 1984) of a person listening to the concert performance should be recognised as the appropriate output measure of an orchestra’s activities.

Both these different outputs have been used in economic modelling of performing arts and other cultural activity. **Table 8.1** refers to a number of published articles

on different research undertaken in this area and identifies whether the output measures used were attendances or performances. In addition, this table indicates whether the model looked at cost, production or demand functions.

Table 8.1: Economic Models of Cultural Activity

Author(s)	Year	Focus	Art form	Quantity Measure
Globerman & Book	1974	Cost	Orchestras & Theatres	Performances
Gapinski	1980	Production	Theatre, Opera, Orchestras & Ballet	Attendances
Gapinski	1984	Production & Demand	Theatre	Attendances
Lange and Luksetich	1984	Demand	Orchestras	Attendances
Lange, Bullard, Luksetich & Jacobs	1985	Cost	Orchestras	Performances
Jackson	1988	Cost	Museums	Attendances
Lange & Luksetich	1993	Cost	Orchestras	Attendances
Felton	1994	Cost & Demand	Orchestras	Performances & Attendances
Luksetich & Lange	1995	Cost & Demand	Orchestras	Performance & Attendances
Taalas	1997	Cost	Theatres	Attendances
Fazioli & Filippini	1997	Cost	Theatres	Performances
Luksetich & Partridge	1997	Demand	Museums	Attendances
Bishop & Brand	2003	Production	Museums	Attendances

It can be seen that various economic approaches to understanding the activities of arts organisations (including symphony orchestras) have been developed in the literature. Many of these have focussed on developing cost functions for particular areas of the performing arts and other cultural organisations (Globerman and Book, 1974; Lange, Bullard, Luksetich and Jacobs, 1985; Lange and Luksetich, 1993; Jackson, 1988; Felton, 1994; Taalas, 1997 for example). While these studies refer to the production process they do not specifically identify a production function for cultural organisations or the performing arts in particular. Taalas noted that the sole application of a production function in the performing arts area was by Gapinski (1980) ‘who estimated transcendental production functions for performing arts institutions’ (Taalas, 1997: 335). Later work by Gapinski (1984) also used a production function to explore the economic underpinnings of the Royal Shakespeare Company (RSC). More recently, Bishop and Brand (2003) undertook to develop a production function to study the efficiency of museums in the United Kingdom.

8.2 Estimating a Production Function for Symphony Orchestras

When fitting a production function to firm data there are a number of forms that can be used. One functional form is that of the Cobb-Douglas production function. In his 1984 paper Gapinski (1984) estimated a production function for the Royal Shakespeare Company (RSC), based on a Cobb-Douglas function. Gapinski looked at the RSC over a 20 year period and used data supplied from various sources to estimate the production function of the theatre. The output variable used by Gapinski was that of attendances. This was inline with his earlier paper where he defined output of the performing arts as being the ‘cultural experience’ gained by each member of the audience (Gapinski, 1980: 578). The labour variable was divided into artists and staff, the former including performers and artistic staff such as directors and designers, while the latter included all other non-artistic personnel. The capital variable was determined utilising data not classified as labour costs such as rent, utilities, taxes, repairs and royalties among others, deflated using appropriate capital-price indices. The data represented two different theatres of the RSC and therefore contained both time-series and cross-section dimensions.

The results showed that the output elasticity with respect to labour as a whole was twice that with respect to capital and that the sum of these elasticities indicated decreasing returns to scale. He found that economic laws held for the theatre under consideration, concluding that non profit performing arts lent themselves to traditional economic modelling, and that “the relationship between inputs and output obeys a well-behaved, standard production format” (Gapinski, 1984: 465). This showed that the Cobb-Douglas function was a useful and appropriate form to examine the production process in a performing arts context.

Based on this, the research presented here looks at symphony orchestras in a similar way as that undertaken by Gapinski. To estimate a function to explore the production characteristics of symphony orchestras the following section determines how the quantity of output and the inputs of labour and capital are to be defined and measured in this context.

8.2.1 Output

As noted in the introduction of this chapter, defining output in a performing arts context is an area of some debate. If it is taken that the primary objective of an orchestra is to perform music to an audience, then it is the people that attend a concert and experience the live music performance that is the focus of orchestral operations. In this case it would appear more appropriate to assess the production activities of an orchestra in relation to the number of people that attend the concerts and experience the cultural activity, rather than assessing the number of concerts themselves. However orchestras perform different types of concerts including schools' concerts, free outdoor concerts and civic, corporate and major events. Due to the nature of these types of performances it may not be feasible to get accurate figures of attendances to all performances and these may in fact not be generally representative of normal orchestral activity.

It is important to ensure one has accurate data in regards to output and to overcome this potential problem it is proposed to use the total number of paid attendances for a given period to measure output as this figure is reliably available across all orchestras. This is inline with Gapinski, who defined the output of cultural experiences as being 'interpreted as paid attendances' (Gapinski, 1984: 460). The paid attendances statistic therefore captures the cultural experience aspect of the output measure and eliminates the potentially inaccurate reporting of free attendances or one-off large scale civic events. For this analysis it is assumed that the proportion of paid attendances out of total attendances is reasonably constant over time and for all orchestras. Under the Cobb-Douglas model, this assumption implies that the difference between the two measures is captured by the constant and it does not affect the slope coefficients.

8.2.2 Inputs

One of the key inputs in the production function is labour. Gapinski (1984) noted that in the case of the RSC there were two distinct labour components, artists and staff. It is proposed that for symphony orchestras, artistic labour should again be divided into the permanent ensemble and contracted artists such as soloists and conductors. This gives three distinct forms of labour contributing to the production process, being:

- Ensemble Labour

- Guest Artists and Conductors Labour
- Management (Staff) Labour

Ensemble Labour

The primary labour input in the production process is the musicians that constitute the ensemble of the orchestra. While they provide the major component of physical activity in the process, they also account for a substantial financial component. In 2003, for example the ensemble costs for the orchestras in Australia accounted for 49 per cent of all expenditure for that year (DCITA, 2005: 36). Therefore it is important to separate this component from other labour components. As a production function is interested in quantities of inputs it would be appropriate to use the number of fulltime equivalent (FTE) musicians employed as the relevant measure.

Guest Artists and Conductor Labour

Most, if not all, orchestral performances require the services of conductors and guest soloists. While each orchestra may have a resident conductor that undertakes a percentage of performances in a season, other conductors and the soloists are contracted for individual performances. Each orchestra is free to contract any guest artists and conductors from the international arena that they are able to secure. It can be assumed that the fees charged by these artists are commensurate with their reputation and calibre of artistry. In addition, any artist or conductor can choose to accept or reject any offer of engagement and it is assumed that they would do so based on their fee being met and the quality of the orchestra seeking their services. The ability for individual orchestras to attract quality artists is indicative of an orchestra's reputation, perceived quality and budgetary restraints. As most concerts use one conductor and one soloist it may not be useful to use the FTE contracted artists as a measure. Instead it is proposed to use the total cost of contract fees for artists as the appropriate measure of this variable.

Management Labour

Management labour is a separate aspect of orchestral operations and encapsulates all personnel involved in administration, marketing, fundraising and production. As the management labour does not contribute directly to the production of music,

it is important to separate this labour component from the ensemble labour already identified. As data on the FTE staff employed was not available, the total cost of staff labour was used as the variable.

Capital

There appears to be little capital investment in regards to symphony orchestras. In Australia for example, orchestras don't own their own venue or invest significantly in equipment (musicians generally provide their own instruments). However there are significant activities of the orchestral organisation which centre on producing a musical performance, which could be substituted for capital in the production function. This includes all concert venue hire, associated technical production support such as sound, lighting and stage management, marketing of the performances as well as all administrative costs not identified as labour costs. It is proposed that this cost represent the production capital component of the function. Again, this is in line with Gapinski, who included similar aspects in the capital component, as being "consonant with the notion of service flow" (Gapinski, 1984: 460).

8.3 Empirical Results of the Production Function

The function used to determine production for symphony orchestras is thus represented as follows:

$$^{(1)} Q_a = \beta_0 L_1^{\beta_1} L_2^{\beta_2} L_3^{\beta_3} K^{\beta_4} M^{\delta}$$

Where:

Q_a = total paid audience attendance

β_0 = constant

L_1 = ensemble labour

L_2 = management labour

L_3 = guest artists and conductors labour

K = production capital

M = market dummy

This equation can then be applied to empirical data via regression analysis, where the function is estimated on the natural logs of the variables. The use of logs in regression takes into account non-linear relationships between variables and allows the analysis of the impact of percentage changes, when applied to statistical data. The resultant coefficients from such a regression analysis indicate the change in percentage of output as affected by the change in percentage of inputs.

As orchestras generally perform in single geographic locations and with little ability to 'export' their product, there are significant differences between the sizes of the markets in which they operate. Concert attenders make up a small proportion of the population, and it is safe to assume that the size of the population in a given market will affect the potential audience size to which any one orchestra has access. As two of the orchestras in this study reside in significantly larger markets than the others, the addition of a dummy variable (M) to account for this is introduced, identifying orchestras in large markets over two million people ($\ln M = 1$) and small markets of less than two million ($\ln M = 0$).

Management of the four orchestras participating in the study provided annual data for the years 2000 to 2004 inclusive in regard to costs and revenues of their activities, number of musicians employed, number and type of concerts undertaken and the number of paid attendances. Two of these orchestras were in large capital cities (over 2 million people) and two were in smaller capital cities (under 2 million people). This allowed the above function to be tested empirically using pooled data supplied by the four orchestras, giving a total of twenty observations ($N = 20$). In the following analysis, ensemble labour was measured as the number of Full Time Equivalent (FTE) employees; and management labour, guest artist labour and production capital were measured using total expenditure on these items, adjusted to constant 2005 prices using appropriate indices derived from the Consumer Price Index as published by the Australian Bureau of Statistics (2005). Total paid attendances figures were used as the dependent variable. This information is displayed in **Appendix 5**. The results of the regression analysis are shown in **Table 8.2**.

Some immediate observations can be made about the general reliability of the model. The equation produced high results in relation to the regression analysis: $F(5, 14) = 210.93^{***}$ with an adjusted $R^2 = .98$. Analysis to check for heteroskedasticity involved undertaking the Breusch-Pagan (B-P) test. The normality of residuals was checked and skewness and kurtosis were significant, so it was decided to use the Koenker version of the B-P test which is less sensitive to non-normality in small samples. The B-P (Koenker) score of 8.4 is not significant as it is below the Chi squared cut-off value of 11.071 at the 0.05 level, signifying no problem with heteroskedasticity.

