

# Brand Equity in the Australian domestic beef market<sup>1</sup>

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## Abstract

Branding remains in a fairly nascent state within the Australian domestic beef market. Several brands have begun to emerge in recent years including Certified Angus, 1824, Hereford Prime, Stockyard Beef and Diamantina. However, these primarily cater for restaurant rather than household trade. This contrasts with other countries, such as the US, where branded beef makes up a large proportion of the domestic market. Using random parameter logit models we examine the willingness of consumers to pay for one type of branded beef, as well specific beef attributes, in a regional area of NSW. We find that there is evidence that segments of the population would be willing to pay for branded beef. The value of the brand is related to several sociodemographic characteristics, as well as attitudinal variables.

## 1. Introduction

Beef has traditionally been marketed as a commodity. However, there are advantages to suppliers from attempting to differentiate their products through branding. As Aaker (1991, p.8) noted, brand associations “reduce the primacy of price upon the purchase decision”, potentially allowing higher prices to be charged and larger profit achieved. In recent years, several firms – such as 1824, Certified Angus, Hereford Prime, Diamantina and Stockyard – have begun to sell branded beef in the Australian market, primarily for restaurant trade. For instance, the 1824 brand was launched in August 2002 (AACO, 2003). Nonetheless, beef branding is in its infancy in the Australian domestic beef market. The branded beef segment presently represents a small percentage of beef sold within the Australian domestic market. Cawood (2003) indicated that the market presently only accounts for 5% of the Australian domestic beef market.

There has been little research about the potential value of brand equity in this market, and the factors that contribute to brand equity. This contrasts with research conducted overseas regarding consumer preferences for branded beef and beef attributes (Lusk and Fox, 2001). This research indicates that there is potentially a substantial market for differentiated beef. Similar research in Australia would be expected to be of value for understanding consumers’ willingness to pay for specific beef attributes (which may be culturally specific), potential market segments for target marketing, and consumers’ additional willingness to pay for differentiated beef.

This paper presents empirical evidence about the value of brand equity, and the factors that influence it in the Australian domestic beef market. Before going on, it is worth clarifying the meaning of brand equity as it is a multifaceted concept. Broadly,

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<sup>1</sup> Paper presented at the Australian Agricultural and Resource Economics Society Conference, Melbourne, 11-13 February, 2004.

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brand equity can be defined as “the added value with which a given brand endows a product” (Farquhar, 1990, p.RC-7). This value is evident in consumers’ choices. Yoo Donthu and Lee (2000) noted that brand equity is manifested in the difference in choice between identical products in terms of features, that differ only in brand name. In some respects, brand equity can be considered to be an intangible. As Biel (1992, p.RC-7) suggested, brand equity is the value “beyond the physical assets associated with its manufacture or provision”. This value is therefore based on consumer perception as opposed to an objective measure.

We aim to test five hypotheses in this paper. The first focuses on whether there is a potential market for differentiated beef in Australia:

***Hypothesis 1: A market segment exists that will pay a premium for branded beef***

We have also attempted to extend knowledge regarding the sources of brand equity pertaining to commodities (Faricloth, Capella and Alford 2001). Three main constructs have been identified as influencing brand equity for non-commodities. These are self image congruence, category involvement and perceived quality. The next three hypotheses focus on testing whether these constructs are also relevant for explaining brand equity for commodities such as beef:

***Hypothesis 2: The perceived quality of the specific beef brand will mediate the strength of the brands equity from the consumer perspective.***

***Hypothesis 3: The consumer involvement in the beef product category will mediate the strength of the brands equity from the consumer perspective.***

***Hypothesis 4: The concept of self image-congruence will mediate the strength of the brands equity from the consumer perspective.***

For commodities such as beef, it is possible that consumers’ may expect there to be greater variations in quality than for non-commodities. If this is the case, perceived quality may provide a stronger rationale for consumers’ purchase of branded beef than the other constructs (self image and involvement). This leads to our final hypothesis:

