The Rise of Trade Marking in Australia in the 1990s*

Joanne Loundes[†] and Mark Rogers[‡] [†]Melbourne Institute of Applied Economic and Social Research and Intellectual Property Research Institute of Australia The University of Melbourne

[‡]Harris Manchester College, Oxford University and Melbourne Institute of Applied Economic and Social Research The University of Melbourne

Melbourne Institute Working Paper No. 8/03

ISSN 1328-4991 (Print) ISSN 1447-5863 (Online) ISBN 0 7340 3120 3

March 2003

*This research was made possible by funding from IP Australia. The authors would like to thank David Brennan, Rod Crawford, Ian Drew, Kerry Sillcock, Ana Dimitriou and for their assistance and comments.

Melbourne Institute of Applied Economic and Social Research The University of Melbourne Victoria 3010 Australia *Telephone* (03) 8344 3701 *Fax* (03) 8344 5630 *Email* melb-inst@unimelb.edu.au *WWW Address* http://www.melbourneinstitute.com

Abstract

This paper provides some preliminary analysis regarding the pattern of trade marking by Australian firms using financial information on large Australian businesses from IBISWorld, and matching this with intellectual property information from IP Australia. Existing businesses that have not historically trade marked in every year are now starting to make greater use of trade marks, at least over the period 1995 to 2000. The increase in trade marking appears partly related to other innovative activity in that there is a positive and significant relationship between trade mark counts and patent counts. There is also some evidence that uncertainty surrounding returns on investment has an influence on whether, and how much, firms trade mark. Overall, however, these factors are insufficient to explain the rapid rise in trade mark activity. Instead, the rise has been driven by changing managerial strategy with respect to intellectual property (IP). One possibility for this change is an increasingly competitive environment between firms with IP being increasingly relied upon.

1. Introduction

This paper analyses recent trends in trade marking in Australia. There has been a rapid rise in trade marking activity over the 1990s, which was then retraced following a peak in March 2000, only to have trade marking activity tick up again from February 2002. Between July 1991 and July 1993, applications were relatively stable at around 2,000 applications per month. However, from July 1993 to the peak in March 2000, trade mark applications have more than tripled, growing at an average rate of 1.5 per cent per month. There is little quantitative research into trade mark activity, either in Australia or other countries, which can shed light on these trends or, more generally, the determinants of trade mark activity. This paper provides a range of analysis that aims to alleviate this situation. One of the objectives is to understand the nature of the rise of trade mark activity. To this end, the paper makes international comparisons and analyses the structure of the increases in activity. A related objective involves modelling the factors that cause Australian businesses to apply for trade marks. Ultimately, it is changes in decision making by applicants that drives the aggregate trends in trade mark activity, and the analysis presented here is the first step towards a more complete understanding.

There are a number of competing explanations for why trade marking may have increased. To motivate what follows consider the following three possible explanations. First, the rapid rise may be due to changing legal or management practices, which have reduced the cost of, or increased awareness in, trade mark activity. If this were the sole cause of the rise, the implications for the wider economy are benign. Second, suppose that the increase in trade marking reflects greater innovation by Australian firms, as trade marks can be associated with new products or better management of existing intellectual property. If this explanation is correct the performance of the economy should also increase. Lastly, trade mark activity may be associated with greater efforts to brand products, defend market share and reduce new entrants. If this explanation is true, it is possible that higher trade mark activity reduces the intensity of

competition, possibly leading to lower economic performance. This paper investigates these and other possible explanations.

The World Intellectual Property Organization defines a trademark (or brand-name) as 'a distinctive sign, which identifies certain goods or services as those produced or provided by a specific person or enterprise.' The ability to protect the intellectual property of the firm is an important determinant in the incentive to innovate. As such, well-defined property rights are expected to be a key component in the generation of intellectual property. The most utilised enforceable rights are patents, trade marks, designs and geographic indications. In cases where these options are not feasible, firms may use other strategies—such as secrecy and lead times—to protect their ideas. The vast majority of the economic research on intellectual property investigates the use of patents to protect new ideas. There has been some work undertaken with regards to trade marks, but designs and geographic indications of source have been neglected in the economic literature. This paper aims to fill part of the research gap in relation to trade mark activity.

The following section presents aggregate statistics on trade marking in Australia. Section 3 provides a description of the analytical framework that will be utilised to explain the pattern of trade marking, including the dataset to be used. In summary, the data are for medium to large Australian firms, for the period 1995-2000, and contain financial and intellectual property data at the firm-level. Section 4 presents the results of this analysis. Section 5 contains an analysis of a management survey of a sub-sample of the firms. These data allow more insight into the role of management strategy and trade mark activity. Section 6 concludes.

2. Aggregate statistics

Figure 1 shows the pattern of trade marking in Australia over the past 10 years, both in absolute terms, and as a share of GDP. The increase in applications has been quite marked over this time,

as was the subsequent downturn after March 2000. There is some indication that not all of this increase has been driven simply by an increase in economic activity, as trade marks per \$billion of GDP have increased from around 50 in the early 1990's to around 100 now.

Figure 2 makes a comparison of Australian trade mark applications with those in the United States over the past 15 years, and splits the sample by resident versus non-resident applications. Residents in both countries (where resident is defined as the place of residence of the applicant as filled out on the application form) take out more trade marks than non-residents. In Australia residents account for around 60 per cent of total trade mark applications, whereas in the United States the figure is closer to 85 per cent. In the 15 years to 2000, trade mark applications by Australian residents have increased more than three-fold, and applications by non-residents are more than four times higher. For the United States, applications by residents are four and a half times higher than the 1986 level, and those by non-residents are more than three times higher (albeit from a lower base). Given the similarity of the growth path, it is probably fair to say that whatever is driving this growth is not necessarily limited to Australia.



Figure 1: Australian Trade Mark Applications (number and per \$billion of real GDP)

Source: IP Australia, Australian Bureau of Statistics



Figure 2: Trade Mark Applications by Resident Status (Australia and US)

Trade mark applications by class also provide some interesting information, and are presented in Table 1. There are 45 different classes that applicants can file under, and more than half of these (that is, class numbers 1 to 34, but excluding 31) loosely come under the heading of manufacturing. The largest classes in 2000/01 are scientific and electrical equipment, followed by miscellaneous services (which includes scientific and technological services (and the related research and design); industrial analysis and research services; design and development of computer hardware and software; legal services) and retailing.