Table 8.2: Empirical Results of Estimating Symphony Orchestra Production Function

Variable	Coefficients	VIF
Constant	-8.69** (-2.33)	
Ensemble labour	.78** (3.30)	6.56
Management labour	.36** (3.26)	5.11
Guest artists/conductors labour	.10 (.57)	27.20
Production capital	.65* (2.32)	23.88
Market Dummy	.26 (.80)	39.70
N	20	
Adj. R^2	.98	
F	(5,14) 210.93***	
B-P	(df 5) 8.4	

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Figures in parenthesis are t statistics

However as can be seen from **Table 8.2** the model does have severe problems in regard to collinearity. In particular there appears to be strong collinearity between the three variables of 'guest artist/conductor labour', 'production capital' and the 'market dummy'. In reviewing the collinearity statistics it is suggested that scores for VIF over 10 are cause for concern (Field 2000, p. 153). Further testing of the model was undertaken omitting the variable 'guest artist/conductor labour' as it did not produce a significant result in the first analysis. Omission of this variable did not significantly affect the overall estimation of the model or the coefficient

figures so it was decided to keep all variables in the model for presentation here. However, as the results relate to only four orchestras over a five year period, one must take care in interpreting them given the small number of observations and recognise it is not possible to extrapolate these findings into more broad generalisations.

With the above provisos, there are three points that can be made from the results presented. Firstly the total of the coefficients of the log input variables is greater than 1, which indicates increasing returns to scale. A t-test was undertaken to test the null hypothesis that the sum of the four input coefficients was equal to unity against the alternative hypothesis that it was greater than unity. The resulting statistic ($t = 2.432$) is larger than the critical value of 1.761 at the 0.05 level so the null hypothesis was rejected, indicating the model presents increasing returns to scale. While the result of increasing returns to scale is contrary to other findings (Gapinski, 1980; Lange and Luksetich, 1993) it is inline with earlier work by Globerman and Book (1974). The result presented here is also supportive of findings presented in 2005 by the Australian government. In a study of the six orchestras in Australia, *The Strong Report* (DCITA, 2005) found that there was significant difference between the economic performances of the two largest orchestras as opposed to the four smaller ones. The report stated that the larger ensembles had performed well financially between 1999 and 2004, building strong surpluses, as opposed to the smaller orchestras that had all accumulated significant deficits during the same time period (DCITA, 2005). Generally the evidence indicates the two larger orchestras had been more productive and financially successful than their smaller counterparts during this period, supporting the notion of increasing returns to scale being evident.

When looking at the individual components of the function, capital shows a strong and statistically significant contribution to production which is to be expected. It seems obvious that there would be a strong relationship between production capital and attendances as additional investment in aspects such as marketing and hiring of additional venue nights should, one expects, result in additional attendances. However, overall the output elasticity with respect to capital is almost half that with respect to the total labour component, which is in line with the results found by Gapinski (1984).

Although the total labour component is a stronger contributor to the production process than capital, when the labour component is broken down into the three distinct types there are interesting differences between them. For instance, the results show there is little contribution made to output by the guest artist and conductor labour component. This result indicates that for the Australian orchestras there are no significant gains to be made in output levels, via increasing expenditure on guest artist or conductors fees. From a management perspective, this may seem at odds with what might normally be expected as it is often perceived that 'star' artists have great power to attract audiences. While this may be true in some cases, the results presented here indicate that this is not a consistent outcome. The results presented suggest that in the Australian context it does not necessarily hold that the more an artist charges for their services, the more attractive he or she will be to the paying audience. At the same time given the importance the musicians place on working with excellent conductors it would be expected that investment in this aspect would have produced stronger results. It would appear that while the standard of conductors is of great importance for the musicians it is not so important for audience members.

Of the labour components, the results show that attendance levels are most sensitive to a change in the ensemble labour. This highlights the labour intensive nature of the performing arts and supports Gapinski's comment, 'art is primarily the artist's – or, more broadly, labor's – medium' (1984 p. 462). There may be a number of explanations for this result, which would require further exploration. Initially it must be recognised that there is a relationship between the size of the orchestra and the size of the city in which it resides (its market). The two orchestras in the two largest markets have ensemble sizes around the 100 mark, while the smallest orchestra in the smallest market is half that size. However, even with the dummy market variable, ensemble labour is still the most important in regards to production.

Another explanation may be that larger ensembles have a greater facility to perform a broader variety of repertoire, including popular romantic works requiring orchestras of 80 or more musicians. The ability to play works from Classical, Romantic *and* 20th Century periods, as well as more popular genres

such as musical theatre, jazz and rock, allows an orchestra to program a mixture of works across the season and attract audience members from a wider cross section than just traditional orchestral concert attenders.

Finally it may also be that larger ensembles are able to break into smaller groups and undertake performances in multiple locations simultaneously. An ensemble of 100 may be able to break into a symphony orchestra of 75 and a small chamber group of 25 and undertake performances of different repertoire, in different locations, to different audiences at the same time, effectively increasing productivity. Also using this example, the larger ensemble could remain in the city location performing to metropolitan audiences while the smaller ensemble tours to regional locations and smaller venues such as schools and civic centres.

Whatever explanation, it seems that the link between the fulltime ensemble and the paying audience is important. While the musician ensemble labour accounts for about half of all expenditure, it can be seen as an easy target for management focussed on cost cutting. Reducing the size of the ensemble is seen as a way of reducing costs, without impacting on the potential revenue raised through box-office (see DCITA 2005). For example, the *Strong Report* (DCITA 2005) argued that if the same conductors and guest artists are performing in the same venues for the same number of performances, then reducing the size of the orchestra should not affect attendances. Based on this assumption the *Strong Report* recommended reducing the size of three of the smaller orchestras which were facing financial hardship. However the results of the analysis here suggest that in fact it is better to reduce the expenditure on guest artists and conductors, as well as management labour, than to reduce the size of the orchestra.

A final comment on the link between audiences and the orchestra itself should be made at this point. Many people subscribe to a series of concerts in a season and it can be assumed that they purchase this subscription based more on the reputation or standard of the orchestra (and perhaps also the repertoire choice), rather than who is the guest artist or conductor for a single concert in the series. In other words, people generally buy tickets to an orchestra's performance, not to hear a particular conductor or soloist. If this is the case then the inputs of ensemble

labour and production capital appear very significant in the decision-making process of subscribers.

8.4 Estimating a Demand Function for Symphony Orchestras

The above results were presented at the International Association of Cultural Economics conference in Vienna in June 2006. Upon presentation it was suggested by one commentator that the above function could be extended to incorporate the demand aspect associated with attendances to performances (Brooks, personal communication). In support of this it was suggested that the size, number and type of venues in which an orchestra can perform are limited as in reality new venues are not built very often. As each orchestra performs the majority of concerts in a single geographic location (its home city), it can then be assumed that the venue is a fixed component of the production activity. At the same time, the number of concerts performed in a given season is also reasonably fixed due to two factors. First, there is a reasonably constant ratio of rehearsal calls to performance calls required by the orchestras to ensure works are of an acceptable standard. Secondly, the programming of an orchestra's annual season of concerts is fixed well in advance and there is little or no opportunity to undertake additional performances in the short term. Therefore, if the number of performances is reasonably fixed, the venue capacity is fixed, and it is assumed that this capacity is always (or almost always) greater than the actual attendances, then it can also be assumed that the total supply of *potential* cultural experiences is fixed at this amount. If a cultural experience can only be actually produced if a person attends a concert, then effectively the number of cultural experiences produced is *equivalent to* the number of experiences demanded. Following on from this, it is proposed that the level of *actual supply* of these experiences is equivalent to *actual demand*, which is indicated by the number of seats sold, or total paid attendances. This actual supply can then be estimated as a standard demand function of price and quality.

While price can be determined from data provided by the orchestras, quality is more complex. However, if one assumes that orchestral activity is designed to produce a quality performance experience, then an adaptation of the original production function can be used to estimate the quality component of the demand

function (Brooks, personal communication). Therefore it is proposed to further develop the production model based on Brooks' comments to take these factors into account.

8.4.1 Demand

A number of studies have looked specifically at estimating demand for performing arts organisations (Seaman 2006 cites at least 44 such econometric studies). One example of particular interest to this study is that by Lange and Luksetich (1995) where the relationship between price and quality, and demand for services for symphony orchestras was explored in detail. In this study it was found that demand for cultural services was relatively price inelastic (-0.16 to -0.42), suggesting that increasing ticket prices would have a small but negative impact on attendances. In another study of symphony orchestras (Felton 1994) results for subscribers showed low price elasticity (-0.24) than attendances taken as a whole (Seaman 2006). This is in line with the notion that decisions made by established arts attenders about whether to attend a performance are based more on qualitative aspects than on price (Throsby 1994).

Quality of an arts performance can be derived from objective criteria such as the type of repertoire being performed and the expenditure on production such as artists, sets, costumes etc. However a more subjective evaluation of quality can be gained from expert observation such as critical reviews or the awarding of grants (Throsby 1990; 2006). A number of studies have used objective data to measure quality as a variable in the demand equation and the results have been mixed. Some studies found positive effects between quality and demand (for example Jenkins & Austen-Smith 1987; Greckel & Felton 1987; Felton 1989) where as others found negative effects (Lange and Luksetich 1995 for example).

Demand Function

The proposed demand function for this analysis is depicted in Equation 2 and is estimated as a function of price and quality.

$$^{(2)} \quad Q_a = \alpha_0 p^{\alpha_1} \hat{q}^{\alpha_2} M^{\alpha_3}$$

Where:

Q_a = number of paid attendances for a season

α_0 = constant

p = the price of an A Reserve single ticket to a *main stage* concert

\hat{q} = predicted value of quality

M = market dummy

To estimate the above function price is taken as being the cost of an 'A Reserve' single adult ticket to a mainstage performance, adjusted to constant 2005 prices. As noted in the earlier production function orchestras generally perform in single geographic locations and there are significant differences between the sizes of the markets in which they operate. Therefore the dummy market variable (M) to account for this is again introduced. Quality is calculated based on the previous production function which is adapted accordingly in the following section.

