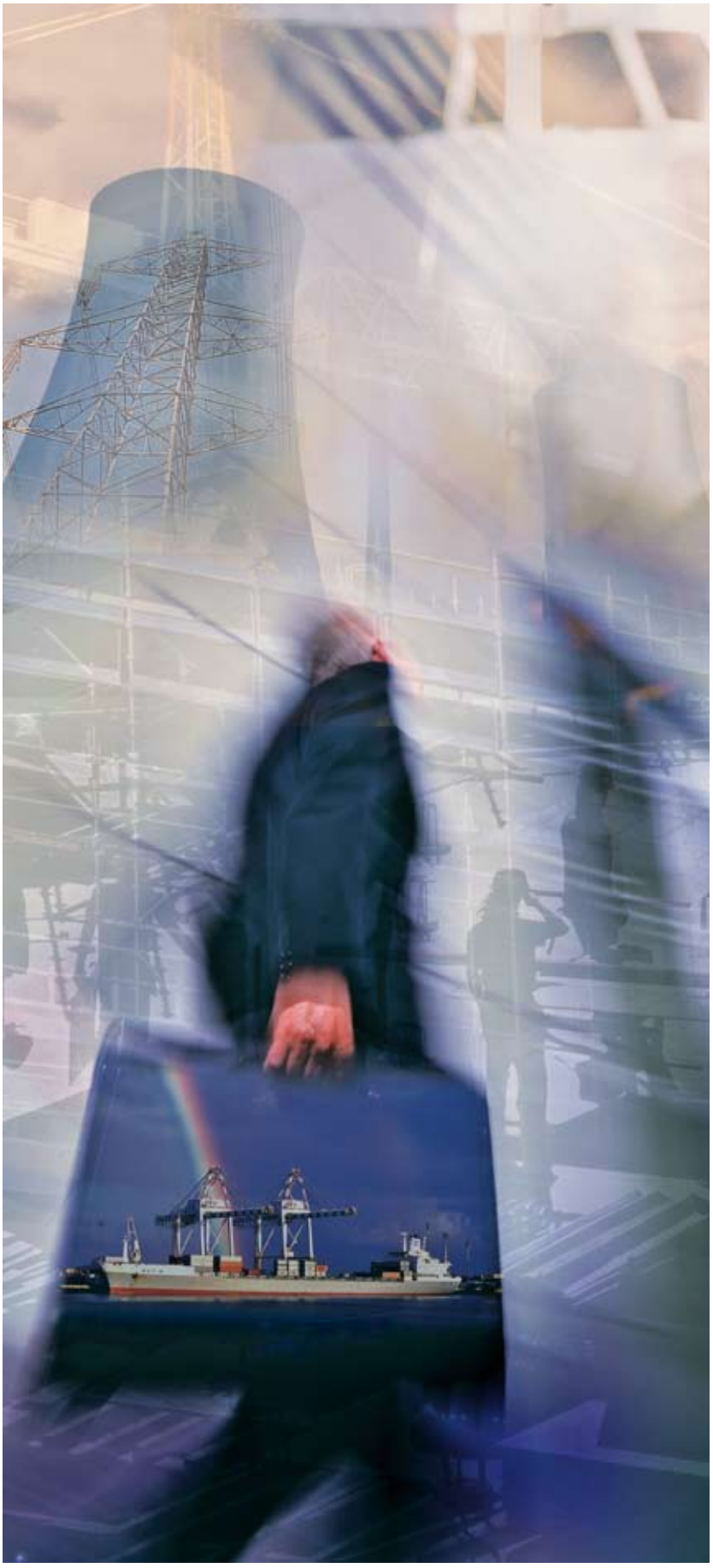

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What Creates Abnormal Profits: Collusion, Efficiency or Strategy?[1]

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Abstract

The debate regarding the determinants of persistent abnormal profits is re-examined using a new approach to the measurement of profits which explicitly accounts for intangible capital. Abnormal profits are estimated using data on tangible and intangible capital for 1600 Australian firms over a 16-year period. The determinants of abnormal profits are then estimated using variables collated from separate accounting and administrative company records data as well as an in-house survey of innovation and management practices. Our results imply that firm-specific factors relating to efficiency and strategy are much larger than the industry-specific effects of collusion.

I. Introduction

Debate over the causes of persistent firm profitability has raged in the industrial economics and strategic management literatures over the last 50 years or more. On one side of the ledger lie the *industry-collusion* economists who, following Bain (1956), argue that technologically-created entry barriers create opportunities for collusion and the extraction of monopoly profits (see Baumol and

[1] The authors would particularly like to thank Stefanie Schurer, Jonathan Temple, Hielke Buddelmeyer, Umut Oguzoglu, Bill Griffiths, Derek Bosworth, Mark Rogers, Jongsay Yong, John Creedy, Stephen King, Jonathan West, Kwanghui Lim, an anonymous referee, members of the Melbourne University Microeconometrics Workshop and seminar participants at the University of Tasmania for comments on this paper. Thanks must also go to Rod Crawford, Sean Applegate, Paul Mills and Leanne McConchie from IP Australia for providing the data on registered intellectual property rights and to Phil Ruthven, Jason Baker and Peter Headberry from IBISWorld for providing firm performance data.