Source: World Intellectual Property Office, IP Australia

_	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Class name and number	%	%	%	%	%	%
Chemicals (1)	2.3	2.2	2.1	1.7	1.7	1.7
Paints (2)	1.0	0.8	0.8	0.7	0.4	0.5
Cosmetics & cleaning (3)	3.7	3.7	3.7	3.4	2.8	2.7
Oils & greases (4)	0.5	0.5	0.5	0.5	0.4	0.4
Pharmaceuticals (5)	4.7	4.8	4.5	4.5	3.7	3.9
Metals (6)	1.6	1.7	1.5	1.7	1.2	1.2
Machines (7)	2.0	2.1	2.0	1.8	1.5	1.4
Hand tools (8)	0.6	0.7	0.5	0.6	0.5	0.4
Scientific & electrical (9)	10.4	10.8	10.7	10.6	11.1	11.7
Medical (10)	1.6	1.6	1.6	1.7	1.3	1.4
Lighting & heating (11)	1.9	1.9	1.8	1.8	1.6	1.5
Vehicles (12)	1.8	1.8	1.9	1.8	1.5	1.7
Firearms (13)	0.1	0.1	0.1	0.1	0.1	0.1
Precious metals (14)	0.9	1.2	1.2	1.0	1.1	0.9
Musical instruments (15)	0.1	0.1	0.1	0.1	0.1	0.1
Paper & printed materials (16)	6.5	6.2	5.9	5.9	5.5	5.4
Rubber & plastics (17)	0.9	1.0	0.8	0.8	0.5	0.5
Leather (18)	1.2	1.6	1.4	1.2	1.3	1.2
Building materials (19)	1.4	1.2	1.2	1.2	1.0	0.9
Furniture (20)	1.4	1.5	1.6	1.6	1.3	1.2
Household utensils (21)	1.3	1.6	1.6	1.4	1.2	1.1
Ropes & tarpaulins (22)	0.4	0.4	0.3	0.3	0.3	0.3
Yarns & threads (23)	0.2	0.1	0.1	0.1	0.1	0.1
Textiles (24)	1.2	1.2	1.2	1.0	0.8	0.9
Clothing (25)	8.8	7.8	7.6	6.9	5.8	6.0
Ribbons & buttons (26)	0.2	0.3	0.3	0.3	0.2	0.2
Floor coverings (27)	0.3	0.3	0.3	0.3	0.2	0.2
Games (28)	3.3	3.0	3.0	2.7	2.5	2.4
Meat & dried fruits (29)	2.7	2.7	2.6	2.5	2.2	1.9
Coffee & cereals (30)	3.8	3.5	3.4	3.4	2.8	2.7
Agricultural (31)	1.9	1.9	1.7	1.6	1.5	1.4
Beers & juices (32)	1.9	1.6	1.5	1.4	1.3	1.3
Other alcoholic beverages (33)	1.5	1.7	2.0	2.0	2.0	2.0
Tobacco (34)	0.3	0.4	0.4	0.3	0.3	0.2
Retailing (35)	3.7	4.8	6.7	7.8	10.1	9.2
Financial services (36)	2.8	2.9	3.4	3.6	4.4	4.3
Building & construction (37)	2.4	2.2	2.1	2.4	2.2	2.3
Telecommunications (38)	2.3	2.0	2.1	2.5	3.8	4.1
Transport & travel (39)	1.6	1.6	1.6	1.7	1.8	1.8
Treatment of materials (40)	0.5	0.6	0.8	0.6	0.5	0.7
Education, entertainment & sport (41)	5.6	5.7	6.1	6.5	7.3	7.4
Miscellaneous services ^a	8.7	8.0	7.2	8.1	10.4	10.7
Total applications (number)	35467	39962	42771	51068	69134	66122

 Table 1: Trade Mark Applications by Class (share of total applications)

Source: IP Australia

a. Includes Business Services (42), Restaurants and Accommodation (43), Health and Agriculture Services (44) and Personal and Other Services (45). Historical information is not available for the separate service classes 42 to 45

One feature of the data that deserves mention is that the manufacturing-type classes have significantly reduced their share of total trade mark applications over the 6 years presented here, down from 71 per cent in 1995/96 to 58 per cent in 2000/01. Those with the largest falls include clothing, paper and printed materials, and coffee and cereal. The primary exceptions to this general trend are scientific and electrical equipment (probably in part driven by increased demand for information and communication technology hardware) and other alcoholic beverages (which may be driven in part by the introduction of new energy drinks such as Red Bull).

In contrast, several non-manufacturing classes have risen rapidly in importance, particularly retailing (notwithstanding the decline between 1999/00 and 2000/01), miscellaneous services, education, entertainment and sport, telecommunications, and financial services. Retailing is a particularly interesting case. This industry is typically characterised as having relatively low profit margins, and trade marking may be one method that retailers may be able to distinguish themselves from their competitors. An increase in the demand for telecommunication services, in particular mobile phones and the Internet, may also go some way to explaining the rise in telecommunication trade marks as new products come onto the market to satisfy this demand.

3. Investigating the aggregate trend using firm-level data

There is some evidence that economic activity explains some, but by no means all, of the pattern of trade marking. That is, with more output comes the need for more trade marks, assuming that some of this output is in the form of new products and services. Research undertaken by Summers (2001) indicates that the aggregate pattern of trade marking can be explained and forecast relatively well (using the Westpac-Melbourne Institute Leading and Coincident Indexes of economic activity, and real GDP). The aggregate pattern discussed above also appears to coincide with the dot.com phenomenon of the late 1990's, and in particular the failure of a large number of these companies from 2000 onwards. However, the industry breakdown shown in

Table 1 indicates that the increase in trade mark activity affected many industries. The remainder of this paper therefore attempts to shed some light on the increase in trade marking in Australia using firm-level information.

The data come from the Innovation Scoreboard Database, which, in turn, are created from matching the IBISWorld Business Database with information provided by IP Australia on patents, trade marks and designs. This database contains medium to large Australian based firms and tracks their trade mark activity by year from 1995 to 2000. In 2000, businesses in this sample accounted for around 10 per cent of all trade marking activity in Australia, and 17 per cent of trade marks taken out by domestic residents. In comparison, in 1995 businesses in the sample accounted for 12 per cent of all trade mark activity. This provides some evidence that some of the rapid rise in trade mark activity is driven by smaller firms or individuals. As such, caution should be exercised in extrapolating the following results to the entire economy.

To provide a conceptual structure for analysing the trade mark data note that a rise in business trade mark activity could come either from established firms or new firms, or both. More precisely, define tm_{i0} as the number of trade marks for firm *i* at time 0, where *i* indexes the number of all firms in existence at time 0 (S₀). At time 0, assume there are M₀ firms with $tm_{i0} > 0$ (M₀<S₀). The rise in trade mark activity could therefore be due to:

a) an increase in mean tm_{it} over the sample period (t = 1995 to 2000) (i.e. more trade mark activity from existing trade markers)

b) a rise in M over time (i.e. established firms (pre-1995) undertaking trade markings for the first time), or

c) an increase in S_{it} (i.e. growth in new firms (post-1995) which also trade mark).

Conceptually, the rise in trade mark activity must be due to one of these three possibilities. Note, however, that in the analysis below, the definition of 'existing', 'new' and other terms is solely based on information in the Innovation Scoreboard Database.

To start to examine the three possibilities above, Table 2 shows basic summary statistics of trade mark activity by type of firm, that is, those that trade marked every year, those that were in the sample for every year—but did not necessarily trade mark in each year—and new firms entering the database. Only 105 organisations were in the database every year and took out at least one trade mark every year. Nevertheless, these firms accounted for the majority of total trade mark applications in the sample, fluctuating between 40 to 50 per cent of the total, with no obvious upward trend in the share of the total. In terms of growth in absolute numbers of trade marks, this group of firms had 1941 in 1995 rising to 2859 in 2000, although it appears that trade mark activity peaked in 1998. A further 846 firms were in the sample every year, but did not necessarily take out a trade mark every year. However, these firms have increased their share of the total from 30 per cent in 1996 to nearly 40 per cent in 2000. Note that the number of trade marks made by this group of firms doubled between 1995 and 2000. There is also a steady influx of new firms into the sample that have applied for trade marks. These firms accounted for just over 16 per cent of all trade mark applications in 2000.