8.4.2 Quality

Quality is an essential factor in any assessment of artistic enterprise. However defining and measuring quality in such a context is contentious and open to significant error in measurement. It is not possible to observe or measure quality directly unless one attends every performance of every orchestra, so a substitute or proxy needs to be developed. For the purpose of this analysis it is proposed that the intention of a symphony orchestra is to produce a quality musical performance experience. This performance experience is created through a mixture of repertoire choice, musician labour, guest artists' and conductors' labour and the venue in which this concert is performed. The choices made in each of these cases are influenced by the type of music being performed and the positioning of the concert within the overall season's program. Therefore using the original production function as a basis one can depict this relationship as quality being a function of labour and capital:

$$(3) \quad q = \gamma_0 L_1^{\gamma_1} L_2^{\gamma_2} K_c^{\gamma_3}$$

Where:

q = quality (as indicated by percentage of mainstage performances)

γ_0 = constant

L_1 = ensemble labour

L_2 = guest artists and conductors' labour

K_c = direct concert costs

Symphony orchestras undertake a variety of concerts based on different types of repertoire. A review of season brochures from the Australian orchestras showed a core of subscription type concerts often called 'Master Series' or similar, which feature prominent conductors and soloists with programs that might be considered from the established classical repertoire. These included works of Mozart, Beethoven, Brahms and Tchaikovsky, through to more contemporary composers such as Piazzolla and John Adams, or Australian composers such as Carl Vine and Peter Sculthorpe. Other classical series, such as small composer-based festivals and 'Great Classics' concerts, add to the presentation of music in this genre. Collectively these concerts are often labelled as '*main stage*' concerts as they are generally performed in the main concert hall of the city. The orchestras also program outdoor events, and more 'popular' or generalist concerts such as those based around movie themes, jazz greats, and classic rock bands such as *Led Zeppelin*, *The Beatles* or *KISS*. These concerts are designed to attract a different audience than traditional classical concerts and increase box-office receipts rather than develop the artistic genre.

It is proposed that an indicator of artistic enterprise can be derived from the ratio of *main stage* concerts undertaken in a season as opposed to more *popular* concert programming. In this regard the more *main stage* concerts programmed in a season, the higher the artistic (as opposed to entertainment) component of the production process.

As the size of the orchestra per se may not relate specifically to the quality of the musicians, in place of the FTE labour measure it is proposed to use total salary costs for this component. It is assumed that higher quality musicians will command higher wages and therefore the total cost of musicians is a more direct representation of quality. This is also true for guest artists and conductors.

Finally it is proposed to adjust the capital component for this estimation to only include direct costs relating to the concert performance itself. This includes venue

hire, technical production and marketing costs. Again it is assumed that there is a positive relationship between the quality of a concert venue such as acoustic properties, front of house facilities and technical production facilities and the fee charged to rent the venue.

8.5 Empirical Results of the Demand Function

The quality and demand function equations were applied to empirical data via regression analysis, where the functions were estimated on the natural logs of the variables. Identified costs, ticket price data and season breakdown of *main stage* concerts versus *popular* concerts is compiled in **Appendix 5**. The results of the estimations are shown in **Table 8.3**.

Table 8.3: Empirical Results of Estimating Production Incorporating Quality and Demand

	Quality Function		Demand Function	
Variable	Coefficients	VIF	Coefficients	VIF
Constant	-1.59* (-2.31)			
Ensemble labour	0.41*** (4.98)	5.24		
Guest artists/conductors labour	-0.28*** (-4.15)	10.59		
Direct concert costs	0.20* (2.26)	12.83		
Constant			8.78** (2.82)	
Price			-0.53 (-.59)	4.05
Predicted Quality			1.06* (1.75)	2.43
Market Dummy			1.51*** (7.87)	2.99
	20		20	
Adj. R ²	0.77		0.92	
F	(3,16) 22.34***		(3,16) 70.61***	
B-P	(df 3) 1.3		(df 3) 5.8	

* Significant at the .05 level
 ** Significant at the .01 level
 *** Significant at the .001 level
 Figures in parenthesis are t statistics

The results demonstrate the validity of the model incorporating the estimation of quality and demand as reported above. The quality equation produced high results in relation to the regression analysis [$F(3, 16) = 22.34, p = 0.000$] with an adjusted $R^2 = 0.77$. Again the normality of residuals was checked and skewness and kurtosis were significant, so it was decided to use the Koenker version of the B-P test to check for heteroskedasticity. The B-P (Koenker) score of 1.3 is not significant as it is below the Chi squared cut-off value of 7.815 at the .05 level, indicating no problem with heteroskedasticity. Although the VIF scores for the quality estimation on two of the variables exceed 10, they are better behaved than in the production function and therefore it was decided to leave all variables in the equation.

The coefficients produced for each variable, while small are all statistically significant. Investment in both ensemble labour and technical production costs such as venue hire are positively related to quality however investment in guest artists and conductors produced a negative result. This result is interesting as it suggests overall quality is not enhanced by this component of music production, which may be contradictory to traditional management and musical perceptions.

The overall result for the estimated demand equation is again quite strong [$F(3, 16) 70.61, p = 0.000$] with an adjusted R^2 of 0.92. A check of normality of residuals showed no evidence of skewness or kurtosis so it was decided to use the standard Breusch-Pagan (B-P) test. The B-P statistic of 5.8 is not significant at the 0.05 level indicating no problem with heteroskedasticity. The VIF statistics are within parameters indicating that there is no colinearity within the data. Overall this seems to be a more reliable model than the original estimation of production.

Looking at each variable in the demand equation shows that the market variable is the most significant predictor of demand, demonstrating a strong positive relationship. This appears an obvious result as it should be expected that the size of the overall market will influence the number of people who attend concerts: the larger the market, the larger the potential audience. Leaving the size of the market to one side, the interest of this analysis lies with the relationship between attendances and price and quality as these are the variables that are under the influence of management.

The quality coefficient has a statistically significant and positive relationship with attendances [$\beta = 1.06^*$]. Quality here is measured by the type of concert being undertaken as a function of investment in musicians, artists and concert production. The results indicate that as the quality of the performance season increases so too do attendance levels in a significant way. This implies that if management wishes to increase attendance levels then investment in the artistic components that contribute to increasing the quality of a performance is a legitimate strategy to pursue.

Interestingly, while not statistically significant, the price variable did display a small and negative relationship with demand. This result is in line with those of other studies (for example Throsby 1977; Lange & Luksetich 1984; Luksetich & Lange 1995) and suggests that demand is relatively inelastic in regard to price. However, as demand encompasses all paid attendances, including both subscribers and single ticket buyers, the negative value of the coefficient of the price variable does suggest that some parts of the audience may be susceptible to changes in price. Therefore if management makes a decision to raise the price of a concert ticket then this may impact negatively on the total number of people who choose to buy tickets and attend performances.

Overall, while these results are interesting, again it must be acknowledged that they relate to only twenty observations, so it is difficult to extrapolate these findings into broader conclusions or generalisations. However, the results do support the validity of the models proposed and indicate that the traditional production and demand functions can be employed in the situation of symphony orchestras. The results have also been able to provide some econometric support to the concept that the musicians are a key input in the production of quality musical performances and there is a strong positive relationship between this and attendances. Increasing attendances at performances and increasing the quality of the artistic output are two key objectives of performing arts organisations and the results suggest that they are not mutually exclusive. It can also be acknowledged that in the context of the Australian orchestras the role of the musicians in the ensemble to achieve these goals is crucial.

Up to this point however the analyses have not directly addressed the notions of efficiency and to look further at the operations of the orchestras the following section applies the data to nonparametric analysis using Data Envelopment Analysis.

8.6 Data Envelopment Analysis

Data Envelopment Analysis (DEA) is a non-parametric method of measuring relative efficiency between like firms (or Decision Making Units as they are usually termed in DEA). This concept dates back to Farrell (1957) but was introduced into Operational Research by Charnes, Cooper and Rhodes in 1978 (Ray 2004, p. 1). The term Decision Making Unit (or DMU) is useful in DEA analysis as it is often used to analyse efficiency of 'non-market agencies' (Ray 2004, p. 28). These agencies can include government departments, nonprofit entities and arts enterprises. Recent studies for example, have looked at the notion of efficiency in areas such as author's rights collection (Marco-Serrano *et al* 2002), highway maintenance patrols (Cook and Zhu 2003), educational institutions (Worthington 2001; Taylor and Harris 2004), human services departments (Martin 2002) and hospitals (Cruise and Nyhan 2000). In many of these cases the price of outputs is not known and many produce multiple outputs, making more traditional econometric modelling difficult.

DEA is a linear programming tool (LP) that uses data on the actual performance of homogenous DMUs to calculate the relative efficiency of all observations in relation to all others (Taylor and Harris 2004, pp. 74-75). Through the use of DEA, it is possible to produce a technical production frontier over all observed data points so that all lie on or below the frontier (Coelli 1996). All DMUs are given a relative efficiency score between 1 and 0. Those that lie on the frontier will gain an efficiency score of 1, meaning they are relatively efficient, with all others scored below 1, indicating their relative inefficiency (Martin 2002).

DEA can be undertaken using a number of different propositions concerning input/output orientation and scale efficiency. DEA can utilise an input orientation where the focus is on minimising inputs while maintaining the same output level, or output orientation which suggests maximising output given a set level of

inputs. Which method is used may depend on which aspects of the input/output process the DMU has control over.

When undertaking DEA a decision must also be made in regard to scale efficiencies. DEA can assume that there are constant returns to scale (CRS), where all DMUs are operating at optimal scale, or variable returns to scale (VRS), where there may be imperfect competition or other constraints on operations (Coelli *et al* 2005, p. 172). It is possible to examine both technical efficiency (TE) and scale efficiency of DMUs by undertaking a combined analysis which produces both a CRS and VRS DEA. If there is a difference between the two scores then this indicates that the DMU exhibits scale inefficiencies (Coelli 1996, p. 18).

In the case of symphony orchestras in Australia there are significant differences in the size of the orchestras and the markets in which they operate. Given that there would also be correspondingly significant differences in the input and output levels of each orchestra it would be appropriate to assume variable returns to scale in this situation.

A useful example to explore further is an application of DEA on the efficiency of fundraising efforts of symphony orchestras in the USA undertaken by Luksetich and Hughes in 1997. Luksetich and Hughes took data on the fundraising activities of seventy-eight symphony orchestras to analyse the relative efficiency of their efforts. The data used in the analysis included outputs of funds received from government, individuals, foundations and businesses. Inputs were measured as staff costs, printing and postage, telephone and other developmental costs (Luksetich and Hughes 1997, p. 77). The analysis used an input orientation to assess whether costs (inputs) could be reduced to gain the same outputs (funds raised) and allowed for variable returns to scale. The study found thirty-two of the seventy-eight orchestras were relatively inefficient in their fundraising activities. These orchestras were then compared to a set of peers identified as having the closest match with their choice of inputs and outputs. Luksetich and Hughes note that relatively inefficient orchestras can benchmark against their identified peers and potentially reduce costs while maintaining existing fund raising levels (1997, p. 83). This study shows that DEA is a useful tool for studying the relative

efficiency of symphony orchestras. Given that, the following analysis uses DEA to measure both the relative efficiency and productivity changes over time for the four ABC symphony orchestras under consideration.