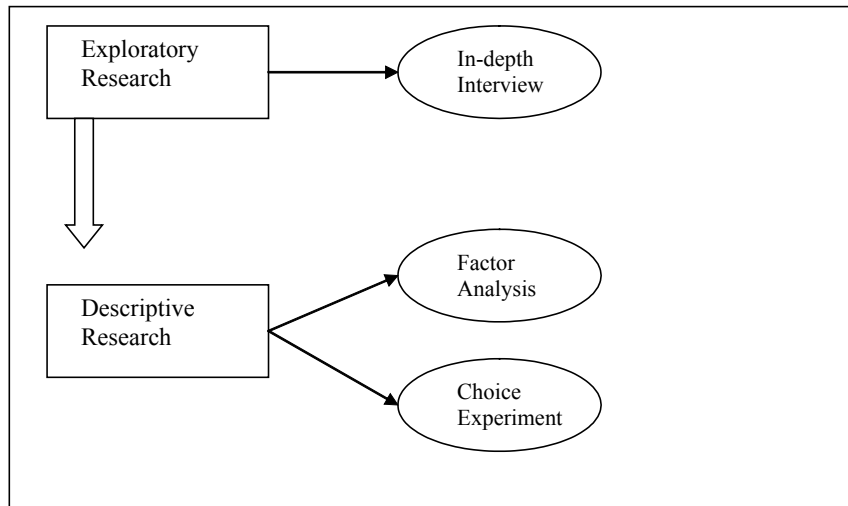
***Hypothesis 5: The perceived quality will have a greater effect on brand equity than either involvement or self image.***

The paper is structured as follows. Next, in Section 2 the methodology used is described. In Section 3, survey logistics are described and in Section 4 results are presented. The results are summarised and implications are offered in Section 5.

## **2. Methodology**

The research design utilised in this research was composed of two stages and incorporated both qualitative and quantitative techniques. In Figure 1 the research design is illustrated.

**Figure 1: Research design**



The first stage involved a series of in-depth interviews to identify those attributes that consumers perceive to be important when purchasing beef. The insights gained via this stage of the research were critical in providing a basis for the choice sets used in the choice experiments. Specifically, a structured interviewing technique was used, as this technique facilitates comparison of responses, allows efficient evaluation and reduces potential interviewer bias (Patton 1990). A total of eleven interviews were conducted with a diverse range of beef consuming households during September 2003. Respondents were selected from a variety of household types in accordance with the extreme case or purposeful method described by Patton (1990). Living arrangements, lifestyles and household structures were used as a means of differentiating between respondents. Two expert interviews were also conducted. The sample size was governed by the notion of saturation. As Minichiello, Aroni, Timewell and Alexander (1990) explained, interviews should be conducted until the point where further interviewing fails to yield new insight and conversely, replication of information previously uncovered occurs. The point of saturation was reached at the conclusion of eleven interviews.

The descriptive research incorporated a factor analysis as well as choice experiments. Factor analysis was used to reduce the three scale items into three parsimonious factors that were able to be included in the choice experiments. The factor analysis used scales that were adapted from previously published research. In Table 2 a description of each of the scales, their focus and source are presented. The perceived quality scale consisted of five scale items and the self-image congruence and the product category involvement scales included four items. The response format for each of the scale questions used in the survey was a five point Likert scale. Principal components analysis with a varimax rotation was used to produce three orthogonal variables (Basilovsky 1994).

**Table 2: Scale Description**

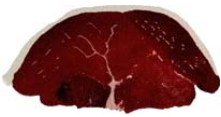
Construct Tested	Source
Perceived Quality	Yoo and Donthu (1997) cited in Washburn and Plank (2002)
Self-Image Congruence	Sirgy, Dhur, Mangleburg, Park, Chan, Claiborne, Johar and Berkman (1997) cited in Bruner, James and Hensel (2001)
Product Category Involvement	Beatty and Talade (1994) cited in Bruner, James and Hensel (2001)

Choice experiments are a technique that is part of the conjoint paradigm. It is an effective technique for identifying the value a consumer assigns to both product attributes and brands (Malhotra, Shaw and Crisp, 1996). In choice experiments, respondents are presented with a series of “choice sets”. A choice set contains several alternatives (eg different brands), that are defined using a fixed set of attributes. An example of a choice set used in the survey presented in this paper is shown below. Respondents in a survey are asked to choose their preferred alternative from several of these choice sets. This choice information can be statistically analysed to identify the value consumers have for both attributes and brands.


**Question 1**


Suppose you were shopping for rump steak, and the following two alternatives were the only ones available, which ONE would you choose if any?