I ubic	4 • 1 \um		l i aaciiia	1 1139 W J	5 vup	und yea	1					
	No. of		No. of No. of				No. of		No. of			
	No. of	trade	No. of	trade	% of	No. of	trade	% of	No. of	trade	% of	
	firms	marks	firms	marks	total	firms	marks	total	firms	marks	total	
Full san	<u>nple:</u>		Of which:									
			Trade mar	king each	year	Trade mar	king infre	quently	Trade mar	king infre	quently	
Unbalanced panel		el	Firms appearing each year		Firms appearing each year			New firms in database				
			S	ample A		S	Sample B		S	ample C		
1995	2919	4407	105	1941	44.0	846	1317	29.9	0	0	0.0	
1996	2925	5420	105	2362	43.6	846	1602	29.6	76	161	3.0	
1997	2703	7215	105	2813	39.0	846	2396	33.2	125	523	7.2	
1998	2717	6530	105	3212	49.2	846	2204	33.8	192	524	8.0	
1999	2778	6704	105	2958	44.1	846	2259	33.7	238	997	14.9	
2000	2498	6962	105	2859	41.1	846	2639	37.9	245	1145	16.4	

Table 2: Numbers of Trademarks, by group and year

Note: Per cent of total do not sum to 100, as the remainder are those firms that were originally in the database, but have since left.

Table 3 shows summary statistics for trademark intensity, which is defined as the number of trade marks divided by total revenue (in millions). Using trademark intensity provides a crude method of adjusting for firm size. The table has summary statistics, by year, for each of the three different groups of firms shown in Table 2. Looking initially at the summary statistics for the 104 firms that are continuous trade markers¹, the main observation is the large difference between the median and mean values, indicating a skewed distribution (a few firms have relatively high trade mark intensity). The only trend appearing from the statistics for the continuous trade marks is a peak of activity in 1997 and 1998 as indicated by the high median and mean values. The summary statistics for the 846 firms in the data each year are shown in the central panel on Table 3. The statistics again show the skewed nature of the data with the maximal intensities being similar in magnitude to the previous sample. There is some evidence of a peak of activity for these firms in 1997, although the year 2000 has the first positive median value (indicating that over 50% of firms in the sample applied for a trade mark²). The last panel of statistics is for the new firms in the IBISWorld database. The majority of these new firms do not trade mark until 1999 (see median value), but throughout the period the mean and maximal values compare favourably with existing firms.

¹ Note that one 'firm' has been excluded from the sample as it was considered an outlier. This organisation had the highest trade mark intensity in the initial five years (1.44, 1.60, 1.07, 1.38 and 0.88 respectively) having made trade mark applications numbering 98, 136, 110, 127, 95 these years. The number of applications fell to 13 in 2000.

² The percentage of the 846 firms that made at least one trade mark application is 35% in 1995 and then 35%, 40%, 38%, 40% and 51% in successive years, providing some evidence of an upward trend.

	No. of firms	Median	Mean	Max	No. of firms	Median	Mean	Max	No. of firms	Median	Mean	Max	
	Sample A					Samp	ole B		Sample C				
1995	104	0.013	0.028	0.37	846	0.000	0.013	0.54	0				
1996	104	0.013	0.028	0.54	846	0.000	0.012	0.62	76	0.000	0.014	0.48	
1997	104	0.016	0.031	0.23	846	0.000	0.020	0.40	125	0.000	0.041	0.94	
1998	104	0.014	0.034	0.62	846	0.000	0.015	0.38	192	0.000	0.012	0.33	
1999	104	0.012	0.025	0.46	846	0.000	0.015	0.40	238	0.002	0.108	0.53	
2000	104	0.013	0.021	0.14	846	0.001	0.017	0.51	245	0.011	0.062	1.78	

Table 3: Summary Statistics of Trademark Intensity, by group and year

Note: Trade mark intensity is defined as the number of trade marks divided by total revenue (in millions). Sample A excludes the Australian Football League.

This section started by noting that the rise in trade marking could be due to: a) more trade mark activity from existing trade markers, b) established firms (pre-1995) undertaking trade markings for the first time, and/or c) growth in new firms (post-1995) which also trade mark). In terms of absolute number of trade mark applications each group of firms contributed to the overall rise, hence one could conclude that all three possible reasons have some validity. Probing more closely, it is explanations b) and c) that appear to have most explanatory power, as these firms have increased both their number of trade marks and their relative share. A further aspect highlighted by this section is the skewed distribution of trade mark activity, with a few firms being very active in particular years.

4. Why have existing firms increased trade mark activity?

In this section the aim is to model trade mark activity more formally in order to understand the trends in, but also the nature of, the data discussed above. Initially, this section reviews some general considerations on trade mark activity. These considerations are then developed into four potential hypotheses about why firms would have increased activity.

Given that applying for a trade mark incurs a positive cost to the firm, managers obviously see some value from investing in trade marking their products and services. This suggests our discussion can be based around the costs and benefits on trade mark activity. On the benefit side, econometric analysis by Bosworth and Rogers (2001) for Australia, and Bosworth and Mahdian (1999) on the UK pharmaceuticals industry, suggest that more trade mark activity is associated with a higher market valuation of the firm, perhaps by acting as a signal regarding the success of licensing and the likelihood of new product launch. These results suggest that trade mark activity may be linked to innovation or, more precisely, the successful management of the innovative process. Management researchers have defined the 'equity' that a trade mark contains is the extra cash flow accruing to a branded product over and above that of unbranded products (Grupp and Maital 2001).³ A survey of firms by Troy (1998) reports that businesses typically utilise two measures of brand equity: performance-based measures, such as market penetration, price premiums and customer satisfaction; and perception-based measures, such as brand awareness and customer perceptions of the brand. These observations suggest that trade mark activity is related to market conditions and consumer perception. If these conditions or perceptions are changing through time, hence altering managers' assessment of the benefits of trade marks, they might explain changes in trade mark activity. Developing these ideas some economists have drawn attention to how changes in market uncertainty can affect firm behaviour, with the idea that greater uncertainty may lead firms to make more extensive use of 'options', such as patents or trade marks. Of course, it is also likely that firms may try to control the market environment that they face, perhaps by preventing new entrants or competition from existing firms. Some have argued that firms can create strategic barriers to entry by using patents, R&D, brands proliferation or alike.

³ The marketing discipline contains a wealth of literature on brand equity; see for example, Keller (2000) and Sullivan and Simon (1993).

All of the above points concern the perceived benefits of trade mark activity. On the costs side the basic factors are the ease and cost of applying for a trade mark, as well as the perceived cost of defending the trade mark should an infringement occur.

This discussion leads to a set of possible reasons for why trade mark activity may have increased:

- Innovation (a rise in the underlying rate of innovation may have caused increased trade mark activity).
- Uncertainty (if markets have become more uncertain, firms may have increased the use of trade marks to use as 'options').
- Legal and administrative changes (which have altered the perceived cost of trade marking).
- Strategic behaviour (firms may has raised trade mark activity as method of affecting competition).

Each of these four hypotheses is further discussed and then tested in a sub-section below. These hypotheses link trade mark activity to real changes in the economy, although clearly this relies on managers altering their behaviour with regard to intellectual property. It is also possible to argue that some managers are influenced by the latest ideas – such as just-in-time (JIT) or downsizing – and that this causes a burst of activity, over and above that required by the real changes in the business environment. This can be labelled as a 'managerial fad' and has the implication that the rapid growth in trade marking is unsustainable. Related to this is the fact that some firms may have a stock of products or services, which are not currently trade marked, and allow the firm to suddenly increase applications. The possibility of such a 'managerial fad' in discussed in the final sub-section below.