DEA Analysis 1

DEA of the four orchestras was undertaken using the program DEAP 2.1 developed by Coelli. Due to the results of the production/demand analysis a Variable Returns to Scale orientation was chosen. In addition, an input-oriented analysis was chosen as it is the level of inputs that management of the DMUs have control over, not the output as measured by the number of paid attendances at concerts. As such the interest here lies in the question *'By how much could the various inputs be reduced while still achieving the given attendance levels?'*

The twenty observations of annual data from the orchestras were converted into twenty DMUs. DEA scores are sensitive to the number of inputs and outputs used in the model, in relation to the number of DMUs being observed. This is due to the increase in the number of dimensions that contribute to the uniqueness of organisations, potentially reducing the number of peers in the analysis. As noted by the Steering Committee for the Review of Commonwealth/State Service Provision, 'DEA gives the benefit of the doubt to organisations that do not have similar comparison organisations, so they are considered efficient by default' (Steering Committee 1997, p. 23). As such, inputs for the analysis of the orchestras were reduced to two, being total labour costs and total capital costs.

Aggregate costs as identified in the previous analyses (see **Appendix 5**) were used as the measures for both the labour input and production costs (capital component). Each DMU was labelled as Orch/Yr – the first digit being the orchestra and the second two digits indicating the year (eg 1/00 = Orchestra 1 in 2000) as displayed in **Appendix 5**.

Analysis using **DEAP 2.1** calculates technical efficiency (TE) for each DMU assuming both constant returns to scale (CRS) and variable returns to scale (VRS), as well scale efficiency scores. Finally the analysis indicates whether a relatively inefficient DMU is operating in the area of increasing returns to scale (IRS) or decreasing returns to scale (DRS).

Results of the DEA analysis are displayed in **Table 8.4**. The model shows that if one assumes constant returns to scale, then only Orchestra 1 is anywhere near technically efficient. In fact only three of the observed DMUs are operating at the maximum degree of relative technical efficiency under these conditions, being the later three years of Orchestra 1's operations. This equates to only 15 per cent of DMUs. Overall the mean technical efficiency score is 0.67, which indicates that 33.4 per cent mean inefficiency exists for all orchestras observed. However, as already noted, technical efficiency may be affected not by ineffective allocation of inputs, but by issues of size of operations or other constraints. In this case it is important to consider a variable approach to scale. As expected, when variable return to scale is assumed the results alter considerably. Under this assumption the number of technically efficient DMUs has increased to eight or 40 per cent. In addition the mean of efficiency ratios has risen to 94.7 per cent which indicates the majority of observations are operating at close to maximum relative efficiency levels.

Table 8.4: DEA Results for Orchestra Analysis (Input Oriented VRS)

Orch/Yr*	CRS TE	VRS TE	Scale Eff.	
1/00	0.784	0.808	0.971	IRS
1/01	0.920	0.932	0.988	IRS
1/02	1.000	1.000	1.000	-
1/03	1.000	1.000	1.000	-
1/04	1.000	1.000	1.000	-
2/00	0.765	0.856	0.893	IRS
2/01	0.851	0.932	0.912	IRS
2/02	0.828	0.929	0.891	IRS
2/03	0.791	0.887	0.892	IRS
2/04	0.765	0.879	0.870	IRS
3/00	0.483	1.000	0.483	IRS
3/01	0.424	1.000	0.424	IRS
3/02	0.445	0.937	0.475	IRS
3/03	0.546	0.881	0.619	IRS
3/04	0.472	0.964	0.490	IRS
4/00	0.429	0.939	0.457	IRS
4/01	0.552	1.000	0.552	IRS
4/02	0.448	1.000	0.448	IRS
4/03	0.395	0.993	0.398	IRS
4/04	0.418	1.000	0.418	IRS
Mean	0.666	0.947	0.709	

*Note: Orch/Yr: 1/00 = Orch 1 Yr 2000

Interestingly the two smaller orchestras (Orchestras 3 and 4) have moved closer to operating at optimal efficiency for the period, given VRS but Orchestra 2 did not achieve optimum relative efficiency in any year. Generally however, while the two smaller orchestras (3 and 4) are technically efficient under VRS, they are operating at considerably lower than optimal scale efficiency. Those DMUs that

are not operating at optimal scale efficiency are within the increasing returns to scale area of the efficiency frontier.

Table 8.5 displays the peers for all observations that are those DMUs of best practice with which the relatively inefficient organisation is compared. Peers are useful as they allow relatively inefficient organisations to use their identified peers as ‘role models’; as the efficient DMUs that are most similar to itself (Steering Committee 1997, p. 14). Interestingly, of the observations for Orchestras 1 and 4 that operated at less than technical efficiency, the peers of those tended to be another year’s observations of the same orchestra, ranging from 87 per cent for Orchestra 1 to 100 per cent for Orchestra 4. This would indicate both the consistent level of operations for each of these orchestras over the five year period and also that their operations are not closely reflected by other orchestras in the study. The operations for Orchestras 1 and 4 seem to be reasonably unique and specific to their own circumstances.

Table 8.5: Summary of Peers for Inefficient DMUs

Orch/Yr	Peers		
1/00	4/01 (0.10)	1/02 (0.866)	3/00 (0.124)
1/01	1/02 (0.083)	4/01 (0.083)	1/03 (0.834)
2/00	4/01 (0.548)	1/03 (0.452)	
2/01	4/01 (0.485)	1/03 (0.515)	
2/02	1/02 (0.520)	3/00 (0.036)	4/01 (0.444)
2/03	1/03 (0.132)	1/02 (0.356)	4/01 (0.513)
2/04	3/00 (0.149)	4/01 (0.360)	1/02 (0.491)
3/02	1/02 (0.005)	3/00 (0.850)	4/01 (0.145)
3/03	1/02 (0.076)	3/00 (0.247)	4/01 (0.677)
3/04	1/02 (0.015)	3/00 (0.896)	4/01 (0.089)
4/00	4/01 (0.687)	4/02 (0.313)	
4/03	4/02 (0.551)	4/04 (0.449)	

Figures in parenthesis are Lambda weightings

The same could be said generally for Orchestra 3, although in one observation its significant peer was Orchestra 4 (4/01: 68 per cent). It is a different situation for Orchestra 2 however. In the observations for Orchestra 2, no peers were identified

as itself, due to the fact that in no year was it operating at optimum relative efficiency. Overall the peers attributed to this orchestra were Orchestra 1 (1/03: 45-52 per cent and 1/02: 36-52 per cent) and Orchestra 4 (4/01: 36-55 per cent). This would indicate that if Orchestra 2 wished to improve its efficiency levels then comparison with the operations of Orchestra 1 in 2002-03 and Orchestra 4 in 2001 would seem most appropriate.

DEA Analysis 2

It is acknowledged that the data used in the above analysis for the orchestras constitutes a panel data set as it spans five years of activity from 2000 to 2004 inclusive. DEA can also be used with panel data to compute a Malmquist TFP index, which measures productivity change, encompassing both technological change and technical efficiency change (Coelli *et al* 1996) from one year to the next for each DMU. The Malmquist index has become the standard measurement for productivity changes over time within non-parametric analyses (Camanho & Dyson 2006).

In 1953 Sten Malmquist introduced a quantity index in consumption analysis which was later developed (and named) by Caves *et al* (1982) to construct a production frontier representing the technology input indices as distance functions for productivity comparison (Ray 2004; Kirikal 2005; Camanho & Dyson 2006). This was further developed by Fare *et al* (1994) providing an opportunity for DEA models to calculate the distance functions identified and decompose the resulting index into two indices, one representing the change in technical efficiency and another representing the change in the frontier of the production possibility set, or technological change (Camanho & Dyson 2006). The resulting index can also identify change in scale efficiency (Ray 2004).

Using the same data set as in Analysis 1, the four orchestras' activities over five years were input into the DEAP 2.1 program as four DMUs over a five year period. Table 8.6 shows the Summary of the Malmquist Index for Years 2 to 5 depicting the following five indices:

1. Effch – efficiency change (relative to constant returns to scale)
2. Techch – technological change
3. Pech – pure technical change (relative to variable returns to scale)

4. Sech – scale efficiency change
5. Tfpch – total factor productivity change

All indices are calculated relative to the previous year, hence the results presented commence at Year 2. If the index calculated for total factor productivity (TFP) is greater than 1, then there has been a positive growth in TFP, whereas if the figure is less than 1 this indicates a decline in TFP (Coelli *et al* 2005). The results in **Table 8.6** indicate that Orchestra 1 has generally achieved an increase in TFP for the period of observations. In Years 2, 3 and 5 increases ranged from 1.027 to 1.144 with only Year 4 showing a slight decline at 0.977. This indicates that Orchestra 1 increased its total productivity in Years 2 and 3 by 14.4 per cent which is quite significant. A small reduction in productivity occurred in Year 4 at -2.3 per cent but the organisation increased its productivity in Year 5 by 2.7 per cent.

Table 8.6: Malmquist Index Summary

Year	DMU	effch	techch	pech	sech	tfpch
2	1	1.000	1.144	1.000	1.000	1.144
	2	0.928	1.199	0.990	0.938	1.112
	3	0.804	1.092	1.000	0.804	0.878
	4	1.073	1.199	1.000	1.073	1.287
3	1	1.000	1.114	1.000	1.000	1.114
	2	0.916	1.064	0.954	0.960	0.974
	3	0.913	1.149	1.000	0.913	1.049
	4	0.762	1.064	1.000	0.762	0.811
4	1	1.000	0.977	1.000	1.000	0.977
	2	0.935	1.021	0.970	0.964	0.955
	3	1.208	0.992	0.932	1.297	1.198
	4	0.863	1.021	1.000	0.863	0.881
5	1	1.000	1.027	1.000	1.000	1.027
	2	0.974	0.994	0.977	0.997	0.968
	3	0.871	1.027	1.073	0.811	0.894
	4	1.067	0.992	1.000	1.067	1.059

Orchestra 2 showed an increase in TFP in Year 2 (11.2 per cent) but declined in productivity in the following years, -2.6 per cent, -4.5 per cent and -3.2 per cent respectively. The results for Orchestras 3 and 4 are more sporadic and severe, showing increases in one year followed by a decline in other years. The TFP change for Orchestra 3 ranges from a reduction of -12.2 per cent to an increase of 19.8 per cent, while results for Orchestra 4 range from -18.9 per cent to 28.7 per cent. This would indicate a more volatile operating environment for these two

orchestras, with significant fluctuations in productivity as measured by attendances.