Willig 1981; Schmalensee 1985; Perrakis and Warskett 1986; Scherer and Ross 1990; McGahan and Porter 1999). Such barriers to entry undermine social welfare by enabling firms to curtail production and raise price.[2]

On the other side are the *firm-efficiency* economists, such as Demsetz (1973) and Brozen (1971), who have argued that the accumulation of unique internal resources provides cost advantages for firms and that this superior efficiency enables firms to grow in size and generate above-normal profits. Higher levels of industry concentration are simply a by-product of this process.[3] The two explanations have fundamentally different welfare implications since the *industry-collusion* view implies that the observed profits arise from welfare-reducing activities, while the *firm-efficiency* view implies that the observed profits arise from welfare-enhancing activities.[4]

One of the premises of this paper is that the debate between the *industry-collusion* and *firm-efficiency* schools of thought is essentially an empirical one since each theory provides plausible *a priori* explanations of the observed phenomenon. However, there are two fundamental problems with the approach adopted by the empirical literature to disentangle the competing theories. First and foremost is the measurement of profits. In particular, most of the available empirical studies rely on measures of profits that do not adequately account for intangible capital, or, differentiate between normal/abnormal risk.[5] Instead, the literature has focused on trying to disentangle the complex causal relationships

[2] Baumol and Willig (1981, p.408) explicitly define barriers to exclude incumbent advantages associated with lower costs.

[3] In addition, Mancke (1974) has shown deductively how a positive relationship between market concentration and profitability can be jointly determined even when returns are random across firms and over time, provided firms automatically re-invest a portion of last period's profits.

[4] Demsetz persuasively argued that his interpretation of the observed facts was based on cost-side efficiency improvements (which are welfare-enhancing) rather than demand-side strategies or *ex post* limits to competition (which may not be).

[5] To be fair, the importance of these issues is well known, it is just that they are extremely difficult to account for. This problem is noted by McGahan and Porter (1997) who state that: "Our study is limited by the shortcomings in accounting

between market share, industry concentration and profits. This effort is not misplaced, but measurement of the dependent variable itself is a more elemental problem. To address this shortcoming, in our paper proxies for intangible capital and market uncertainty are included in the measurement of profits. The importance of accounting for intangible capital is highlighted by the fact that recent estimates suggest that about one third of all company assets are intangible (see Webster 2000).

Secondly, the literature has typically attempted to examine the role of firm efficiency using either firm dummy variables or firm-specific market share. One problem with this approach is that market share reveals the extent of past successful efficiency, strategy *and* rent-seeking activities and is therefore an imperfect proxy for the *firm-efficiency* hypothesis. Use of a simple market share variable doesn't enable us to identify which of these factors are the sources of increased market share (and thus profitability). Given the recent emergence of the strategic management literature, this appears to be an important lacuna in our understanding of the forces shaping firms' competitive advantage and the generation of abnormal profits.

In this paper, we take a step forward in our understanding of these issues through the inclusion of *a set of firm-specific variables* in our model. Over and above market share, we incorporate survey-based measures of the firm's capabilities, the inimitability of its resources, and its competitive strategy into our model.[6] While this approach does not perfectly separate the effects of different firm-specific behaviour, it enables us to examine the effects of accumulated returns to efficiency, strategy and rent-

measures of profit. Because accounting conventions exclude intangible assets from the balance sheet, measured assets may be too low…." (p.17).

[6] See Lippman and Rumelt (1982) for a discussion of uncertain imitability and inter-firm efficiency differences.

seeking activities (proxied by market share) and current strategic positioning (proxied by other firm-specific variables) on abnormal profits.[7]

The analysis is undertaken in two stages. In the first stage, we construct an unbalanced panel dataset which includes data on profits, tangible capital and proxies for intangible capital – such as patent and trade mark stocks – for 1600 Australian firms over a 16-year period. Estimates of long-run profitability for each company are then obtained using a linear least squares dummy variable (LSDV) approach. The estimated firm fixed-effects are interpreted as an estimate of abnormal profits. In the second stage, we examine the relationship between estimated abnormal profits, industry characteristics and a set of firm-specific variables. Our study is the first we know of that has addressed the determinants of abnormal profits using matched company accounting data with patent office data and survey data. It is this novel dataset that enables us to re-examine the relative importance of efficiency, collusion and strategy on long-run profitability.

This paper is organised as follows. Section II further discusses the distinguishing features of the three views of persistent abnormal profits. Section III provides some definitions of the concepts used in this paper and develops a model of profits while Section IV discusses the data set used and provides some detailed descriptive statistics. The results and analysis are presented in Section V. Finally, Section VI presents some conclusions and policy implications.

II. Theories of Persistent Abnormal Profits

[7] Ideally, we would also like to separate accumulated returns to efficiency from accumulated returns to strategy. However, as we will see when we present more detail on the survey data, we only observe the firm's current (or forward-looking) strategic intent. Therefore, accumulated returns to strategy remain embedded in our market share variable. Nevertheless, there may be a positive relationship between current strategy and past strategy.

Understanding the existence and causes of abnormal profit is among the most enduring issues in the study of economics. Smith (1776) argued that when few sellers existed in a market, competition would fail to fully discipline the firms and collusive price setting, tacit or otherwise, could flourish unchecked. One explanation of the fewness of sellers in a market is the presence of barriers to entry. Such barriers have been variously attributed to laws and government fiat (Smith 1776); sunk costs (Baumol and Willig 1981); economies of scale (Bain 1968); advertising (Bain 1968); and differential cost functions (Stigler 1968). These theories all argued that the genesis of barriers to entry is exogenous to the firm's managerial decisions. In such a world, industry concentration creates conditions conducive to collusion and the generation of abnormal (collusion) profits. We refer to this as the *industry-collusion* view of abnormal profits.