Before analysing the main hypotheses listed above, this section sets out a basic framework for the econometric analysis. A very basic model of a firm's trade mark activity (T_{it}) could be specified as:

$$\log T_{it} = \alpha + \mu_i + \beta_1 t + \beta R_{it} + \varepsilon_{it}$$
^[1]

where μ_i is a firm specific dummy (i.e. fixed effect), t is a time trend, R_{it} is total revenue, α is a constant and ε_{it} is a (standard) error term. The time trend is included to show the increase in trade mark activity for the average firm in the panel. Total revenue is included to control for the fact that trade marking may be related to sales or the size of the firm more generally. A fixed-effects estimator is utilised to capture unobserved firm level attributes. The unobserved attributes could include innovativeness, advertising, management ability or marketing strategy. The presence of fixed effects means that it is not possible to include industry dummies in the estimation. The estimation of equation [1] can be thought of as a baseline model, with subsequent sections adding additional variables. These additional variables can be thought of as 'substituting for' either the time trend in [1] or the use of fixed effects, since in both cases their presence in [1] is uninformative about the underlying mechanisms at work.

Table 4 shows the results of estimation [1] on two sub-samples. The first sample is the 105 firm sample shown in Table 2, and the second is the 846 firm sample. The first regression shown only includes the time trend, with the log of trade marks as the dependent variable. The results show that the coefficient on time is significant with the magnitude suggesting trade mark applications have risen by 7.5% annually over the period. The second regression includes the log of sales. The significant coefficient of 0.356 suggests that trade marking increases less than proportionally with sales. Note that the inclusion of sales does reduce the time trend coefficient,

in other words some of the rise in trade marking is due to increased economic activity.⁴ The subsequent two columns undertake a similar analysis for the 846 firm sample, although a Poisson count model is now utilised.⁵ Again the results show the presence of a significant time trend and a significant relationship with sales. Direct comparison of the coefficients across the two samples is not possible, since the dependent variables are different. However, if we reestimate the models for the 105 firm sample using the count data estimator, the results show that the coefficient on the time trend is 0.015 and 0.03. This confirms the impression from the previous section that the firms that continuously trade marked have raised activity less than other firms.

0	Log 7	Trade Marks	Trade	Marks
	Fixed Effects	Fixed Effects Sales	Count	Count Sales
Constant	-147.259	-86.008		
	(3.73)***	(2.00)**		
Year	0.075	0.042	0.117	0.082
	(3.79)***	(1.91)*	(21.95)***	(14.19)***
Log sales		0.356		0.364
		(3.39)***		(15.12)***
Observations	630	630	5076	5076
Number of firms	105	105	846	846
R^2	0.63	0.64	Na	Na

Table 4: Trade Marking Trends, 1995 to 2000

Notes: Absolute value of t statistics in parentheses. *, ** and *** denotes significant at 10%, 5% and 1% level of significance, respectively. The fixed effects in the 'log trade marks' specification are significant at the 1% level.

Two other potential explanatory variables were also investigated for inclusion in the baseline model: advertising and profitability. Unfortunately, advertising data at the firm-level are not available, and the only way of including advertising is at the sector level. This variable shows no significance in either sample, perhaps not an unsurprising result given the level of aggregation. The profitability measure investigated was the net profit before tax to revenue ratio. Since this

⁴ For all of these results the inclusion of the Australia Football League makes little difference to the results.

⁵ The presence of zero values in these data precludes the use of a log specification.

ratio has some extreme positive and negative values a set of dummy variables for 'low', 'normal' and 'high' profitability were created.⁶ These also showed little explanatory power in the regressions.

4.2. Innovation

As mentioned above, the increase in trade marking may reflect greater innovation by Australian firms, in particular the introduction of new products and services, or better management of existing intellectual property. To examine this possibility, explanatory variables for the firm's R&D expenditure, as well as the number of patent applications, are added to the model.

The results of this estimation are presented in Table 5. Again, results for both the 105 firm and 846 firm samples are shown. The coefficients on sales and the time trend do not change substantially from the base model in Table 4 and are all still statistically significant at the 10% level. The coefficients for R&D expenditure and patents differ between the two samples. For the 105 firms that applied for trade mark in each year, neither R&D expenditure or number of patents have any statistically significant link to trade marks. Further investigation, using a variety of different specifications, confirmed this basic result.⁷ In contrast, for the 846 firms that are present in the data for all years, but do not trade mark each year, there is a negative association with R&D expenditure and a positive association with patenting. Once again, the result for R&D was checked by using a variety of different specifications (see above footnote),

⁶ A 'low' profitability was defined as when NPBT/Revenue is negative, a 'normal' level when the ratio is between 0 and 0.2, and 'high' above 0.2.

⁷ The variations in specifications included: using the log of R&D or a one year lag of R&D; using a dummy variable for R&D active firm; omitting either R&D or patents from the regression; and, omitting government owned firms. All of these different specifications still showed no significant association between trade marking and R&D or patenting.

but the negative relationship appears robust. While the results for R&D might appear surprising, it is important to be clear on their interpretation. The econometric specification investigates a link between \$ spent on R&D and extent of trade mark activity, moreover, the use of firm-level fixed effects means this relationship is estimated on the basis of inter-temporal changes in both R&D spend and trade marks. This is a different question from asking whether firms that engage in some R&D are also likely to use trade marks.⁸ Having noted this methodological issue, what might explain a weak or negative link between R&D expenditure and trade marks? One issue concerns the timing of innovative investment. If R&D is rising in the initial stages of the innovative process, whereas trade marking occurs in the final part of the development process, when the product or service is released onto the market, a negative association in the fixed effect model is plausible. If this is the reason behind the results it suggests that some individual firms have 'cycles' in R&D expenditure through time (i.e. a lack of persistent in R&D expenditure).⁹ In contrast, patent application counts are positively and significantly associated with trade mark counts, suggesting that such applications are complementary investments in the innovation process. That is, when firms patent a product, they have an increased likelihood of applying for a trade mark. Note that the coefficient implies that an additional patent application is associated with 0.056 trade mark applications. Therefore, the strength of this association is unlikely to

⁸ There does appear to be a relationship between doing at least some R&D and trade marking. For example, for the whole sample of firms, only 19.5% applied for one or more trade marks, while for those that did R&D, 42.8% applied for one or more trade marks (a Chi² test shows this difference is significant at the 1% level). Further empirical support for Belgium, Luxemburg and the Netherlands comes from Allegrezza and Guard-Rauchs (1999) who, using cross sectional data, find that firms which trade mark have higher R&D expenditure.