In relation to changes in technical efficiency (given constant returns to scale) the results for Orchestra 1 indicate no change in technical efficiency between years, with each index result being 1.000. Orchestra 2 results show a slight but steady decline in technical efficiency with indices varying between 0.916 and 0.974. Orchestras 3 and 4 again show different results between years with some periods depicting increases in efficiency and other years depicting declining efficiency. These results are also mirrored in the scale efficiency changes for each orchestra.

When looking at pure technical efficiency changes (assuming variable returns to scale) the results improve considerably for Orchestras 3 and 4. Orchestras 1, 3 and 4 are all relatively constant under variable returns to scale, while Orchestra 2 depicts a minor but constant decline in efficiency.

Tables 8.7 and 8.8 show the overall means of these results for each year and each DMU respectively. The overall mean for the TFP for each year has remained relatively constant ranging from 0.98 to 1.013 showing relatively little change over the five year period for the orchestras as a whole. This is representative of the relationship between technology (techch) and efficiency (effch) changes over the same years. The results show an increase in the technological change in each year but a decrease in technical efficiency over the same period.

Table 8.7: Malmquist Index Summary of Annual Means

Year	effch	techch	pech	sech	tfpch
2	0.946	1.158	0.997	0.948	1.095
3	0.893	1.097	0.988	0.904	0.980
4	0.994	1.003	0.975	1.019	0.996
5	0.975	1.010	1.012	0.964	0.985
Mean	0.951	1.065	0.993	0.958	1.013

When looking at the overall means for individual orchestras the results are shown in **Table 8.8**.

Table 8.8: Malmquist Index Summary of DMU Means

DMU	effch	techch	pech	sech	tfpch
1	1.000	1.063	1.000	1.000	1.063
2	0.938	1.067	0.973	0.964	1.000
3	0.937	1.063	1.000	0.937	0.997
4	0.932	1.066	1.000	0.932	0.993
Mean	0.951	1.065	0.993	0.958	1.013

Orchestra 1 is the only orchestra to show no change in technical efficiency, all others demonstrate a slight decrease overall in this regard. The results for Orchestras 2, 3 and 4 are very similar with an overall decrease of between 6 per cent and 7 per cent. All orchestras on the other hand, demonstrated a positive move in technological change with means ranging between 6.3 per cent and 6.7 per cent. The resulting TFP showed a slight increase for Orchestra 1, no change for Orchestra 2 and slight decreases for Orchestras 3 and 4.

These results show that when constant returns to scale are assumed Orchestra 1 is the most efficient and most stable in its operations. Orchestra 2 seems slightly inefficient in comparison. Orchestras 3 and 4 fluctuate more widely than the other two, increasing their efficiency levels in some years and decreasing in others. Orchestras 3 and 4 operate in much smaller markets and are smaller in scale than the other two orchestras and this may contribute to the greater fluctuation in results. This notion is supported when considering the pure technical change which is relative to variable returns to scale. In this case Orchestras 3 and 4 are deemed more efficient than in the previous scenario and show mean index results of 1.000 along with Orchestra 1. Orchestra 2 still shows a decline in pure technical efficiency in this case with a mean index value of 0.97.

8.7 Summary and Conclusions

The economic analyses took information supplied by four orchestras for the period of 2000 to 2004. Having estimated a production function, this data allowed the empirical testing of the proposed models. The first analysis allowed the examination of the relationships between labour and production capital encapsulated in a standard Cobb-Douglas production function as it related to the output of attendances. An adaptation of this production function was then

developed and used to predict quality, which formed part of a function along with price to better estimate the production of demanded experiences.

It was expected that the labour component would demonstrate a strong influence on production and this was supported. Results of the first analysis showed that the elasticity with respect to labour was twice that with respect to capital in the production process. However the labour component was subdivided into three separate components of permanent musicians (ensemble), contracted guest artists and conductors and management. The results showed that the ensemble labour was the most important component of the production process. However the estimation also produced some unexpected results, namely that the guest artists' labour did not contribute strongly to output levels at all. Given the importance placed on this aspect of work by the musicians, the implications of this result for management are significant. If increased costs in hiring guest artists cannot be recouped through increased paid attendances then one might question the financial viability of such a decision.

However it was recognised that in the orchestral context the supply of potential seats for sale is fixed by the size of the venue and the number of performances; and the number of paid attendances to a performance actually realised equates to the number of cultural experiences produced. At the same time, decisions around the contracting of specific artistic labour and the choices made in regard to venue and repertoire contributed to the overall quality of the concert performance created. Taking these two points together a function to estimate the production of demanded experiences actually supplied was developed. Results of this second analysis showed that for the orchestras observed, production as measured in paid attendances demanded was positively influenced by the quality level of production and negatively by price. Overall the results suggest that attendance is influenced more by the quality of the performance than the price of a ticket. In this model quality was measured as a function of the type of musicians, guest artists and venue used as well as the concert profile of the programmed season. This implies that to increase audience numbers to concerts for these orchestras it would be better to utilise resources in maintaining and/or increasing the artistic components of the product being created. This is in some way opposite to the

more utilitarian position that orchestras need to reduce costs and undertake more populist programming if they are to develop sustainable operations.

In regard to increased efficiency and productivity it was expected that the DEA results would demonstrate this. However analysis of the relative efficiency of the orchestras reported that when assuming constant returns to scale, only the orchestra in the largest city was considered efficient in its use of labour and production inputs when measured against paid attendances. Those operating less efficiently were operating in the increasing returns to scale area of the frontier. Under the assumption of variable returns to scale, the two smaller orchestras and in particular Orchestra 4 moved closer to the efficiency frontier. In fact under variable returns to scale the largest and smallest orchestras were deemed more efficient compared to Orchestras 2 and 3.

These results suggest that there is possibly an ideal size for an orchestra which is directly related to the size of the market in which it operates. Orchestra 2 for example, while similar in size to Orchestra 1, and operating at a similar performance level, is deemed inefficient in comparison as it is not able to attract as many paid attendances as Orchestra 1. The results of the DEA indicate that Orchestra 2 could reduce inputs by between 7 per cent and 15 per cent and still achieve existing attendance levels. While this may not work in reality it does indicate that management has the ability to adjust where their funds are expended while maintaining or even improving attendance levels. Together these analyses show that attendance levels are influenced by the aspects of quality and price, and therefore indirectly by the investment choices made by management in regard to the ensemble and other artistic variables.

Overall the analyses show that the symphony orchestras studied generally follow the standard economic laws of production. While the results need to be interpreted carefully given the small sample size, they do show generally that there are increasing returns to scale for the orchestras and a strong reliance on musician labour and production capital investment in the production of musical performances for the paying audience. The results also indicate that since corporatisation there has been mixed results in regard to the orchestras' abilities to increase productivity and efficiency.

CHAPTER 9

SYNTHESIS AND IMPLICATIONS OF FINDINGS

9.1 Introduction

The principal focus of this thesis is on the evaluation of the change in organisation and ownership of the Australian orchestras that occurred during the 1990s. The case reported in the previous three chapters was aimed at assessing various aspects of the orchestras' structure and operations in empirical terms, based on general data for all six orchestras and specific data and the results of a survey of musicians in four of them. The question that is then raised is – what are the implications of these results? This chapter will take the results of the three analyses and evaluate the change in ownership in light of the theoretical discussion earlier. The thesis will then look to compare the results of the analyses against the hypotheses proposed. Finally, the chapter will develop an understanding of the nature of symphony orchestra operations in Australia and the potential for developing sustainable models for the future.

9.2 Evaluating the change in structure in light of the empirical analyses

In Chapters 4 and 5 a number of key factors were extracted from the literature to help define the operations of symphony orchestras. These factors were then incorporated into a model of activity which was discussed theoretically to assess how they might each be influenced under different ownership options. Prior to corporatisation all orchestras conformed to the institutional model, but this leads

to the question: has the change to a nonprofit corporate subsidiary model achieved the expected results? To answer this question the following section looks at the key characteristics identified to assess how they have changed post-corporatisation. The different components in the model depicted in **Figures 5.2** and **5.3** have been extracted and the results of the analyses prior to and since corporatisation are shown in **Table 9.1** below.

Table 9.1 Results of analyses in relation to components of theoretical model of orchestral activity pre-corporatisation and post-corporatisation

Category	Component	Observations pre-corporatisation	Observations post-corporatisation
Constraints	Ownership	Owned and operated by ABC	Owned by ABC but operated as separate corporate entities allowing more autonomy for management to make decisions
	Financial	Significant Federal government subsidy Little State government subsidy Little sponsorship or commercial fees	Overall government funding increased from both State and Federal sources Sponsorship, commercial fees and donations were evident
	Orchestra capabilities	Little differentiation between orchestras except size	Musicians perceived their orchestra as having unique capabilities that set it apart
	Market size	Market size not an issue as all orchestras viewed collectively	Size of market had significant influence on demand and efficiency at individual orchestra level
Decision Variables	No of activities	Activity levels decreased during 1980s but increased during 1990s	Activity level increased and many musicians feel now they are 'too busy'
	Type of activities	Mix of activities based around broadcasting and live performance	Greater variation between orchestras. More emphasis on live performances
Inputs	Labour	Significant labour costs Some inefficient use of ensemble labour in studio recording work Guest artists contracted to perform with more than one orchestra creating efficiencies	Labour costs increased Musician labour most important in production function Reduction in studio recording work apparent Guest artist labour not significantly related to demand
	Production Capital	Use of venues for live performance was moderate as rehearsal and recording work done in studios	Production costs increased More marketing and performances being undertaken Technical costs important in production of quality performances

	Repertoire	Repertoire chosen to fulfil broadcasting needs as well as local markets and guest artists' choices	Repertoire changed but not necessarily improved, financial imperatives over artistic seen as important
	Guest artists	Often contracted to perform with a number of the orchestras. Apparent economies of scale with the national network	Mixed, with larger orchestras more able to attract higher quality artists and conductors. Choice of artists did not impact on attendances
Process	Rehearsal	Adequate rehearsal time, although some orchestras spent considerable time undertaking studio recording work	Some reduction in rehearsal time, reducing ability to 'properly prepare', most evident in smaller orchestras
Outputs	Performances	Number of performances decreased during 1980s but began to increase during 1990s	Number of performances increased
	Attendances	Attendances declined in line with performance levels	Number of paid attendances increased, although average attendance per performance remained constant. Attendances influenced by quality – musician labour and production values
Outcomes	Achieve objectives	Community stakeholders and musicians did not feel artistic objectives were being met. Lack of links with local communities through limited performance opportunities	Some success in achieving objectives, revenue generation more successful than audience development. High level of artistic success as perceived by musicians
	Revenue	Revenue low	Earned revenue higher and continuing to grow
	Image	Image of orchestras within local communities perceived to be low	Image mixed, important to have high reputation, musicians did not all necessarily feel that community valued them
Identity	Professional	Unknown	High
	Organisational	Unknown	Not high, orchestras seen generally as vehicles to undertake profession, highest in smallest orchestra
Quality	Musician perception	Unknown	Perceived emphasis on financial viability over artistic importance. Perceived lower calibre of artists engaged for smaller orchestras. Generally though musicians felt they had achieved artistic success.
	Repertoire	Significant Australian works recorded and performed	Apparent reduction in Australian works and reliance on standard classical repertoire

It can be seen from this table that the move from institutional to nonprofit structure has been relatively successful for the orchestras with a number of areas now showing strong nonprofit characteristics. As was expected, the change in corporate status of the orchestras has affected the constraints within which they operate. In particular it was expected that by choosing the corporatised model the orchestras would be able to retain Federal funding while at the same time stimulate an increase in State commitment. This outcome has been successfully achieved. Evidence of the key performance indicators has shown that while maintaining their level of funding from the Federal government, the orchestras have also secured substantial funding from State and local governments, effectively increasing the total subsidy provided from these sources in real terms. At the same time, income generated from other sources such as sponsorship has also increased in real terms.