This view was challenged by the *firm-efficiency* school of thought pioneered by Brozen (1971) and Demsetz (1973, 1979, 1982). They argued that market concentration and abnormal profits may simply be by-products of sustained superior efficiency rather than an abuse of market power. Barriers to entry, and the resultant concentration, are natural outcomes of firms striving for efficiency in the context of uncertainty, resource heterogeneity and factor immobility. Rivals of successful firms have difficulty copying the complete suite of profitable intangible assets since this requires replication of the entire accumulation path. In this view of the world, barriers to entry are endogenous and are the result of firms moving to a more efficient point along the cost curve.

Since the early 1980s, the *firm-efficiency* view has been extended by the bourgeoning management literature known as the resource- (or knowledge-) based views of the firm and the strategic-management literature (see Wernerfelt 1984; Rumelt 1984, 1991; Barney 1991; Peteraf 1993; Teece and Pisano 1994; Peteraf and Barney 2003). At the heart of this literature is the notion that firms strive

to achieve and maintain a competitive advantage. As Rumelt (1991, p.167, 173) states: profitability arises from the 'unique endowments and actions of business corporations…which include business-specific skills, …reputations,…learning, patents and other intangible contributions…'. This line of argument resonates with Demsetz's reasoning regarding the importance of the firm's unique and inimitable resources. However, management theorists place more emphasis on: the diversity of inimitable resources including strategies – such as the use of patents and trademarks – to limit *ex post* competition and inhibit imitation; the cultivation of skills and capabilities to build and sustain the firm's competitive advantage; and the strategic positioning of the firm as the dominant player in the market. Such behaviour may not be welfare-enhancing since (endogenously-determined) barriers to entry may be due to pure rent-seeking behaviour by the firm – such as predatory pricing or the creation of patent thickets – rather than any efficiency-enhancing behaviour.

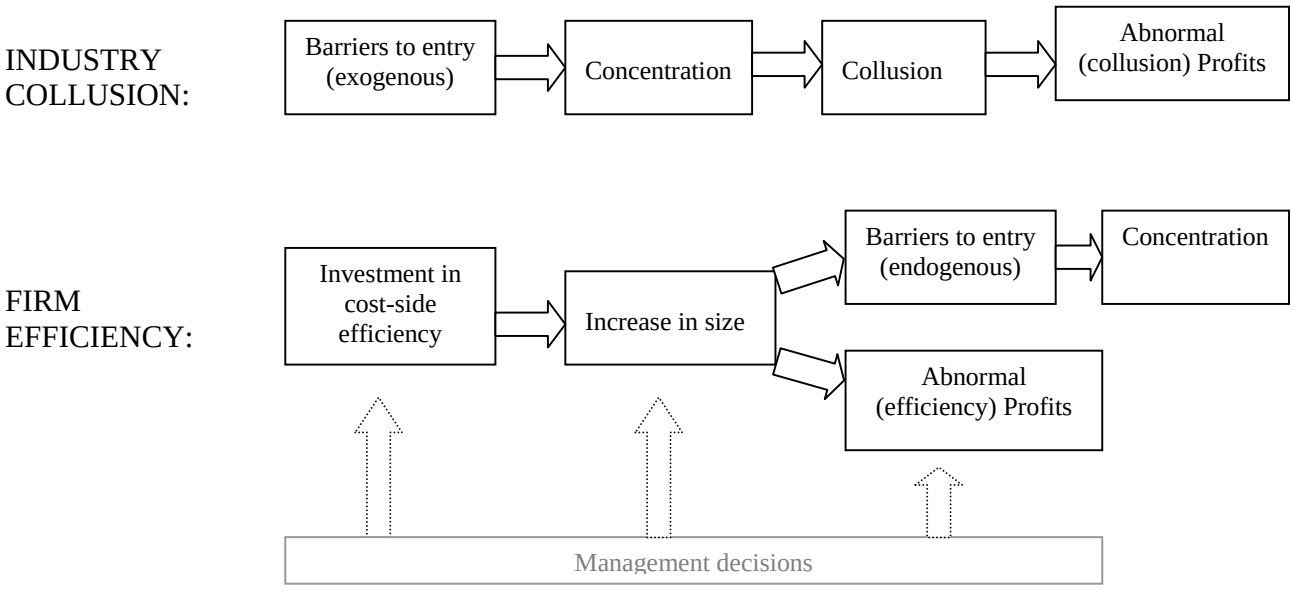
While the theory of collusion is well-specified and testable, these strategic management and the resource-based views are more amorphous. Weick (1980) denotes the latter as 'theories of the middle range'.[8] They represent an agglomeration of conjectures about firm profitability rather than clear, well-defined, refutable theories.[9] There is such an array of behaviours which create and protect competitive advantage (and profits) in the resource-based view that the absence of a specific behaviour is not inconsistent with any of its predictions.

One of the problems for researchers interested in examining the sources of persistent abnormal profits is untangling cause from effect and correlation. To see this more clearly, we summarise the lines of causation implies by the two theories in Figure 1 below. According to the *industry-collusion* view,

[8] A pragmatic interpretation taken, for example, by Kapoor and Lim (2007).
[9] That is, a well-defined theory must make an observation that could disprove the theory as false.

abnormal profits can arise only in the presence of market concentration whereas according to the *firm-efficiency* view, abnormal profits may go hand-in-hand with, but are not caused by, concentration. Another important difference between the two theories is that while efficiency profits are typically a consequence of firm size, the existence of collusion profits should not be related to firm size *per se* (since firms of all sizes benefit from monopoly prices). However, industries usually only achieve concentration by the growth of one or more of its constituent firms. Accordingly, we are able to say that once the level of industry concentration has been accounted for, market share should have no effect on profits if the *industry-collusion* view is correct. Once we are able to control for market share, concentration should have no effect on profits if the *firm-efficiency* view is correct.