**Alternative A: Unbranded beef**



Colour: Maroon  
Fat: Marbled  
Price/Kg: \$5


**Alternative B:** 



Colour: Red  
Fat: Extra Muscular  
Price/Kg: \$11

Please indicate which one of these options would you purchase?

Alternative A:            unbranded beef

Alternative B:            

I would not purchase either

In developing the questionnaire it was necessary to consider that respondents potentially lacked understanding of beef brands. Therefore, survey respondents were introduced to the concept of beef branding via a series of visuals, and an explanation by the interviewer. The beef brand *1824* was used for the purpose of this case study and examples of the brands promotional materials were used to aid in explanation. Following the initial introduction respondents were asked to complete nine choice tasks in the survey.

Based on the results of the in-depth interviews, the choice task included three main attributes. These were the attributes of colour, price and fat. Respondents in the in-depth interviews indicated that they perceived a difference between the colours of meat, so the attribute levels of red, pink and dark were used. The second attribute included in the choice sets was fat. The three levels of fat included in the choice sets are explained in detail in Table 3, below.

**Table 3: Explanation of Fat Attribute**

Attribute level	Description
Lean	Minimal visible fat is present
Extra Muscular	A band of fat is present – on the outer edge of the meat
Marbled	Fat is dispersed throughout the meat

The third attribute that was included in the choice set was price. This attribute had six levels for unbranded beef and a further six levels for branded beef. It can be noted in Table 4, the levels have differing ranges, with branded beef having a larger range and premium prices.

**Table 4: Explanation of Price Attribute**

Unbranded	Branded
\$5.00	\$11.00
\$7.00	\$14.00
\$9.00	\$17.00
\$11.00	\$20.00
\$13.00	\$23.00
\$15.00	\$26.00

Finally, each of the choice sets contained two brands. In the presentation of the choice tasks respondents could choose from three options. The first option was option A, which was unbranded beef. The second option was labelled as *1824* branded beef. The third option was ‘no choice’ where neither option A or B met the consumers usual purchase criteria.

Estimation of the choice models was calculated using two main techniques. The models that have been reported in this research were estimated using both conditional logit and random parameters logit (RPL) models. The latter model was estimated because violations of the Independence from Irrelevant Alternatives (IIA) were

identified with the conditional logit using the test recommended by Hausman and McFadden (1984). RPL models do not have the IIA property, and therefore are increasingly being used for modelling discrete choice data. RPL models also have the capability of allowing for panel or grouped data. Panel data arises in this context because respondents each answer nine choice questions, hence it would be expected that their individual responses to these nine questions are correlated. However, this does come at a cost of increasingly computational and statistical complexity (Anderson 2003). Therefore, it was necessary to estimate a conditional logit model when alternative specific parameters were modelled.

### **3. Survey Logistics**

The survey was conducted in the regional New South Wales town of Bathurst. Using the Australian Bureau of Statistics census collection districts as a framework, a cluster sample was drawn with a total of 230 respondents. Data was collected through in-person interviews in the respondent's home; between September 2003 and January 2004. The in-depth interviews were preceded by an introduction to the branded beef context and an explanation of the survey task.

### **4. Results**

The methodology for this study involved initially the use of factor analysis was conducted to reduce the three sets of scale items into a parsimonious set of variables. Therefore, we start this section by reporting the results from this analysis. Both the KMO measure of sampling adequacy (0.787) and Bartlett's test of sphericity indicated the appropriateness of using factor analysis. Consistent with expectations, three factors corresponding to the three scales were extracted with eigenvalues in excess of 1.000. The factors have been labelled "Image", "Perceived Quality" and "Involvement". An examination of the scree plot also supported the three factor solution, and the cumulative explanation of the three factors was 61.73%.

Subsequent to the factor analysis, five different choice models have been estimated to provide estimates of the value of beef attributes and branding, and to enable testing of the five hypotheses described in Section 1. The first model is a basic conditional logit model. In model two, socio-demographic variables were introduced into the model. These variables were included to facilitate a basic segmentation analysis. In model three, a Random Parameters Logit model is used. The inclusion of model three was because of the IIA violation found in the basic conditional logit. The fourth model is a conditional logit with alternative specific coefficients. This model was used to calculate the willingness to pay of Bathurst consumers for branded and unbranded beef. It was used to estimate willingness to pay as the model explicitly allows for different price sensitivities and product preferences across branded and unbranded products. The final model reported is model five, which is a conditional logit that includes the three constructs of interest: image, involvement, and perceived quality. The five models were estimated using LIMDEP 3.0. To assist in the interpretation of the results, the variables included in these models are described in Table 6. This table provides a brief explanation of each variable and indicates the expected sign. In Tables 7 and 8 the full results from each of the models estimated are provided and following this table these results are discussed.