Another expectation of choosing the corporatised subsidiary model was that by retaining ABC ownership the orchestras would also retain the existing national network support system. However, some commentators (Waks 1998 for example) warned that separating the orchestras may be detrimental to smaller orchestras as they could lose this protection. Results of the production analysis and efficiency analysis have indicated that the orchestras are now more open to market forces and the size of the market is a critical factor in the financial outcomes produced. As each orchestra is now responsible for their own income and expenditure, those in the smaller markets have suffered severe financial stress since corporatisation (DCITA 2005).

Moving to the autonomous nonprofit model of operation has allowed the management of each orchestra to make individual choices in regard to the various decision variables and operational variables for their orchestra. It is assumed that these changes were designed to achieve a variety of outcomes as identified in **Table 9.1**. The following section will address the main areas of orchestral activity and the decision variables inherent in these, with regard to the outcomes expected. Overall, it was expected that the change from the Federal institution model to the corporatised nonprofit subsidiary model would result in improvements in the following areas, each of which will be discussed in turn in light of the empirical analyses undertaken:

- fundraising and revenue generation;
- working conditions for musicians;
- image with the community;
- repertoire choices
- live performances and attendances;
- artistic quality – guest artists and conductors;
- balance of rehearsal and performance activity; and
- efficiency.

The results of the analyses indicate that the change process has been most successful in stimulating the fundraising and revenue generation efforts of the orchestras. The ability to secure and sustain a strong mix of funding from various sources, including government and the private sector, is an important indicator of the nonprofit model. In particular the ability to earn revenue has increased significantly since corporatisation. Earned revenue has increased by almost 25 per cent immediately post-corporatisation and effectively doubled between 1979 and 2002. This was a key objective of the corporatisation process and the evidence presented here indicates the success of the change in this regard.

One of the features of the nonprofit model is that it attracts professional members who focus on technical benefits rather than pecuniary benefits. It was expected that changing to a nonprofit model would see an increase in the importance of the musicians become evident. The results of the labour input in the econometric analysis highlight the importance of the ensemble and the labour of the musicians in orchestral activities. In the case of an orchestra, the musicians are the key component of operations and their professionalism and focus on technical ability is evident from the survey analysis. It was also found that the professional identity of the musicians surveyed is very high and this understanding strongly influenced their perceptions of what is important for an orchestra to produce. Important activities as perceived by the musicians included artistic development activities and connecting strongly with their audiences. These observations again demonstrate characteristics of the nonprofit model well. However not all musicians perceived that the working conditions had improved. The results show that the smaller orchestras in particular have suffered in regard to a perceived lowering of working conditions. For example the musicians in the smaller

orchestras felt they were too busy to properly prepare, that working conditions had not improved and that generally morale was lower, than with musicians in the larger orchestras.

The notion of image as perceived by the musicians of the orchestras also demonstrates characteristics of the nonprofit model. It was expected that by creating independent entities the orchestras would be better positioned to develop and strengthen this image. There was indication from results of the survey that the musicians felt it was important to have a good reputation within the community and that generally they felt their image was portrayed in a positive way. However, there was some level of dissatisfaction with some members feeling their orchestra was undervalued in the community. This highlights the importance for nonprofit organisations to maintain a positive image with the community, and how a mismatch between identity and image can be a source of tension between different groups of the overall organisational membership. As nonprofit organisations are reliant on many external stakeholders for funding and other support, those orchestras that are not as highly valued may find securing such support more difficult in the future.

In changing to the nonprofit model it was expected that a focus on repertoire of high artistic merit would become evident and that the more commercially oriented performances would be limited. In this context it was assumed that commercial activities would undertaken only to provide financial resources that are then utilised in ways to better service those objectives of a more altruistic nature. In the context of a performing arts organisation, it is expected that this would manifest itself in the entity undertaking more popular performances to attract a larger proportion of the population, which would in turn produce greater box-office returns. If the organisation then reinvested this return in performing other more artistically significant works at other times, this would be in line with the nonprofit model.

However the results of the musicians' survey do not totally support the idea that in fact this investment in programming better artistic works has occurred. In this regard the musicians reported that repertoire choice had changed since corporatisation, but there was less agreement as to whether it had improved. When

looking at the choice of repertoire being performed there is evidence of a steady move away from more artistically adventurous programming towards what might be considered the standard symphonic repertoire. This supports the musicians' agreement that commercial imperatives are becoming more important when making artistic decisions around repertoire choice.

Another major area of consideration is that of live performance levels. One of the proposed outcomes of the corporatisation process was to increase live performances and develop better marketing practices. This should then result in increased attendance levels at live performances. One indicator of performance levels encapsulates expenditure on venue hire, technical production and the marketing of performances. The results have shown that these production costs have increased in real terms over time and are strongly related to the level of attendances being achieved, which are in line with the expected move to a greater focus on live performance post-corporatisation.

However, the analyses undertaken indicated that the effect of changing the organisational structure on the orchestras' ability to become more productive in regard to concerts and audience figures has been limited. Generally the results show that audience figures in relation to the numbers of performances have remained relatively static at best. With some degree of fluctuation there have been periods of great decline followed by periods of less enthusiastic growth. The end result shows that the average attendance levels at performances were actually at their highest under the original separate department model, pre-1985. This indicates that the changes in organisational structure have had little impact on the orchestras' ability to attract and keep additional audience members.

It was expected that through giving autonomy to each orchestra they would be able to contract guest artists and conductors of their own choosing, resulting in improved artistic quality. In support of this notion, the musicians indicated that working with excellent conductors was the most important activity for an orchestra to undertake. Results of the analysis however were mixed as there was a distinct difference between the perceptions of musicians in the smaller orchestras as opposed to those in the larger orchestras. Those in the smaller orchestras

indicated that the quality of guest artists and conductors had not improved since corporatisation.

Interestingly results of the econometric analysis indicated that increasing expenditure on guest artists and conductors would not be returned through sufficient increases in paid attendances. Perhaps audiences are more motivated to attend concerts based on the reputation of the orchestra or their allegiance to them, rather than the opportunity to hear and see a particular artist or conductor. Many orchestras rely strongly on subscription purchasers who buy their tickets in a package and these attenders may not be overly influenced by the choice of artists used for individual concerts. These points suggest that unless higher prices can be charged for tickets to concerts featuring guest artists and conductors who command higher fees, there is no financial incentive to contract those that are more expensive. However if one assumes that the fee charged by such artists is commensurate with their level of quality, this result is in direct contrast to the musicians' desire to perform with the best conductors and artists available.

The ability for the corporate nonprofit model to afford some balance between adequate rehearsal time and increased performance opportunities does not seem to have been effective in practice. This is particularly evident in the smaller orchestras as the musicians in these orchestras believed they had become too busy to properly prepare for some performances. In this scenario, with only a finite number of calls available, it would appear that fewer calls are being scheduled for rehearsal, presumably because more are being used for activities that directly result in financial returns.

Finally, there is also little evidence to support the notion that corporatisation would increase efficiency or productivity. When measured in relation to attendances, there is limited evidence of the orchestras being able to achieve relatively efficient levels of activity. The results of efficiency analysis have shown that when constant returns to scale are assumed only the orchestra in the largest market is deemed efficient and stable in its operations. The other orchestras are inefficient in comparison. Even when assuming variable returns to scale while the smaller orchestras are deemed reasonably efficient, their productivity levels fluctuated more wildly from year to year than the orchestra in the largest market.

This would suggest that the size of the market and the relative size of the orchestra may have a more significant effect on efficiency and productivity than the organisational structure alone.

9.3 Testing of the Hypotheses

Taking the above observations into account the following section will address the specific hypotheses proposed earlier. In Chapter Five, seven hypotheses were proposed in relation to the organisational changes and their impact on various aspects of symphony orchestra activity. Based on the results of the analyses undertaken, the following sections will discuss each of the hypotheses in turn.

H1: change in organisational structure will have a positive impact on the orchestras' ability to achieve artistic objectives

- This hypothesis is supported for larger orchestras
- This hypothesis is not supported for smaller orchestras

The results of the musicians' survey indicated those in the two larger orchestras felt more confident that corporatisation has been a positive change. Over 70 per cent of musicians surveyed in these two orchestras agreed that they were better off since corporatisation, while no respondent disagreed. On the other hand, between 67 per cent and 87 per cent of respondents from the two smaller orchestras stated they believed they were worse off since corporatisation. This feeling was underpinned by the same orchestras responding more negatively to questions such as whether the orchestra was in a better position to pursue artistic goals and whether guest artists and conductors being contracted were of a high quality. The responses indicated that the musicians in the two smaller orchestras believed they had been less able to achieve appropriate artistic outcomes than musicians in the larger orchestras, post corporatisation.

This result may not necessarily be a result of the size of the orchestras, but more related to the market place in which they operate and the income they derive. There is no doubt that the two larger orchestras have significantly larger budgets than the smaller orchestras and enjoy much larger audience levels. These facts contribute to the financial viability of the larger orchestras and their ability to

invest significantly more resources in their artistic activities than the other orchestras.