Figure 1: Theories regarding the creation of abnormal profits



III. Modelling Profits

Theoretical Model

Profits (Π) are defined as company incomes net of payment for consumables, interest, depreciation and tax. The annual rate of profitability (π) of shareholders' investments is the level of profits in a given year divided by the present value of all investments made by shareholders in the company since its inception. Shareholder investments include all injections of equity through new share issues and retained earnings. In accounting parlance, shareholders' funds (equity), at the start of the year, should represent the present value of investment at that time if all asset values have been re-valued for unanticipated market changes and inflation, and if all expenditures which are expected to yield returns beyond a year are classified as investments.

Firm *i*'s rate of profit, at time *t*, may be decomposed into a normal rate (n), an abnormal rate (a) and a temporary windfall gain (ω):

$$\pi_{i,t} \equiv n + a_i + \omega_t \qquad (1)$$

Ex ante normal profit consists of the opportunity cost of capital (i.e. the default-free interest rate) and the return to the average level of business risk and uncertainty.[10] Abnormal profits are persistent profits which are above or below this normal rate of profit.[11] Accordingly, whether a firm generates above-normal profits depends on how one estimates the premium for average risk and uncertainty.[12] Windfall

[10] Knight (1921) showed that profits are not required to compensate for risk if there are enough repeat observations to provide a (near) certain outcome. By definition, certainty does not arise from pooling uncertain occurrences.

[11] We use the term "abnormal profits" here in preference to similar concepts such as "monopoly profits" or "supernormal profits" since the prefix "abnormal" clearly articulates that the rate of profit could be above *or below* the normal rate. Moreover, it is a neutral term which doesn't attribute the source of the profit to any specific factor – abnormal profits could be due to market power (i.e. monopoly profits) or superior efficiency (i.e. efficiency profits).

[12] Demsetz (1973, p.3) points out that high profits do not arise from artificial scarcity and collusion but are due to 'the combination of great uncertainty plus luck or atypical insight'.

profits are unexpected and represent temporary gains due to transient macroeconomic conditions, *inter alia*.[13]

From the above discussion, abnormal profits, then, may be composed of returns to collusion (*c*), efficiency (*e*), firm-specific strategic management factors (*m*), and returns to (above or below) average levels of risk and uncertainty (*u*):

$$a_i \equiv c_i + e_i + m_i + u_i \qquad (2)$$

Note that returns to abnormal uncertainty cannot be calculated objectively since, by definition, there are few data upon which to forecast outcomes. This is particularly relevant to intangible investment, such as R&D, since firms typically do not know *ex ante* whether the investment will result in a final product (i.e. there is technological uncertainty) or whether the final product will find a niche in the market (i.e. there is market uncertainty). However, as we shall illustrate below, subjective measures can be constructed to proxy for abnormal risk and uncertainty.

The absolute level of profit for firm *i* in year *t* is:

$$\Pi_{i,t} \equiv \pi_{i,t} K_{i,t} \qquad (3)$$

where *K* is the accumulation of prior shareholder investments (depreciated for obsolescence). Substituting Equations (1) and (2) into Equation (3) gives:

$$\Pi_{i,t} \equiv \left(c_i + e_i + m_i + u_i\right) K_{i,t} + nK_{i,t} + \Omega_t \qquad (4)$$

[13] Windfall gains could also be attributable to firm-specific external shocks, but for simplicity, we do not allow for that possibility in our model.

In this model, the abnormal profit variables – c_i, e_i, m_i and u_i – are firm-specific but time-invariant, the normal profit variable, n, is common across the whole economy, and to simplify matters, we assume the windfall gain variable, $\Omega(=\omega K)$, is only time-varying.

Investors' capital, K, consists of both tangible (TK) and intangible (IK) assets less that part 'owned' by debtors (L) and can be written as:

$$K \equiv IK + TK - L \tag{5}$$

Accounting standards only require firms to identify and record their investments in tangible capital (plus a limited number of intangible assets), and accordingly typical measures of profitability – such as price-cost margins or returns-on-equity – exclude intangibles from both the numerator and the denominator.[14] Measures of accounting profitability, therefore, are likely to produce biased estimates since they conflates the effects of normal returns to investments in intangible capital with abnormal profits.[15] Accordingly, most studies on the existence and persistence of abnormal profits, such as McGahan and Porter (2003), may be merely measuring the existence and persistence of different proportions of intangible assets across companies, *not* abnormal profits. Without some account for intangibles, the case for establishing and explaining abnormal profits is weak.

In order, therefore, to account for both tangible and intangible capital, let:

$$K_{i,t} \equiv \left(IK_{i,t}^{\times} + IK_{i,t}^{*} \right) + TK_{i,t} - L_{i,t} = S_{i,t} + IK_{i,t}^{*} \tag{6}$$

[14] See Demsetz (1982). In addition, Fisher and McGowan (1983) have shown how the use of differing depreciation rules in accounts can affect the calculated returns on assets.