**Table 6: Choice Experiment variable index**

Variable	Explanation	Expected Sign
ASC1	Alternative-Specific constant unbranded	+
ASC2	Alternative-Specific constant branded	+
ALT_A	Alternative A – Unbranded beef	+
ALT_B	Alternative B – 1824 branded beef	+
Price	Price per kilo (\$)	-
Extra	Extra muscular fat	+
Marbled	Intra muscular fat (marbling)	+ or -
Red	Beef red in colour	+
Maroon	Beef maroon in colour	-
Marbeduc	Interaction marbling and education level	+ or -
Marbred	Interaction marbling and red colour	+
Marbmar	Interaction marbling and maroon colour	-
Extred	Interaction extra muscular fat and red colour	+
Extmar	Interaction extra muscular fat and maroon colour	-
Income	Annual household income before tax	+
Age	Age in years	+
Gender	Male =0 Female = 1	+ or -
Quality	Factor score for Quality construct	+
Image	Factor score for Image construct	+
Involve	Factor score for Involvement construct	+

### ***Model 1 – Basic Conditional Logit***

Model one is a basic conditional logit and was the simplest of the five models that have been reported. The Chi squared value reported is significant at 1% indicating that overall the model is significant. The explanatory power of the model is good, with a rho squared of 0.19. Hensher and Johnson (1981) stated that values between 0.2 and 0.4 indicate very good model fits. The model was additionally assessed for IIA violations, and these were found to occur.

In Model 1 both alternative specific constants are significant. ALT A (unbranded beef) is larger than ALT B (branded beef), which implies that consumers perceive unbranded beef to have a greater utility. This would mean that branded beef has no brand equity, and consumers see no value in the branded product. However, more careful modelling (see Model 4) indicates that this is not the case.

All of the variables modelled are statistically significant at the 1% level in Model 1. An examination of the coefficients in Model 1 shows that they are consistent with exceptions.

**Table 7: Choice Experiment Results for Models 1-3**

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
A_ALTA	2.450*** (-14.473)	2.286*** (-10.933)	2.904*** (-14.853)
A_ALTB	2.065*** (-9.26)	1.244*** (-3.569)	2.477*** (-9.862)
Price	-.328*** (-3.527)	-.371*** (-3.171)	-.047*** (-4.197)
$\sigma_{\text{Price}}$			.063*** -9.153
Extra	.950*** (-6.186)	.824*** (-4.182)	.951*** (-5.546)
Marbled	1.242*** (-4.716)	.912*** (-2.698)	1.176*** (-3.926)
Red	1.371*** (-16.841)	1.461*** (-14.418)	1.517*** (-17.169)
Maroon	-.956*** (-16.838)	-.917*** (-13.105)	-.992*** (-16.463)
Marbeduc	-.132*** (-4.806)	-.888*** (-2.594)	-.118*** (-3.713)
Marbred	-.225*** (-2.652)	-.298*** (-2.809)	-.204** (-2.211)
Marbmar	.735*** (-6.932)	.820*** (-6.281)	.802*** (-7.109)
Extred	.365*** (-3.059)	.410*** (-2.797)	.393*** (-3.108)
Extmar	-.233*** (-2.488)	-.274** (-2.315)	-.172* (-1.705)
Income		0.000001 (-0.498)	
Age		.021*** (-5.05)	
Gender		-.341*** (-2.615)	
Quality			0.86 (-1.307)
Image			.413*** (-6.245)
Involve			0.059 (-0.875)
Observations	2260	1324	2268
Log likelihood	-1721.89	-1115.89	-1630.01
Rho squared	0.190	0.200	.283
Chi-Squared	822.17***	568.39***	1287.05***

Note (1) The t statistic appears in brackets under the coefficients

Note (2) \*\*\*sig at 1% \*\*sig at 5% \* sig at 10%



### ***Model 2 Conditional Logit including Socio-demographics***

In Model 2 a number of socio-demographic variables were introduced into the model. The purpose of this was to identify if beef brand held value for a particular demographic segment from within the sample. This model is also significant overall, and has slightly better explanatory power than the previous model (rho squared 0.20).