H2: change in organisational structure will have a positive impact on the level of income generated from sources other than government subsidy

- This hypothesis is supported.

The results of the analyses have shown that in real terms income earned from sources other than government subsidy has increased significantly since corporatisation. Earned income as a proportion of total income increased at each structural phase from 29 per cent during Phase 1 to 39 per cent in Phase 3. In addition, the average earned revenue per attendance increased by 55 per cent between Phases 1 and 3.

H3: classical musicians will identify strongly with their profession

- This hypothesis is supported.

Evidence from the musician survey clearly supports the concept that musicians have a very high sense of professional identity and that they see the orchestra as a vehicle for them to undertake their professional activities. This is supported by the fact that they rank those activities that build on this notion of professionalism as most important for the orchestra to undertake. The econometric analysis of the production/demand functions also demonstrated that the musician labour was a significant component in the production of musical performances and the 'cultural experience' of those that attend. Results showed that investment in musician labour would increase quality of performances significantly and that this increase in quality would positively influence attendance levels.

H4: change in organisational structure will have a positive impact on the individual identities of the orchestras

- This hypothesis is partly supported.

Evidence from the musician survey supports the notion that each orchestra has developed an individual identity. The majority of musicians felt that the identity they held of their orchestra was understood amongst other musicians, although

this was less supported in regard to how they believed management perceived the organisation's identity. Interestingly though, while the musicians felt their orchestra had a unique identity, their descriptions of what made them unique and distinctive did not differ significantly between orchestras. This may indicate that the way classical musicians define their orchestra is very similar regardless of which orchestra they perform with. Notions of technical ability, professionalism, approach to playing, and the relationships between players all scored highly across each orchestra. These ideas link very strongly to the understanding of what it means to be a professional musician, which supports the existence of a link between organisational and professional identity.

H5: change in organisational structure will have a positive impact on the image portrayed to the community

- This hypothesis is partly supported.

To undertake a proper test of this hypothesis would require the surveying of the communities in which these orchestras operate. As this is beyond the scope of this thesis a proxy for community image was taken to be how the musicians within the orchestras perceive that image. The majority of musicians surveyed agreed that there was a strong image being portrayed in the community with a mean score of 3.31 (out of 5) to questions relating to image. However the mean scores for questions relating to how they were valued by the community were significantly lower for two orchestras. In particular two orchestras responded significantly less positively towards the statements *'The people of this State value the music we perform.'* and *'I am happy with the image of the orchestra that is portrayed to the wider community'*. While there seems to be agreement that the community is strongly aware of the orchestras, there is a difference between how the individual orchestras perceive the value placed upon them by their own community.

H6: change in organisational structure will have a positive impact on the productivity of orchestras in relation to audience attendances and concert performances

- This hypothesis is not supported.

Evidence from the analysis of key performance indicators over time showed that there seems to be a finite level of performance activity that can be undertaken by the orchestras as a whole. Average attendances, in real terms as well as a percentage of the population, were at their highest under the separate departmental model of pre-1985. By merely changing the structure under which the orchestras operate, the ABC has not been able to stimulate increases in productivity as measured by paid attendances.

Results of the DEA analysis suggest that if constant returns to scale are assumed then only the orchestra in the largest market is deemed efficient, with all other orchestras being seen as relatively inefficient. However, as noted previously there are substantial differences in the size of operations between the orchestras and it is more appropriate to assume variable returns to scale. Under this assumption the two smaller orchestras (and in particular the smallest) also became relatively efficient. Also, when looking at productivity changes over time, the largest orchestra demonstrated a relatively consistent increase in productivity from year to year. Orchestra 2 displayed gradual reductions in productivity over time, while Orchestras 3 and 4 showed great variation between years, with increases in one year followed by decreases in another. These results do not show a clear link between organisational structure and productivity in the case of the ABC orchestras.

H7: change in organisational structure will allow the orchestras to develop financially and artistically sustainable structures

- This hypothesis is supported for larger orchestras
- This hypothesis is not supported for smaller orchestras

The musicians in the two larger orchestras generally agreed that they were now better off since corporatisation with between 70 per cent and 74 per cent answering “better off” to the question *“In your opinion is this orchestra now better off, worse off or the same since it separated from the ABC?”* However the reverse was true for those in the smaller orchestras with only 23 per cent and 9 per cent of musicians agreeing that they were better off. This sentiment is supported by other results in the analysis such as musicians in the smaller orchestras feeling greater pressure to perform more often; guest artists and conductors being of a

lower standard; and financial goals replacing artistic ones in the decision-making process.

When looking at the production/demand functions there is a direct link between the size of the orchestra and its ability to attract paid audience members. Even when the dummy variable is added to take into account the variation in market size, the size of the orchestra is a strong predictor of attendance. This shows that the larger orchestras, in larger markets, are more able to attract audiences and therefore better position themselves artistically and financially.

9.4 Further Effects of the Corporatisation of the ABC Orchestras: Trends and Challenges

The following section discusses a number of observations made about the changes in the overall operating environment of the Australian symphony orchestras over the last twenty-five years. In particular the type of work being undertaken by the orchestras has changed significantly over time, costs have continued to rise and the opportunities for the orchestras to earn additional revenue have increased. However there is also evidence that those orchestras resident in smaller cities such as Adelaide and Hobart have not been as successful at creating financially secure organisations as those in larger cities such as Sydney and Melbourne, which may impact on the future sustainability of the sector.

9.4.1 There is a Constant Level of Activity but the Type is Changing

The activity levels of the orchestras observed have remained relatively constant over time but the composition of these activities has changed considerably. In the early period of their existence the orchestras undertook a mixture of public performance and broadcasting, whereas now they undertake primarily live concert activities. However, since the change in structure, there hasn't been the significant rise in actual concert performances, which one might have expected. It is possible that the time that was previously used for studio recording work has now been replaced not with self-promoted concerts but other activities such as commercial work or accompanying other theatrical performances such as the ballet and opera.

As noted earlier, professional symphony orchestra production in Australia has been relatively stable over time with no new entrants into the industry and no real technological innovations. Nor has the transformation process changed, with musicians still generally spending a series of orchestral calls working with conductors and artists in rehearsal, followed by a limited number of public performances of the works. In addition, each orchestra predominantly performs in its own physical location, limiting its market and making it reliant on the location's relevant performance venues to deliver its product. As it is not often that cities build new concert halls the venue size is a relatively fixed factor in the production process. When combined, these factors appear to limit the level of production activity and therefore act as constraints on any real productivity increases.

9.4.2 Financial Aspects – Costs, Revenue and Government Funding are Increasing

There is no doubt that the cost of producing symphony orchestra performances is increasing. In real terms, the cost of producing a concert experience for an audience member has increased by 65 per cent between 1979 and 2002. Over the same period of time government contribution per seat sold has increased 41 per cent and the earned revenue per seat sold has more than doubled (115 per cent).

Government subsidy continues to rise but at a slower rate than costs, so more pressure is being placed on the orchestras to increase earned revenue at greater rates to cover the gap. However, there are implications for increasing revenue without increasing audience numbers as it has been shown that raising ticket prices may have a negative impact on attendances. If this occurs then the cost of a ticket will have to increase at even greater rates, which is not sustainable. Alternatives to continually raising ticket prices are to reduce costs or revert back to a greater reliance on government funding.

The *Strong Report* (DCITA, 2005) recommended the first option in part due to the terms of reference which imposed the restriction not to support the second option. The main fixed cost in an orchestra's operations is the salary cost of the permanent musical ensemble. The report recommended replacing some of the permanent ensemble membership with casual employees. This would shift some

of the labour cost from a fixed cost to a variable one and would allow the orchestras to employ additional musicians only as required for particular performances. This was seen as a satisfactory solution to better managing this expense while still maintaining the flexibility of being able to program a broad range of repertoire. However, the results reported in the present thesis suggest that the size and strength of an ensemble is directly related to quality and its ability to attract paying audience members. There is no indication in the *Strong Report* as to how the impact of reducing the permanent ensemble and relying more on casual musicians would affect an orchestra's performance quality and therefore its ability to attract audiences in the future.

Whilst the recommendation to reduce numbers of fulltime musicians was not implemented, the question still remains as to how these orchestras will be able to continue operations at their current levels without the continued growth in government subsidy. If costs continue to rise at their current rates and audiences do not grow in parallel to this, the looming financial crises would seem, at best, to have only been postponed.

9.4.3 Overall the Smaller Orchestras are More Susceptible than Larger Ones

A number of earlier reports suggested that the smaller orchestras (the BAPH State orchestras) were potentially more likely to suffer if removed from the relatively stable environment of the ABC. Results of our analysis suggest that the musicians certainly believe that this has been the case. Musicians in the two smaller orchestras surveyed reported lower levels of satisfaction with structural issues such as working conditions, morale and inclusion in decision-making processes. In addition they did not feel that separation from the ABC had been a positive influence on the orchestras' positions. In relation to artistic issues, again the musicians in the smaller orchestras reported lower levels of satisfaction with the quality of conductors and artists engaged and in particular did not feel that corporatisation had improved their ability to pursue their artistic goals.

Findings of the Econometric and Data Envelopment Analysis showed that the smaller orchestras are not as well placed to increase productivity (in regard to increasing the level of paid audience members at their concerts), given the lower levels of investment in musicians and ensemble size, and the smaller markets in

which they operate. In fact only one orchestra was able to achieve consistent increases in productivity.

Taking these two perspectives together it would seem that the smaller orchestras are struggling to operate both effectively and efficiently in the current environment. These findings are in line with those of the *Strong Report* (DCITA, 2005), which showed that the orchestras in the BAPH States would be in severe financial trouble in the next few years, if significant changes to funding or working arrangements were not implemented.

9.4.4 Creating Sustainable Structures

The key points for management that have been identified in this thesis relate to the role of the musicians in the production of music, their feelings about what is important, and how to involve the musicians in creating efficient production models. Orchestras operate in a context of stagnant technological development as historically there has been little technological advancement in classical music production and there is no indication of this changing in the short term. The performance of a musical work requires exact instrumentation as instructed in the musical score, and this does not change over time.

However the choices in repertoire made by individual orchestras may have some impact on the production process to some extent. By choosing well-known works orchestras may be able to reduce the rehearsal time allocated, and by choosing a broader range of music to perform they may increase the breadth of market appeal. However, the traditional repertoire of a symphony orchestra is reasonably set and agreed upon by both the orchestras themselves, music experts such as critics, and the general public. While some orchestras have broadened their repertoire to include concerts of popular music, rock band musicians, musicals and film scores, the core product of a symphony orchestra is likely to remain the performance of music by composers recognised as making up the classical symphonic music genre. If this is not maintained then the orchestras run the risk of no longer being able to achieve their mission of performing and developing this particular art form.