[15] Measuring abnormal profits as the difference between book and market value (as used by Smirlock et al. 1984) also conflates normal and above normal returns to intangible assets.

where $IK^{\times}$ is the value of intangible assets formally recorded in company accounts, IK^{*} is the value of intangible assets missing from the accounts, and *S* is shareholders' equity at the beginning of the year. Thus from Equation (4), profits can be expressed as:

$$\Pi_{i,t} \equiv \left(c_i + e_i + m_i + u_i\right)\left(S_{i,t} + IK^{*}{}_{i,t}\right) + n\left(S_{i,t} + IK^{*}{}_{i,t}\right) + \Omega_t \qquad (7)$$

where $S_{i,t} = IK_{i,t}{}^{\times} + TK_{i,t} - L_{i,t}$.

If we write $S_{i,t}$ and $IK^{*}{}_{i,t}$ in terms of deviations from their firm means, say $S_{i,t} = \overline{S}_i + \nu_{i,t}$ and $IK^{*}_{i,t} = \overline{IK}^{*}_i + \eta_{i,t}$, then Equation (7) can be rewritten as:

$$\Pi_{i,t} = a_i + n\left(S_{i,t} + IK^{*}_{i,t}\right) + \Omega_t + \varepsilon_{i,t} \qquad (8)$$

$$\text{where } a_i = (c_i + e_i + m_i + u_i)\left(\overline{S}_i + \overline{IK}^{*}{}_i\right) \qquad (9)$$

$$\text{and } \varepsilon_{i,t} = (c_i + e_i + m_i + u_i)(\nu_{i,t} + \eta_{i,t}). \qquad (10)$$

Empirical Model

To calculate abnormal profit (a_i) using Equation (8), we require data on accounting profit, tangible assets, macroeconomic conditions and intangible capital. Since intangible capital can not be perfectly observed, and following Griliches (1981), Griliches et al. (1987), Lanjouw et al. (1998), Hall (2000), Bosworth and Rogers (2001), Greenhalgh and Longland (2005) and Greenhalgh and Rogers (2006a,b), we use firm-level intellectual property (IP) measures to proxy for IK^{*}. Previous studies have typically

only included patent application counts (sometimes weighted by citations) as a proxy for intangible capital. One of the contributions of our study is that we explicitly account for a much broader range of intangible capital. In fact, we use the full set of recorded IP variables including applications and stocks of patents, trade marks and designs as well as company age.

Patents and designs most closely correlate with product and process innovations, while trade marks are more closely related to innovation and marketing capital. We have included IP stock variables (being equal to IP grants which are renewed by their owner) since stocks are a capital concept. Two patent stock variables are included: those granted and those whose applications are still pending. For completeness, we interacted current IP applications with time to capture any trends in their value. Over and above these IP measures, we include company age as a catch-all proxy for the accumulation of other intangible assets such as the acquired knowledge and capabilities of the workforce, marketing, distribution and organisational capital. Given the comprehensive treatment of both tangible and intangible capital in our estimation, we interpret the estimated fixed-effects, a_i, as unbiased estimates of abnormal profits. Finally, we proxy Ω by the Australian stock market index adjusted for inflation.

To control for the fact that our proxies for intangible capital are imperfect, our empirical specification allows for a distributed-lag structure on the independent variables by including a lagged dependent variable (via the Koyck transformation). This allows for partial adjustment to occur over time and helps control for omitted variables. However, use of a lagged dependent variable in panel estimation is known to produce biased estimates of β and the lagged dependent variable coefficient (the so-called "Nickell Bias"[16]). Given that our panel is quite long and that our interest is in the estimated fixed effects rather than the estimated βs, this bias may not be strictly relevant. However, Monte Carlo

[16] See Nickell (1981).

estimates by Buddelmeyer *et al.* (2008) show that for T~15, LSDV estimates of the fixed effects are also biased. The bias is considerably smaller for instrumented and bias-corrected versions of the LSDV estimator.[17]

Given this, our empirical specification for estimating abnormal profits is as follows:

$$\Pi_{i,t} = a_i + \Pi_{i,t-1} + n\delta S_{i,t} + n\beta_P \mathbf{P_{i,t}} + n\beta_{TM} \mathbf{TM_{i,t}} + n\beta_D \mathbf{D_{i,t}} + n\beta_A A_{i,t} + \theta ASX_t + const + \varepsilon_{i,t} \qquad (11)$$

where $\boldsymbol{P_{it}}$, $\boldsymbol{TM_{it}}$ and $\boldsymbol{D_{it}}$ are vectors of the firm's patents, trade marks and designs; A_i is the firm's age; ASX_t is a deflated index of the Australian Stock Exchange.

In the second stage of the empirical procedure, we examine the determinants of our estimated abnormal profits. From Equation (9), we know that the firm-specific estimated fixed-effect, a_i, comprises returns to collusion, efficiency, management decisions and abnormal risk and uncertainty. Since the a_i are denoted in terms of a level, they also vary according to the assets of the firm. We therefore estimate Equation (9) from above:

$$a_i = (c_i + e_i + m_i + u_i)\left(\overline{S}_i + \overline{IK}_i^*\right)$$

In the estimation of Equation (9), industry concentration, *c*, is proxied in by the published Herfindahl concentration index for 2-digit industries in 2000-01.[18] Since the basis of the *industry-collusion* hypothesis is that exogenous barriers to entry provide opportunities for firms to extract monopoly profits, concentration should be significantly related to abnormal profits. Although this variable is a

[17] Most other Monte Carlo studies of this situation only estimate the bias for the coefficients on the lagged dependent variable and the independent variables. The most prominent example of this is Judson and Owen (1999).