Of the four sociodemographic variables include, only the coefficient for income is not statistically significant in Model 2. The statistical insignificance of the income variable in this model is of interest, as it could be reasonably expected to be a useful socio-demographic variable from a segmentation perspective. It was anticipated that as income increased consumers would be more financially able to afford branded beef, and appreciate the consistency offered by branded beef. In this model this inference cannot be supported; however the broader general segmentation variables of age and gender are both significant at the 1% level.

The model does however show that men perceive branded beef as having more utility than women. In addition, the coefficient for age in Model 2 suggests that as age increases so to does utility. This result offers additional insight into potential target markets for branded beef. In the early stage of beef brand development, an older demographic is potentially a more attractive target market as they perceive branded beef as having greater utility. Finally, the coefficient for the interaction between marbling and education level is significant in this model. This relationship suggests that as consumer educational level increases the utility in the marbling characteristic falls. The marbling characteristic is well documented influence on flavour as well as tenderness; at the same time Australian consumers have been educated that lean meat is better from a health perspective. The better educated consumer may have an understanding of the potential health implications of a diet high in fat and this drives their preference for leaner meat. This presents a challenge for the marketers of branded beef, from the perspective that their product is likely to exhibit the marbling characteristic. This is an example of an area that may need to be addressed in brand communication.

### ***Model 3 – Random Parameters Logit including theoretical constructs***

The third model that is reported can be contrasted with the four other models reported. This is a Random parameter logit. The inclusion of this estimation method is due to the IIA violation that was identified in tests completed on the conditional logit model. RPL models do not have the IIA property (Louviere, Hensher and Swait, 2000). RPL have the feature of allowing for heterogeneity in one or more parameters.

Model 3 is significant overall, as shown by the Chi squared value. The models explanatory power is additionally very good, with a Rho squared value of 0.283. The model does however, have a number of variables that are insignificant. The variables of perceived quality and category involvement are both statistically insignificant. These two constructs were included key elements of the research hypotheses.

The model does clearly demonstrate the importance of self image congruence in the beef context. The image coefficient in contrast to the other two constructs studied is significant at the 1% level. In the branded beef market it appears that self image congruence is of importance to consumers. This suggests that simply applying a label to beef will not be sufficient, conversely a strong image is required. This insight may be useful when considering evaluating brand expenditure, as it suggests that image development is critical for successful beef brand development.

#### ***Model 4 – Alternative Specific Conditional Logit***

The fourth model that has been reported is similar to Model 1, except it has alternative specific coefficients for branded and unbranded beef, and a quadratic for price for unbranded beef. The model has better explanatory power than Models 1 and 2, with rho squared of 0.211. Most coefficients are significant, apart from EXTRA (unbranded) and MARBLED (Branded).

<b>Table 8: Choice Experiment Results for Model 4</b>			
ASC1	2.54*** (5.520)	ASC2	2.005*** (7.735)
UBR_Price	-.304*** (-3.426)	BR_Price	-.075*** (-5.763)
UBR_Price2	.016*** (3.652)		
UBR_Extra	.060 (.786)	BR_Extra	.350*** (3.557)
UBR_Marbled	.861*** (5.633)	BR_Marbled	.186 (1.212)
UBR_Red	1.295*** (15.976)	BR_Red	.747*** (9.130)
UBR_Maroon	1.324*** (-15.889)	BR_Maroon	-1.664*** (-14.537)
Marbeduc	-.136*** (-4.818)		
UBR_Marbred	-.400*** (-3.067)	BR_Marbred	.335** (2.562)
UBR_Marbmar	.854*** (6.569)	BR_Marbmar	.351** (2.150)
UBR_Extred	.340** (2.427)	BR_Extred	.183 (1.277)
UBR_Extmar	-.367*** (-2.977)	BR_Extmar	-0.746 (-.429)
Observations	2268		
Log likelihood	-1678.310		
Rho squared adjusted	0.211		
Chi-Squared	-2273.53		

The willingness to pay values for both branded and unbranded beef and the various attributes were calculated from the results in Model 4. The values for the various beef attributes surveyed are reported in the Table 8. The results show a premium for branded beef of between -\$9.997 to \$14.27, depending on the beef attributes.