With these assumptions in place, the only options open to orchestral management in their search for developing sustainable models of operations would be to either increase revenue or decrease the cost base. Each of these options will be looked at in turn.

Increase Earned Revenue

The avenues open to an orchestra to increase revenue from sources other than government include both earned and unearned. Unearned sources include philanthropy such as donations, bequests and sponsorship. Earned revenue can be gained through the box-office and by undertaking commercial work.

Historically, there has not been a tradition in Australia of philanthropy in the performing arts sector, but the support for philanthropic giving is growing. Donations and bequests to performing arts organisations in Australia have grown with private donations for the orchestral sector increasing from \$1.75 million in 2001 to \$2.52 million in 2003 (DCITA 2005, p. 20). Revenue from the box-office has increased slightly over the same period of time from \$18.5 million in 2001 to \$20.7 million (DCITA 2005, p. 20), representing a 16.3 per cent increase over this time. The raising of ticket prices has provided some relief to the financial burden faced by the orchestras, but this may not be a sustainable solution. While not statistically significant, the price variable in the demand model did indicate a negative relationship with demand.

Commercial work has also become an important component of the revenue mix for the Australian orchestras. Fees from undertaking commercial work grew from A\$2.34 million in 2001 to A\$3.46 million in 2003 (DCITA 2005, p. 20). This represents a growth of almost 48 per cent over the three year period. Whether this rate of increase can be maintained is uncertain but it does indicate that undertaking commercial work does offer orchestras an opportunity to increase revenue generation at a greater rate than might be achieved through traditional concert performances.

However, a greater focus on undertaking commercial work may negatively impact on an individual orchestra's ability to maintain existing levels of more traditional concert performances. A reduction in main stage concert performances by an

orchestra will negatively influence its ability to achieve its artistic mission and further move it into a commercial model of operation rather than the nonprofit structure envisaged. In addition, further changes in the type of work undertaken by the orchestras may have a negative effect on the professional identity of the musicians, creating tension between different groups in the organisational membership. Together these points will add further stress to the artistic viability of the ensembles.

Decrease Costs

The main costs for orchestral production fall into the areas of labour and production. Production costs have risen over the three years from 2001 to 2003 by around 18 per cent (DCITA 2005, p. 37). These costs incorporate venue hire, technological production and marketing, and as such are directly linked to the number of performances undertaken. As venues are hired from third parties and orchestras require these to undertake their performances, there seems little room to reduce these costs without reducing the number of performances undertaken and potentially the size of the paying audiences.

Labour costs accounted for almost 72 per cent of the total expenditure by the orchestras in 2003 (DCITA 2005, p. 37). Figures presented in the *Strong Report* indicate that the cost of musicians in the ensembles amounted to almost 51 per cent of total costs (DCITA 2005, p. 37) and it would seem that the greatest scope for efficiency gains may be found in this area. However, results of the production analysis indicate that the size of the ensemble is a significant contributor to the level of quality, which in turn influences attendances. The results of this analysis indicate that a reduction in the size of the ensembles will impact negatively on attendance levels.

Another area that may provide some savings in costs while maintaining output levels is in contracting guest artists and conductors. However, the value placed on the quality of guest artists and conductors by the musicians also needs to be taken into account. Good conductors are vital to maintaining and developing artistic standards of orchestras and both these factors rated as the most important from the perspective of the musicians. While cost efficiencies can be gained from reducing expenditure on conductors, the negative impact of this decision on artistic quality

and musician morale could be significant. Ultimately this may also affect the artistic reputation of the orchestra which will also impact on the musicians and the work they undertake. Artistic reputation is built on the perceived standards and quality of the ensemble, and the conductors and artists that they can attract to perform with. Management needs to balance the desires of the musicians to perform at the highest levels artistically with the financial restraints of being able to afford suitable conductors.

A final area for further investigation in regard to costs is in the employment arrangement of the ensemble itself. It has been shown that the size of the ensemble is a key factor in enhancing both quality and attendance levels but that this comes at a significant cost to the organisations. In Australia the majority of musicians are employed on a full-time fifty-two week basis. An alternative model, used by many orchestras internationally, employs the full ensemble on a seasonal basis, as opposed to full-time. This model sees all musicians employed for a set number of weeks per year, spanning the performance season. For example, the ensemble may be employed for thirty weeks of the year and all rehearsals and performances for the year are scheduled during this period. This model is similar to that used by theatre companies and some opera companies where performers are employed on contract for specific seasons. This allows the organisation to structure its season in response to the market place and resource availability. In this way management can schedule a mixed program and contract all artists as required.

The full-time status of the ABC symphony orchestras has ensured that the ensemble has sufficient time together to develop a cohesive and distinctive sound. This has allowed the musicians to develop the required level of understanding between players and sections, and enhances the quality of the performance experience. However, this outcome could also be achieved by contracting the musicians on a seasonal basis across many months, allowing the time to rehearse together while also allowing the organisation to hire sufficient musicians to maintain an ensemble of full strength.

This option raises a new question as to whether the labour market of professional musicians in Australia would be able to adapt to these new arrangements. Since

their creation in the late 1940s the orchestras in Australia have maintained full-time ensembles, so a move to a more contractual arrangement of employment would be a major shift in the labour market. It may be that future orchestras would not be able to have access to sufficient musicians of a required standard in such a marketplace given the lack of employment opportunities available outside the symphony orchestras. Whether musicians would be able to sustain their standards and be available for seasonal employment is questionable and as yet untried in this country. These issues would require further exploration to see if in fact this would be a viable option for the orchestras in the future.

CHAPTER 10

SUMMARY AND CONCLUSION

10.1 Conclusions

The corporatisation process undertaken by the ABC orchestras was designed to increase the abilities for the orchestras to achieve artistic excellence as well as allow them to diversify their funding bases. Results show that, in the case of financial arrangements, the process has been moderately successful. Post-corporatisation the orchestras have been able to secure significant funding from both State and Federal governments, while at the same time increasing their earned revenue levels. In addition they have been successful in developing stronger links with their own communities and achieving varies levels of artistic success.

However in regard to other aspects, in particular increasing attendances and maintaining high artistic levels, the results are not so clear. In particular, the orchestras of the smaller States have had greater difficulty in maintaining their levels of operation under the new structure. Those in the smaller States have been less successful at developing sufficient additional revenue through box-office and sponsorship as well as being able to attract artists and conductors of sufficient standard, as perceived by the musicians in the ensembles. On the other hand the larger orchestras, which reside in the largest metropolitan cities in the country, have been more successful at developing a sustainable level of operations. These orchestras also display the highest level of agreement that they are now better off since corporatisation than they were when part of the ABC network.

Sustaining growth in the revenue sources identified in this study will be important for the future of all orchestras. While commercial work offers an important source of revenue growth, this will need to be balanced with the need to continue fulfilling the artistic mission. While box-office revenue has also shown signs of growth, the actual audience figures have not consistently increased proportionately. This shows that existing audience members are paying increasingly higher prices for their tickets and if this continues it may begin to have a negative effect on demand. Marketing tactics employed by the orchestras over time may have had some influence in maintaining audience levels despite the increase in prices. The introduction of subscription packages, for example, has been a successful tool to encourage ticket buyers to commit to a season of performances rather than individual concerts. Other ticket pricing tactics such as charging premium prices for one-off events with star artists also has the ability to raise revenue without alienating the average concert goer. However without the ability to increase the overall number of paid attendances, the increases in box-office returns will not be sustainable in the long term.

The cost of operating the orchestras has continued to rise, and the employment of musicians in the ensemble is the single greatest cost for the orchestras. Given their permanent employment status, it is not possible to adjust this cost in the short term. The impact of possible changes to work practices and employment arrangements are unknown; possible negative outcomes include a reduction in artistic standards, less ability to attract top conductors and artists to work with the orchestra, lowering of musician morale, and affecting the professional identity of the musicians. These factors would impact on the performance standards achieved and in turn the revenue able to be earned through the box-office.

Ultimately however, the orchestras, particularly those in smaller markets, may need to consider these issues if their reliance on government funding is to be addressed and they wish to achieve more independent and sustainable structures in the future.

10.2 Further Research

The changing landscape for the professional symphony orchestras in Australia has provided a unique situation offering important insights into the production operations of these ensembles. While it is unlikely that the exact scenario will be replicated in other locations or art forms, there is further potential for extending this research in the future.

In particular, it has been noted that the production analysis presented here has relied on a relatively small sample size of observations. It would be useful to extend this analysis and apply the estimated demand/production functions and DEA to a larger sample set. This would allow comparison with the results gained here to see if there indeed are generalisations that can be made about orchestral production in the current environment. This would probably require utilisation of data sourced from other locations with a greater number of individual ensembles than is available in Australia, perhaps opening up the analysis for international comparison as well.

In this light, the musician survey can also be applied to other orchestras in other countries. An international comparison between value sets of musicians in Australia versus the USA, UK or Europe for example, would further enrich the understanding and knowledge we have of these workers and the work they do. Many musicians travel and undertake work across the world and so comparing orchestras in different countries would be useful. Do the values of musicians transfer between countries and orchestras? How do they adapt to differences in perceived value and importance placed on the various aspects of their work in these different settings? These questions would certainly prove to be a useful area of research in the future.

The notion of artistic values as intrinsic components of an artist's work is not the sole property of classical musicians of course. Nevertheless one factor that does set these musicians apart from many others is their employment status. Very few artists in Australia are employed on a full-time basis and therefore may not have the strong links to the one organisation as these musicians display. Exploring the link between individual professional identity and organisational identity across

different art forms with different employment practices would be of great interest. Do those artists who generally work alone (for example visual artists) have a different concept of professional identity from those that work in collaboration with others (for example musicians or dancers)? Do those that have some permanent employment in an organisation feel differently from those that only work on project based contracts and move regularly from one organisation to another?

Most arts organisations are structured as nonprofit entities and as such, have a myriad of stakeholders whose needs and interests need to be considered by management. No stakeholder group is more significant than the artists that are employed within them. The labour intensive nature of the arts means that the role of the artist is paramount in the production and presentation of artistic goods. Understanding the relationship between an artist's own professional identity and that of the organisation employing their services is important for managers of arts organisations and further extension of this study could help illuminate this area of organisational life.

Ultimately though, financial imperatives will dictate the success or otherwise of being able to create sustainable arts organisations and any research that can contribute to the understanding of arts production and the role of artists within that is of great importance.