[18] As published by the Australian Bureau of Statistics Cat. No. 8140.0.55.001 Industry Concentration Statistics, Data Report - Electronic Delivery 2000-2001. More disaggregated Herfindahl measures are not available. While 2-digit concentration measures are perhaps too broad, we use them in our analysis as we believe they provide more information content than simple industry dummy variables.

direct measure of the degree of barriers to entry, it could also be considered as an indirect measure of the level of collusion since it is only through the combination of both barriers to entry and collusion (tacit or direct) that firms are able to extract monopoly profits.

Firm efficiency, *e*, is measured by the firm's market share, which is the most commonly-used proxy for firm-level efficiency (see Clarke et al. 1984, for example, and the literature review in Slade 2004). Market share has been calculated as the average total company sales as a proportion of total sales in the company's 2-digit industry over the period 1996-97 to 2002-03. One way to interpret market share is that it reflects accumulated returns to superior performance. Consider a firm that is old and has well-established brands (and reputation) in the market place: its current economic fundamentals (productivity, efficiency or profitability) are poor but it has a large share of the market primarily because of its accumulated returns to previous performance. Note that market share is not a perfect proxy for firm efficiency since it picks up much more than just returns to efficiency. For instance, firms engaging in predatory pricing or other rent-seeking behaviour may also achieve a high market share, *ceteris paribus*.

The rationale for using market share in such empirical models is as follows: if collusion is the source of abnormal profits, then firms of all sizes within a concentrated industry will have abnormal profits since all firms benefit from monopoly prices, irrespective of size or market share. However, if inter-firm differences in efficiency are the cause of abnormal profits, then size should matter. Once size is controlled for, the concentration effect will disappear. Thus, concentration and market share are typically regarded as the being the levers through which the effects of collusion and efficiency can be separated.

The strategic management factors, *m*, are represented by three sets of variables which reflect inimitability, internal capabilities and the competitive strategy of the firm. These variables are derived from the survey responses. The first set of variables is a series of scaled responses about the importance of methods to prevent imitation of their competitive advantage (comprising patents, secrecy, lead time, organisational complexity and control over distribution and brands). The second variable is the percentage of the firm's skilled staff that possess especially valuable product, process or organisational knowledge. The third set of variables are indicators of the firm's competitive direction – that is, whether it places most emphasis on enhancing production efficiency, being customer focused, being a product leader or being a price cutter. Our hypothesis is that these management initiatives reflect the firm's intent to develop sustained competitive advantage. Note that the management variables are current or forward-looking in nature and so do not capture accumulated returns in the way that market share does.

Since this second stage of the analysis is conducted on a cross-section, it is not possible to ascertain the direction of causality between the management variables and abnormal profits. Nevertheless, our use of management variables represents a departure from the main thrust of the empirical literature entering the debate[19] which typically reduces the empirical specification to the relative explanatory contribution from industry dummies versus firm dummies.

The final variable, *u*, is a survey measure of a manager's views about the volatility of their product and input markets. As illustrated in our model, risk and uncertainty play an important role in the determinants of profits. However, data on risk and the degree of felt uncertainty at the firm or industry level are scarce which makes empirical estimation difficult. Here we solve this problem by using

[19] See Rumelt (1984), Roquebert et al. (1996), Hawawini et al. (2003), Spanos et al. (2004).

survey data where managers were asked five questions on the unpredictability of consumer demand in their industry and the speed of technological obsolescence. If our hypothesis is correct, this variable should be positively related to the magnitude of abnormal profits since firms will demand a premium for the level of risk associated with these factors. Further detail on the construction of the *c*, *e*, *m* and *u* variables can be found in the Appendix.

IV. Data and Descriptive Statistics

The main source of data for the panel estimation is IBISWorld. This is a proprietary dataset of all Australian-located parent firms (and the highest accounting unit of foreign firms) with an annual turnover greater than $50m during the period 1989-2004.[20] IBISWorld contains data on a wide range of firm-level accounting parameters including profits, size, and turnover. It provides information on organisation types such as public and private companies, trusts, associations, cooperatives and partnerships.

As shown in Table 1, there were 1,922 distinct organisations in the IBISWorld dataset in 2002. Over the 16-year period of study, however, there were 3,950 distinct organisations. The population of firms is predominantly public companies and private companies. The most important data for the purposes of this study are profits. However, not all firms in the dataset report profits – most are obliged to by law, but some organisations in the dataset are non-profit organisations and therefore do not report a profit. Overall, almost three quarters of all entities reported a profit figure in 2002.

[20] This includes Australian-owned companies and the highest accounting unit of Australian-located foreign owned multi-national companies.

Table 1: Organisations reporting a profit, by type, Australia, 2002

Company type	Number	Percentage	Percentage reporting profits
Association	14	0.73	78.57
Cooperative	17	0.88	100.00
Public company	972	50.57	58.64
Private company	919	47.81	86.18
Total	**1,922**	**100**	**72.32**

Source: IBISWorld.

In order to construct a proxy of each company's intangible capital, annual 'parent' enterprise-level accounting data from the IBISWorld database were matched across to data on patents, trade marks and designs owned by Australian firms. The latter is sourced from IP Australia – the patents, trade mark and design office. A match was made if the applicant name was identical to either the name of the parent company or one of its subsidiaries.[21] These data enabled us to construct IP stock variables, calculated as the sum of all IP currently in-force (using both grant and renewal data) in addition to current applications.[22] For example, two types of patent stocks were constructed: a stock of patents granted (and still valid) and a stock of patents pending.[23] The latter are more recent applications but can sometimes be up to 6 years old.