⁹ Volatility in R&D intensity (i.e. R&D/revenue) for Australian firms has been noted before (Bosworth and Rogers, 1998), but for the data here R&D expenditure *per se* appears quite persistent (a simple OLS regression of log(R&D) on its one year lag, for the 546 firms in sample B that have R&D data, yields a coefficient of 0.93 which is highly significant). Hence, any explanation based on a lack of persistence in R&D appears unlikely to be important.

explain much of the overall rise in trade mark activity. This is confirmed by the fact that the coefficient on the time trend is still approximately 0.08.

abic 5. Innovation and 112	aue Marking, 1995 to	2000
	Log Trade Marks	Trade Marks
	Fixed Effects	Count
Constant	-84.846	
	(1.96)*	
Log sales	0.356	0.358
-	(3.38)***	(14.80)***
Year	0.041	0.078
	(1.88)*	(13.39)***
R&D expenditure	0.000	-0.011
-	(0.32)	(5.89)***
Patent count	0.003	0.056
	(0.15)	(8.67)***
Observations	630	5076
Number of firms	105	846
\mathbf{R}^2	0.64	

Table 5: Innovation and Trade Marking, 1995 to 2000

Notes: Absolute value of t statistics in parentheses. *, ** and *** denotes significant at 10%, 5% and 1% level of significance, respectively. The fixed effects in the 'log trade marks' specification are significant at the 1% level..

4.3. Uncertainty

One approach to the economics of intellectual property suggests that the incentive to innovate is a strategic choice, and treats investment in intellectual property as a real option, where real options refer to the right, but not necessarily the obligation, to acquire or sell an asset (Pakes 1986; Reiss 1998; Bloom and Van Reenen 2002). This line of reasoning suggests that businesses apply for patents, trade marks or designs as an investment decision in times of economic uncertainty, but only complete the registration process—or use the intellectual property right—if it is felt that they will be pre-empted by competitors, or the product or service is likely to yield returns that make it worthwhile investing in intellectual property protection. This particular approach has only been applied to patents in the economics of intellectual property literature, although it is possible to think of trade marks performing a similar function. However, the ability to use trade marks as a strategic investment to be activated when required is somewhat limited, as after three years, unused trade marks may be removed from the trade marks register. This is

likely to occur if a trade mark registration is being held up by an existing registration that has not yet been utilised.

In order to test the uncertainty hypothesis, the base estimation is supplemented with a measure of the variance in profitability in each two digit industry in each year (this is a proxy for uncertainty in the industry in that year). The results of this estimation are given in Table 6. Again, the results of the base estimation and the innovation proxies remain broadly unchanged. For the 105 firm sample, the coefficient on the uncertainty proxy is insignificant, suggesting no role trade marks as real options. For the 846 firm sample, the coefficient on the uncertainty proxy is positive and significant. However, the coefficient magnitude of 0.001 implies that an increase of 10% in the standard deviation of profitability only increases the number of trade marks by 0.01.¹⁰ Hence, although the influence of uncertainty on trade mark activity is statistically significant, its practical importance appears limited. Again, the coefficients on the time trend are approximately the same as in Table 4, suggesting uncertainty explains none of the rise in trade mark activity.

	Log Trade Marks	Trade Marks
	Fixed Effects	Count
Constant	-90.193	
	(2.05)**	
Log sales	0.354	0.364
-	(3.37)***	(15.14)***
Year	0.044	0.084
	(1.97)**	(14.43)***
Standard deviation of profits	0.001	0.001
-	(0.49)	(3.22)***
Observations	630	5076
Number of firms	105	846
R^2	0.64	

Notes: The standard deviation of profitability is calculated for each two-digit ANZSIC industry in each year. Absolute value of t statistics in parentheses. *, ** and *** denotes significant at 10%, 5% and 1% level of significance, respectively. The fixed effects in the 'log trade marks' specification are significant at the 1% level.

¹⁰ The standard deviation of the uncertainty measure is 40%, with a mean of 21%. Similarly, the mean number of trade marks for the 846 sample is 2.4.

4.4. Legal changes

Intellectual property law as a discipline started to grow from about the mid 1970s, but only really took off in the early 1980s. This suggests that part of the interest in trade marks is that organisations are now more aware about their intellectual property rights than they were previously. Awareness of property rights, however, does not necessarily mean that protection of intellectual property rights is a useful pastime for organisations to engage in. Therefore, the rapid uptake of trade marks suggests that organisations perceive some benefit to their business by engaging in these sorts of activities.

On January 1 1996, the *Trade Marks Act 1995* commenced, replacing the *Trade Marks Act 1955*. According to Senator Chris Schacht the (then) Minister for Small Business, Customs and Construction, the new Act was designed to "refine and streamline the current trade marks system, and update it to reflect recent international developments" as well as "benefit users of the trade marks system through the introduction of simpler procedures that eliminate unnecessary steps, improved efficiency in the Trade Marks Office and being in tune with the realities of modern marketing" (Second Reading Speech, Trade Marks Bill 1995). Several important changes arose out of the Act that may have had an impact on the propensity of firms to trade mark. Those changes included:

- replacing the divided register with a single register, thereby streamlining and simplifying the process of obtaining trade mark registration;
- the introduction of multiclass applications, enabling applicants to apply for registration of a trade mark in several classes under the one application;
- the introduction of a "presumption of registrability", which means that any residual doubt as to a trade mark's registrability should be resolved in favour of the applicant;

- provision for new kinds of signs, such as packaging, shape, sound, colour, and scent trade marks;
- widening of the infringement test to include similar goods and services, rather than only the goods or services for which the trade mark is registered; and
- change from a 7 year registration and renewal term to 10 years.

As outlined above, there were several benefits in registering under the new system. The difficult question is how managers perceived the net value of these changes and, in turn, how this affected trade mark activity. Table 2 shows that firms in IBIS increased their applications in 1996 and some or all of this increase may reflect the (perceived) benefits to firms of the new system. However, there were further increases in 1997 and 1998, and again in 2000 for sample B, which suggests either other factors at work, or complex lag times in adjusting to the new system.

4.5. The Management of Intellectual Property

The greater use of trade marks by firms is likely to reflect a change in the management strategy of businesses. The issues discussed with respect to innovation, uncertainty and legal changes can all be viewed as interacting with management strategy to create changes in trade mark activity. Other catalysts are also possible. The mediums through which organisations can advertise have become much broader, hence a change in strategy utilising recognisable trade marks are required for consistency across mediums. Alternatively, recent research in marketing regarding brand creation and value-added suggests that there is growing recognition of incorporating trade marking, or IP more generally, into an overall management strategy. One extreme position would be to view these changes as a 'fad', with managers (over) reacting to the latest set of ideas pushed by consultants or gurus. However, there may well be rational reasons for managerial

strategy reflecting current trends in trade marking activity. Low overall usage of IP by all firms could represent an equilibrium (in the sense that the typical firm perceives limited benefits from IP), however, once a critical mass of firms start using IP, the threat from competitors increases, implying an incentive for all firms to engage in more IP activity. This process could be part of the explanation of the rapid rise in trade mark activity in the 1990s.

Is there evidence to suggest that the change in intellectual property management introduced only a short term boost to trade mark activity? There is some evidence of 1997 and 1998 being peak years, but for the 846 firm sample the year 2000 has higher applications. A managerial fad might also be expected to cause a short-lived increase in the proportion of firms applying for trade marks. However, for the 846 sample, although the proportion of firms trade marking did rise to 40 per cent in 1997, it did not decline much in 1998 and 1999, and then increased to 51 per cent in 2000. This pattern of activity suggests that the change in management strategy was not short lived, as might be expected by a 'fad'. In addition, the differences in trade mark activity across classes (Table 1) indicate that the trends reflect more than a short lived, managerial fad.