**Table 8: Dollar Values for Beef Attributes**

<i>Attributes</i>	<i>Unbranded</i>	<i>Branded</i>	<i>Premium</i>
Pink & lean	\$17.67	\$26.69	\$9.02
Red & Lean	\$26.68	\$36.64	\$9.95
Maroon & Lean	\$8.46	\$4.53	-\$3.93
Pink & Extra	\$18.09	\$31.35	\$13.26
Red & Extra	\$29.47	\$43.74	\$14.27
Maroon & Extra	\$6.75	\$8.20	\$1.45
Pink & Marbled	\$22.29	\$26.54	\$4.25
Red & Marbled	\$31.30	\$40.95	\$9.65
Maroon & Marbled	\$19.02	\$9.05	-\$9.97

The following section relates the results back to the original five hypotheses, to summarise these findings. Each of the hypotheses are examined individually and either accepted or rejected on the basis of the preceding results.

## **5. Implications of Results for Research Hypotheses**

**Hypothesis 1 : A market segment exists that will pay a premium for branded beef in the Bathurst region.**

To conduct psychographic segmentation of the market a congruent self image and brand image as well as higher involvement increased the consumer willingness to pay. When considering demographic variables the target segment would firstly, be more likely to be male and secondly, be older (As age increases so does willingness to pay for branded beef).

**Hypothesis 2 : The perceived quality of the specific beef brand will mediate the strength of the brands equity from the consumer perspective.**

Hypothesis two is not supported based on the results from this research. In the results presented the coefficient for quality exhibited limited statistical significance. This implies that it is not a critical variable in mediating brand equity. This is a significant finding and has implications for marketers of branded beef in the sense that the consistent quality offered by branded beef is a critical point of differentiation. The consistent quality of branded beef is a significantly superior element of the product when a comparison is made with the commodity or traditionally marketed beef. This research suggests that in the beef context at least this is not a significant mediator of brand equity.

**Hypothesis 3: The consumer involvement in the beef product category will mediate the strength of the brands equity from the consumer perspective.**

The results in this research demonstrated that the involvement construct could not be shown to influence brand equity in the beef context. The coefficient did exhibit the expected sign; however it was not statistically significant. It was expected that a consumer with a level of involvement in the category would value the consistency in

product quality that branded beef offers. The results from the models reported however, are unable to support this hypothesis.

**Hypothesis 4 : The concept of self image will mediate the strength of the brands equity from the consumer perspective.**

The results that have been reported for Model 3 provide support for hypothesis four in this research. In fact the coefficient for self image was statistically significant at the 1% and in addition exhibited a positive sign that was expected. In contrast to the previous two constructs hypothesised in this research as mediating brand equity, self image does have an effect. This result suggests that in the branded beef context brand equity increases where there is a self image and brand image congruence. A strong brand image should be an important consideration in the early stages of beef brand development. In developing this image, consumer research should have a critical role and be followed by investment in brand communication. The importance of image in this context is such that labelling beef will not be sufficient; it must be supported with an investment in effective brand communication.

**Hypothesis 5 : The perceived quality will have a greater effect on brand equity than either involvement or self image.**

These results do not provide confirmatory support for hypothesis five. It may be recalled that the quality construct was not significant. The hypothesis that consumers would value the increased quality and consistency inherent in branded beef could not be substantiated with these results.

***Conclusions and Implications for Future Research***

The present study intended to firstly identify if brand equity existed in the Australian domestic beef industry. We have found that brand equity does exist for branded beef.

The opportunity for longitudinal study is apparent. The development of beef brands is both in a traditional commodity based marketing area and additionally a relatively recent development. There is thus an opportunity to document this development. The second element of this research was concerned with the theoretical development of the brand equity construct.

The theoretical contribution made through this research is based on the demonstration of the mediating effects of self-image congruence, category involvement and perceived quality. A documented criticism of brand equity is that it lacks theory relating to factors that drive its development. In the branded beef context examined in this research it was demonstrated self image congruence has a role in brand equity development of beef.

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