Table 2 presents selected descriptive statistics of our sample. On average, companies were 25.7 years old with an average reported annual profit figure of $32m and shareholder funds of $240m (both in

[21] A company is defined as a subsidiary of a parent if the latter owns at least 50 per cent of the former.

[22] It is possible that the intellectual property for an innovation made by a local enterprise is owned in the name of its foreign parent company. A small survey by the authors of 91 patenting companies in 2002 and 2003 revealed that, in general, 80 per cent of patents were taken out in the name of the local entity and only 14 per cent in the name of a foreign parent or subsidiary (the remainder being the inventor and 'other').

[23] Unlike Hall et al. (2005) our stock measure is the actual number of patents in force in each year, and is not an estimate based on past applications.

1989-90 prices). The average stock of patents and patents pending was 1.2 years, with the average stock of trade marks and designs being 20.6 and 2.1 respectively.

Table 2: Descriptive statistics, company means, Australia, 1989-2004

Enterprise type	Company age (years)	Net profit before tax (A$000)[(a)]	Lagged shareholder funds (A$000)[(a)]	Stock of granted patents[(b)]	Stock of granted trade marks[(b)]	Stock of granted designs[(b)]
Association	5.4	6,030	94,000	0.1	3.5	0.2
Co-operative	20.5	6,512	67,000	0.2	17.0	0.6
Proprietary company	24.0	6,379	52,000	0.6	17.2	1.3
Public company	27.6	51,000	390,000	1.8	24.2	2.9
Total	**25.7**	**32,000**	**240,000**	**1.2**	**20.6**	**2.1**

Notes: (a) All financial variables have been deflated by the CPI (1989-90=100).

(b) Enterprise means for patent, trade mark and design counts include zeros.

In order to undertake the second stage of the empirical analysis – where we analyse the determinants of abnormal profits – the data we used to proxy c_i, e_i, m_i and u_i consisted of published Australian Bureau of Statistics (ABS) industry-level data on industry concentration and sales; company registration data from the Australian Securities and Investments Commission (ASIC) matched by company name to the telephone listings (which was done in order to determine the company's industry); and firm-level survey responses from on market volatility, firm capabilities, strategic positioning and resource inimitability. The survey-based variables were collected from a Melbourne Institute survey of large Australian firms during the period from 2001 to 2005 (details are given in the appendix). Survey respondents answered questions on a seven-point Likert scale. Similar to other studies using this approach (see for example, Arvanitis 2002; Hollenstein 2002), the majority of variables used in this paper are constructed using a data reduction method and do not rely upon a

single variable. The use of a single variable is unlikely to adequately measure the underlying latent construct of interest. However, we do not want to use a data reduction method that will exclude cases if there is a single missing response. Accordingly, we used factor analysis to select from a list of items (single questions) which we believed measured our concept and then use the average of the selected items.[24]

As part of the Melbourne Institute survey, approximately 1400 organisations were sent surveys each year (over the 5-year period 2001-2005) with a total of 1170 useable surveys returned from 840 unique organisations. This is a response rate of 16.7 per cent, which is consistent with surveys of this type (see for example, Huselid 1995; Covin et al. 2001). Note that the survey did not include all of the organisations in our profits equation and that only 318 firms who returned useable surveys were able to be matched through to the estimates of abnormal profits. The distribution of responses across major industry and size does not differ markedly from the initial selected population, implying that the sample is representative (see Table 7 in the Appendix for details). For our model, we have used the organisation as the unit of analysis and have averaged multiple responses from the same firms where they exist. Further details on all the data sources are provided in the Appendix.

V. Results and Analysis

In this section, we start with the results on the magnitude of abnormal profits, which are estimated using least squares dummy variable (LSDV) methods. Given that simple LSDV estimators produce biased estimates of the fixed effects (see Buddelmeyer et al. 2008), we present results using two

[24] If a constructed variable was the average of 6 items, but, one item was missing for a firm, then for this firm the constructed variable would be the average of 5 items.

estimators which minimise the bias. In the first model, we use an instrumented variable panel estimator (Stata command 'xtivreg') where the lagged dependent variable is instrumented by its own lagged value. In the second model, we use the bias-corrected LSDV estimator for the standard autoregressive panel-data model with an unbalanced panel (Stata ado command 'xtlsdvc').[25]

The results of the two estimations for our sample of 12,469 observations (1,618 firms) are presented in Table 3. With respect to the explanatory variables: we found that all most all variables are significant and plausibly signed. Patent stocks, pending patents, trademark stocks and design stocks are significant in the first estimation and the patent variables are significant in the second. Trended patent and trademark applications were significant and positive in both estimations suggesting a rise in the value of patents and trade marks over time. Finally, the interaction of company age with patent and design stock were significant and negative in both estimations suggesting that older firms derive less value from their IP stocks than young firms. The coefficient on the interaction between company age and trademark stocks was positive and significant suggesting that old firms are able to extract disproportionate value from their trademark stocks compared with younger firms. This result perhaps reflects the fact that trade marks can potentially exist in perpetuity, whereas patents are time-limited.

It is not straight forward to compare our results with other estimations of profits or market value since there are no other studies which use IP stocks and few with any trade mark or design variables. An exception is the UK study by Greenhalgh and Longland (2005) who found that both patent and trade mark applications were significant determinants of firm productivity. A summary of findings of the effects of patent applications is given in Hall (2000, Table1) and Bosworth and Rogers (2001, Table A1).

[25] This is based on Bruno (2005) who extends the results by Kiviet (1995), Kiviet (1999), and Bun and Kiviet (2003).