4.6. Competition

There are two competing hypotheses regarding the impact of increased trade marks (or brands) on competitive outcomes. The first of these is that an increase in trade marks increases the number of competitors for consumers, therefore leading to increased price competition, and presumably, cheaper prices for consumers (Cohen 2000). Clearly, this suggests lower profits for the firms (depending in part on how sensitive demand is to changes in price). Individual firms, however, cannot avoid this outcome as if they do not react to their competitors' trade marking strategy, they risk consumers becoming more aware of competitor brands.

Alternatively, some have argued that branding and trade marks can actually reduce the level of price competition. If the trade mark is associated with a dominant brand name, clearly this could

act as a barrier to entry to new firms (Tuominen 1999; Anand and Shachar 2000; Cohen 2000). Others have noted that incumbent firms may use brand proliferation to segment the market so that new entrants can only gain limited market share. It is also possible that brand proliferation leads to a larger amount of information regarding the product or service that the consumer has to absorb. The increase in information may therefore distort consumer choices if it cannot be processed adequately, causing sub-optimal consumption decisions. Businesses may then take advantage of consumer confusion by charging higher prices. In this instance, firms have an incentive to introduce multiple trade marks so as to increase the information asymmetry between themselves and consumers (Cohen 2000).

While the basic idea that firms may try to manipulate the competitive conditions they face is well-known¹¹ and intuitive, testing the importance of such ideas with data is much more difficult (see, for example, Sutton 1991; Sutton 1998). The problem is that there is no variable for 'strategic behaviour' and instead we have to infer its presence from observing outcomes. One possible outcome is the level of profitability for the firm (or industry): if profitability is relatively high (sometimes called 'supernormal' profits) this may imply that barriers to entry, including use of IP, may have reduced competition. However, assessing the whether profits are at the 'normal' level is difficult, as firms and industries have specific risk profiles, accounting procedures, financing structures and other idiosyncrasies. Equally, the level of profitability may be a causal factor in the level of IP activity, meaning that any modelling approach must use a system of simultaneous equations. These issues are beyond the scope of this paper and the data available here.

¹¹ See Tirole (1988) for a comprehensive textbook on the issue of strategic interaction.

Despite the difficulties with this area of analysis, it is possible to use certain established methods to indicate whether trade mark activity may have caused more or less competition. The specific method is referred to as profit persistence analysis (Mueller and Cubbin 1990; Waring 1996; Goddard and Wilson 1999; Glen, *et al.* 2001). A simple profit persistence model can be written:

$$\pi_{i,t} = \alpha_i + \beta \pi_{i,t-1} + \varepsilon_{it}$$
^[2]

where π_{it} is firm *i*'s profits in year *t*, α_j is industry dummy, β represents the persistence to a profit shock and ε_{it} is a standard error term. A β coefficient close to zero implies little persistence and, by implication, a competitive environment (i.e. any positive profit shock due, say, to an innovation, is rapidly competed away by rivals). In contrast, when $\beta>0$, profit shocks persist and the implication is that the competitive process is less strong. In general, the value for β could vary across industries, through time, or even across firms. However, given the data available here, and the objective of the paper, the aim is to test whether β varies between IP active and IP inactive firms. If undertaking trade marking (or patenting) has the effect of reducing competition, this should raise the value of β , since competitors would find it more difficult to compete away profits. Interacting a dummy for trade marking with the lagged value of profitability, and entering this interaction term in a regression of [2], provides a simple method of testing this hypothesis. The results for these regressions are shown in Table 7.¹² The results indicate that trade mark activity does raise the persistence of profitability. A similar result is found for patent activity. The increases in persistence are relatively small, which might be expected if trade mark activity is only one component of the strategic process to improve

¹² In preliminary analysis it became clear that the persistence of profitability for small firms (less than 100 million total revenue) was less than for larger firms, as one would expect if size is an indicator of market power. For this reason firms with less than 100 million turnover are excluded from the sample shown in Table 7 (around 30% of the sample).

profitability. These simple regressions suggest, therefore, that there may be some validity to the argument that IP activity reduces competitive pressures in the short run, although clearly the analysis does not indicate the long run outcome, or the overall social value from IP.

Table /: Profit persistence and Intellectual Property activity, 1996 to 2000										
	Return on	Return on Assets	Return on Assets							
	Assets	(Trade Mark Dummy)	(Patent Dummy)							
Constant	0.362	0.381	-0.165							
	-0.14	-0.15	-0.07							
Return on assets (RoA) lagged	0.69	0.664	0.684							
one period	(52.61)***	(45.77)***	(50.87)***							
Lagged RoA interaction with		0.065								
trade mark application dummy		(4.18)***								
Lagged RoA interaction with			0.047							
patent application dummy			(2.16)**							
Industry dummies	Yes	Yes	Yes							
Observations	3285	3285	3285							
R^2	0.62	0.63	0.62							

T 11 **7** D 4 11 1 D 100/ 2000

Notes: Dependent variable is return on assets (which has been restricted to values between -10% and 50%, as in Waring, 1996). The sample used is includes all firms in IBISWorld that are in the data for all 6 years (1995 to 2000). Absolute value of t statistics in parentheses. *, ** and *** denotes significant at 10%, 5% and 1% level of significance, respectively. The fixed effects in the 'log trade marks' specification are significant at the 1% level.

Although these results provide no direct insight into the rise in trade mark activity in Australia, they do reveal the potential benefits from trade mark activity. It is also possible that the various microeconomic reforms in Australia since the 1980s have increased the general level of competition faced by firms. This, in turn, may have raised the incentives for firms to use intellectual property as a partial defence. However, there is little quantitative data on the trends in competitive pressure to investigate this possibility.

5. Management strategy: some survey evidence

The previous sections have made clear that it is the interaction between management strategy and external economic forces that is most likely to be behind the rise of trade marking. This section considers how managerial strategy can impact on intellectual property activity. Data on these issues are scarce and here the results of a management survey in 2001, undertaken by the Melbourne Institute of Applied Economic and Social Research, are used. Although this point-intime survey is inappropriate to pursuing inter-temporal changes in trade marking, it provides important background to the issues considered. The results from the survey identified brand name and marketing as the second most effective method of protecting the competitive advantages of new or improved products and processes that the organisation has invented, as shown in Table 8. In contrast, patenting ranked the lowest (although there is no control here for what market the firm was operating in).

The above survey also allows the matching of the trade mark information with the survey questions. Similarly to the analysis earlier in the paper, the IBISWorld Business Database supplemented with information provided by IP Australia on patents, trade marks and designs, as well as the survey questions on management style and competitive strategy. As such, it is possible to estimate, albeit on a cross-sectional basis, whether particular types of competitive strategy, management style or market environment are associated with trade marking activity. The results of this analysis are presented in Table 9, which shows regressions of a count model with trade marks as the dependent variable.

	Very						Very	
	ineffective	2	3	4	5	6	effective	
		Р	er cent	of resp	ondents	5		Mean
Product protection								
Patents to prevent duplication	22	13	10	23	15	11	6	3.54
Secrecy	15	16	13	26	18	11	2	3.57
Lead time	5	10	13	29	23	16	4	4.17
Moving quickly down the learning curve	4	7	9	27	33	17	3	4.40
Control over distribution	8	12	7	21	25	21	5	4.28
Brand name & marketing	4	4	7	13	22	34	17	5.13
Organisation know-how & capabilities	1	3	2	10	27	41	16	5.47
Product & production complexity	4	8	11	19	25	26	8	4.62
Process protection								
Patents to prevent duplication	24	18	12	22	11	9	3	3.18
Secrecy	13	20	15	22	16	13	2	3.55
Lead time	5	13	12	29	27	13	1	4.02
Moving quickly down the learning curve	3	9	7	31	32	16	3	4.39
Control over distribution	7	13	11	21	23	21	3	4.14
Brand name & marketing	6	9	8	19	21	26	11	4.62
Organisation know-how & capabilities	1	3	5	12	27	36	16	5.34
Product & production complexity	5	7	9	22	28	22	7	4.55

 Table 8: Effectiveness of Different Methods in Protecting the Competitive Advantages of New or Improved Products and Processes, 2001

Source: Melbourne Institute of Applied Economic and Social Research, Melbourne Institute Business Survey, unpublished data.

The first panel of results are concerned with the role of management style. Firms with a bold management style are those that favour high-risk projects and take an aggressive attitude towards initiating change (for further information on how these variables are constructed, see the Appendix). Firms with an intuitive management style rely on intuition and experience to make strategic decisions, rather than formal quantitative and systematic analysis of information. There is some weak evidence (at the 10 per cent level of significance) that organisations that tend towards an intuitive management style have fewer trade mark counts, suggesting that rules-of-thumb management strategies are not particularly conducive to the use of trade marks as part of an overall strategic plan.

The second panel of results concerns firms' competitive strategy. Firms that take a product leader approach to their competitive strategy—that is, they are first to market with new products or services, or produce a continuous stream of state-of-the-art products or services—appear to

trade mark more than those organisations that do not adopt this approach. This provides some evidence that trade marking is an important part of the launch of new and innovative products by Australian firms that consider themselves market leaders.

	Cross sectio	n count estimation
_	Coefficient	Standard Error
Management style		
Constant	2.65	1.165**
Bold	0.20	0.138
Intuitive	-0.44	0.228*
Observations	254	
Log likelihood	-3044.09	
Pseudo R ²	0.0601	
Competitive strategy		
Constant	0.04	1.119
Cost focussed	0.17	0.131
Customer focussed	-0.10	0.213
Product leader	0.24	0.115**
Price taker	0.08	0.115
Observations ^a	256	
Log likelihood	-2778.31	
Pseudo R ²	0.0295	

 Table 9: Trade Marking, Management Style, Competitive Strategy and Market Conditions, 2001

Notes. *, ** and *** represent significant at the 10, 5 and 1 per cent levels of significance respectively.

It is worth noting that just because a trade mark law exists, it may not be in the best interests of firms to use them, either because of the cost of registering, or the difficulty in defending their property rights. Research in the US on patents suggests such issues dissuade smaller firms from using the intellectual property protection system (Hall and Ham 1999; Cohen *et al.* 2000). Future research should involve investigating why particular groups of businesses are not interested in utilising the intellectual property protection system. In particular, it needs to be determined whether this is a rational and economically efficient choice on the part of businesses, or whether something needs to be done regarding the protection of intellectual property because of a fault in the system.

6. Conclusion

The purpose of this paper was to provide some preliminary analysis regarding the pattern of trade marking by Australian firms, with a focus on understanding the rise in trade marking in the 1990s. Section 2 shows that the rise in trade marking out paced economic activity, with trade marks per \$billion of GDP more than doubling in the 1990s. An analysis of growth in trade marks by class indicates that the rise in trade marking occurred across many different industries and activities, suggesting that simple industry-specific explanations for the rise – such as the dot.com or telecommunications boom – are incorrect. The subsequent sections of the paper conduct a microeconomic analysis on a unique database that combines financial data with intellectual property activity for Australian firms. This database consists of medium to large organisations, and we would be cautious in generalising these results to the rest of the economy. Nevertheless, some useful observations can be made.

If attention is restricted to trade mark activity by businesses, the rise in trade marking activity can be attributed to one or more of the following: more trade mark activity by frequent trade markers, firms which trade mark infrequently increasing activity, and/or a rise in trade marking by 'new' firms. Section 3 of the paper analyses these possibilities. The results suggest that all three avenues have played some part in the rise in trade marking: the rise in business trade marking in the 1990s reflects a wide ranging change in behaviour across many firm types. However, the categories of firms that appear to have contributed most are established firms that trade mark infrequently and 'new' firms. For example, regression analysis suggests frequent trade marking firms increased activity by 4 per cent per annum, while for infrequent trade markers the figure was 8 per cent.

The evidence shows that there has been an important change in business use of trade marks. What could have driven this increase? This question is investigated in section 4. Five possible reasons are considered: an increase in the rate of innovation, an increase in uncertainty, legal and administrative changes, management fads and strategic behaviour. Regression analysis on firmlevel data is used to investigate these reasons where appropriate. The regression analysis suggest trade mark activity is positively linked to patent activity for many firms, but there is no positive association with the dollar value of R&D expenditure, at least contemporaneously. These results suggest that the rise in trade marking does not reflect a rise in innovation, although there is an important caveat: R&D and patent data are proxies for traditional, manufacturing-based innovative activity, hence the analysis may fail to detect changes in the service sector. Additionally, a regression analysis of the role of uncertainty, proxied by the variation of profitability within the industry, finds that a more uncertain environment is associated with more trade mark activity. Although this result confirms theoretical work on the option value of IP, the results also suggest that the strength of this association is small and cannot account for the rise in trade marking in the 1990s.

Although it is not possible to directly test the outcome of the legal and administrative changes that occurred to the trade mark system from 1996, the analysis suggests that these could, at most, only account for some of the rapid rise. More specifically, trade mark activity did not peak in 1995 or 1996, as might be expected if the changes were perceived as negative or positive by firms. Instead, trade mark activity for firms reached local maxima in 1997 and 1998, and an overall maximum in 2000 for many of the firms. Although this could be due to complex lag times and adjustment processes, this seems unlikely.

The issue of a change in management strategy towards the net benefits of trade marking is obviously central to explaining the rise in activity. Clearly, if one accepts that managers are (predominantly) rational, the expected net value of a trade mark must have increased over the period. Despite this, some might argue that the increases in trade mark activity reflected a managerial fad, rather than being based on changes in real economic variables. Again, although it is not possible to directly test for the existence of a managerial 'fad', the analysis suggests this argument could not explain the magnitude of the increases in trade mark activity.

The general, if not unsurprising, conclusion is that the rapid rise in trade mark activity was driven by changes in management strategy towards trade mark activity. More interestingly, it does not appear that this was simply a managerial 'fad' based on no real underlying benefits. Instead, the increases reflect changes in the economic environment to which managers have responded. This said, it may be that some firms had a backlog of un-trade marked products and services that led to bursts of trade mark activity. It does not appear that increased uncertainty in the business environment or increases in innovation are the fundamental economic factors are work. A further possibility is that firms are operating in an increasingly competitive environment, in which intellectual property is one of the strategic variables. An analysis of the persistence of profitability, which is expected to fall with increased competitive pressure, does confirm that trade mark- and patent-active firms do preserve profits longer. However, we are unable to directly test the hypotheses that competitive pressures have increased and intellectual property use has become much more critical to firm performance.

References

- Allegrezza, S. and A. Guard-Rauchs (1999). "The Determinants of Trademark Deposits: An Econometric Investigation (A Case Study of the BENELUX)." <u>Economic Appliquee</u> 52(2): 51-68.
- Bloom, N. and J. Van Reenen (2002). "Patents, Real Options and Firm Performance." <u>The</u> <u>Economic Journal</u> **112**: 97-116.
- Bosworth, D. and H. Mahdian (1999). "Returns to Intellectual Property in the Pharmaceuticals Sector." <u>Economie Appliquee</u> **52**(2): 69-93.
- Bosworth, D. and M. Rogers (2001). "Market Value, R&D and Intellectual Property: An Empirical Analysis of Large Australian Firms." Economic Record 77(239): 323-337.
- Cohen, M. (2000). "The Impact of Brand Selection on Price Competition: A Double-Edged Sword." <u>Applied Economics</u> **32**(5): 601-609.
- Cohen, W. M., R. R. Nelson, et al. (2000). Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not), National Bureau of Economic Research: 50.
- Glen, J., K. Lee, et al. (2001). "Persistence of Profitability and Competition in Emerging Markets." <u>Economics Letters</u> 72(2): 247-253.
- Goddard, J. A. and J. O. S. Wilson (1999). "The Persistence of Profit: A New Empirical Interpretation." International Journal of Industrial Organization 17(5): 663-687.

- Grupp, H. and S. Maital (2001). <u>Managing New Product Development and Innovation: A</u> <u>Microeconomic Toolbox</u>. Cheltenham, Edward Elgar.
- Hall, B. H. and R. M. Ham (1999). The Patent Paradox Revisited: Determinants of Patenting in the US Semiconductor Industry, 1980-94, University of California, Berkeley: 44.
- Keller, K. L. (2000). Building and Managing Corporate Brand Equity. <u>The Expressive</u> <u>Organization: Linking Identity, Reputation and the Corporate Brand</u>. M. Schultz, M. J. Hatch and M. H. Larsen. Oxford, Oxford University Press.
- Mueller, D. C. and J. Cubbin (1990). <u>The Dynamics of Company Profits: An International</u> <u>Comparison</u>. Cambridge, Cambridge University Press.
- Pakes, A. (1986). "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks." <u>Econometrica</u> **54**(4): 755-784.
- Reiss, A. (1998). "Investment in Innovations and Competition: An Option Pricing Approach."
 <u>The Quarterly Review of Economics and Finance</u> 38(Special Issue): 635-650.
- Sullivan, M. W. and C. J. Simon (1993). "The Measurement and Determinants of Brand Equity: A Financial Approach." <u>Marketing Science</u> **12**(1): 28-52.
- Summers, P. (2001). Forecasting Patent Renewals and Trademark Applications: Modelling demand for the services of IP Australia. Melbourne, Melbourne Institute of Applied Economic and Social Research, University of Melbourne: 19.
- Sutton, J. (1991). <u>Sunk Costs and Market Structure: Price Competition, Advertising, and the</u> <u>Evolution of Concentration</u>. Cambridge, MIT Press.

- Sutton, J. (1998). <u>Technology and Market Structure: Theory and History</u>. Cambridge, MIT Press.
- Troy, K. (1998). Managing the Corporate Brand. New York, The Conference Board.
- Tuominen, P. (1999). "Managing Brand Equity." <u>The Finnish Journal of Business Economics</u> **48**(1): 65-100.
- Waring, G. F. (1996). "Industry Differences in the Persistence of Firm-Specific Returns." <u>American Economic Review</u> 86(5): 1253-1265.

Appendix

The variables bold, intuitive, cost focussed, customer focussed, product leader and price taker are derived from a summated scale of questions asked in the Melbourne Institute Business Survey.

'Bold' is constructed using questions 1a though to 2c under 'management style'. 'Intuitive' is constructed using questions 3a to 3d under 'management style'. 'Cost focussed' is calculated using the first three statements, that is, (a) to (c) under 'competitive strategy'. 'Customer focussed' is calculated using statements (d) to (f) under competitive strategy. 'Product leader' is calculated using statements (g) to (j) under competitive strategy. 'Price taker' is calculated using statements (k) to (m) under competitive strategy.

Management style

1. In general, the top managers of my organi	isatio	n fa	ivoi	ır				
a. A strong emphasis on the marketing of tried and true products and services.	1	2	3	4	5	6	7	A strong emphasis on R&D, technological leadership, and innovation.
b. Low-risk projects with normal and certain rates of return.	1	2	3	4	5	6	7	High-risk projects with chances of very high returns.
c. A cautious, 'wait and see' posture in order to minimise the probability of making costly decisions when faced with uncertainty.	1	2	3	4	5	6	7	A bold, aggressive posture in order to maximise the probability of exploiting potential when faced with uncertainty.
2. In dealing with its competitors, my organiz	satio	n						
a. Typically responds to actions which competitors initiate.	1	2	3	4	5	6	7	Typically initiates actions to which competitors then respond.
b. Is very seldom the first organisation to					_	,	_	Is very often the first organisation to
introduce new products/ services, operating technologies, etc.	1	2	3	4	5	6	7	introduce new products/services, operating technologies, etc.
c. Typically seeks to avoid competitive		_			_	_	_	Typically adopts a very competitive, 'undo-
clashes, preferring a 'live-and-let- live'	1	2	3	4	5	6	7	the-competitor' posture.

3. To what extent do the following statements best describe <u>your workplace's competitive strategy</u>? (On each row, circle <u>one</u> number on the 1 to 7 scale.)

		Strong	ly				Stron	ıgly
		disagr	ee				ag	gree
a.	Our major operating and strategic decisions nearly always result from							
	extensive quantitative analysis of data	1	2	3	4	5	6	7

b.	Our major operating and strategic decisions are nearly always detailed in formal written reports.	1	2	3	4	5	6	7
c.	We rely principally on experienced-based intuition (rather than quantitative analysis) when making major operating and strategic decisions	1	2	3	4	5	6	7
d.	In general, our major operating and strategic decisions are much more affected by industry experience and lessons learned than by the results of formal research and systematic evaluation of alternatives	1	2	3	4	5	6	7
e.	Our major operating and strategic decisions rely on 'rules of thumb' developed from the success of past decisions.	1	2	3	4	5	6	7

Competitive strategy

To what extent do the following statements best describe <u>your workplace's competitive strategy</u>? (On each row, circle <u>one</u> number on the 1 to 7 scale.)

							A 1	very
		Not					g	reat
		at all					ex	tent
a.	Increases operating efficiencies.	1	2	3	4	5	6	7
b.	Develops new process innovations that reduce costs	1	2	3	4	5	6	7
c.	Focuses on increasing productivity	1	2	3	4	5	6	7
d.	Tailors and shapes products/services to fit customers' needs.	1	2	3	4	5	6	7
e.	Develops customer loyalty	1	2	3	4	5	6	7
f.	Has the flexibility to quickly respond to customer needs.	1	2	3	4	5	6	7
g.	Produces a continuous stream of state-of-the-art products/services	1	2	3	4	5	6	7
h.	Is 'first to market' with new products/services.	1	2	3	4	5	6	7
i.	Responds to early market signals concerning areas of opportunity	1	2	3	4	5	6	7
j.	Develops products/services which are considered the best in the industry.	1	2	3	4	5	6	7
k.	Produces products/services at a cost level lower than that of our competitors	1	2	3	4			7
1.	Prices below competitors	1	2	3	4	5	6	7
m.	Produces products/services for lower-priced market segments	1	2	3	4	5	6	7