Table 3: Determinants of profits: Australian companies, 1989 to 2004. Panel data estimations

Dependent variable=Net profits before tax ('000)[(a)]

Independent variables	Model 1	Model 2[(b)]
LAGGED DEPENDENT VARIABLE	0.431**	0.463**
	(19.97)	(40.94)
STOCK MARKET INDEX	6.062	4.243
	(1.05)	(0.52)
TANGIBLE ASSETS		
Lagged shareholder funds ('000)	0.007	0.018**
	(1.42)	(3.94)
INTANGIBLE ASSETS		
Patents		
Total registered patent stocks (days)	2.278**	1.921**
	(9.21)	(5.88)
Stock of patents pending	10,737**	8,953**
	(5.03)	(3.15)
Company age × stock registered patents	-79.781**	-59.471**
	(-6.89)	(-4.03)
Time × patent applications (trend)	318.602**	314.320*
	(2.90)	(2.14)
Trade marks		
Total registered trade mark stocks (days)	0.041*	0.029
	(2.38)	(1.16)
Company age × stock registered trade marks	3.968*	4.095†
	(2.21)	(1.61)
Time × trade mark applications (trend)	84.036**	72.275*
	(3.96)	(2.60)
Designs		
Total registered design stocks (days)	0.347*	0.256
	(2.52)	(1.32)
Company age × stock registered designs	-34.736**	-32.841**
	(-3.79)	(-2.58)
Time × design applications (trend)	92.795	100.454
	(1.53)	(1.22)
Other intangibles		
Company age	306.475	312.069
	(0.55)	(0.38)
Constant	-14,543.10	
	(-1.63)	
Estimation method	IV	LSDVC
No. observations	12469	12195
No. firms	1618	1605

Notes: (a) All financial variables have been deflated by the CPI (1989-90=100).

(b) The instrument used for the lagged dependent variable is the second lag of the dependent variable.

† significant at 10% level; * significant at 5% level; ** significant at 1% level.

For the second stage of the estimations, where we examine the determinants of abnormal profits, we extracted the estimated fixed-effects from Table 3 above and regressed them – using a Generalised Linear Model (GLM) – against our measures of *c*, *e*, *m* and *u*.[26] Even though we had estimated fixed-effects for about 1600 firms, we only had survey responses for 840 of these firms, and only a complete set of variables for 318 firms. As a consequence, we treated the variables in this second stage of our analysis as a simple cross-section rather than an unbalanced panel. Our main interest here is to consider whether there are any robust conclusions we can draw about the competing hypotheses.

As previously mentioned, one of the limitations of most studies in this genre has been their inability to find a measure of profitability that accounts for intangible investments.[27] Before we proceed to analyse the determinants of abnormal profits, we consider the results obtained if we use one of the most commonly-used accounting measures, return on equity. Table 4 presents the two sets of regressions using our explanatory variables against return on equity (averaged over the period 1990-2004) as defined in company accounts. The first matter to note is that return on equity bears either no or a negative relation to our firm-level measure of market volatility. As such, this measure of profitability does not pass the most basic common-sense test. The second matter to note is that none of the barrier to entry or market-share variables are close to statistical significance. Finally, we note that of most of the variables relating to management strategy, internal capabilities and inimitability are significant

[26] Tests for normality of residuals, homoskedasticity and multicollinearity revealed that our residuals were not normal. This means that OLS will not produce valid p-values for the t-tests and F-test. Accordingly, we estimated the model using GLM. Since our estimation of *a* contains negative numbers, we normalised all the estimated *a* on 70,000. This will not affect the estimated coefficients in the abnormal profits equation, but will change the constant.

[27] Hawawini et al. (2003) recognise that return on equity or return on assets is problematic and devise two other measures; market to book value and return on assets with an adjustment for the cost of capital. However, we do not believe these are measures of profitability. The former is just a measure of intangible capital – as the literature spawned by Griliches (1981) attests – and the latter does not account for intangibles at all.

and, as we will see when we examine the next table, consistent with the results obtained when we used the panel estimated values for abnormal profits.

Table 4: Determinants of abnormal profit: GLM estimation

Dependent variable = Return on equity

Independent variables	*Return on equity*	*Return on equity*
Markets volatile (firm)	0.029	-0.586*
	(0.15)	(-2.17)
Industry collusion (Herfindahl) (ind)	0.056	0.086
	(0.36)	(0.48)
Firm efficiency (market share) (firm)	0.001	-0.000
	(0.59)	(-0.32)
Main forms of inimitability (firm)		
Patents		-0.986**
		(-6.97)
Secrecy		0.594**
		(3.24)
Lead time		0.155
		(0.66)
Organisational complexity		-0.329
		(-1.27)
Distribution & branding		-0.129
		(-0.66)
Internal capabilities (firm)		
Staff with valuable skills		0.000
		(1.05)
Competitive strategy (firm)		
Cost efficiency		0.001**
		(3.37)
Customer focus		-0.000**
		(-2.60)
Product leader		0.000**
		(3.29)
Price cutter		-0.00
		(-0.49)
Constant	11.156**	11.154**
	(13957.15)	(5327.47)
AIC	18.68	19.64
Log likelihood	-4200.02	-3178.19
Observations	450	325

Notes: Z statistics in brackets, † significant at 10% level; * significant at 5% level; ** significant at 1% level.
(firm) and (ind) indicate whether the variables are measured at the firm- or industry-level respectively.

Table 5: Determinants of abnormal profit: GLM estimation

Dependent variable = Estimated fixed-effects from Table 3

Independent variables	Dep var = fixed effects from IV panel estimation *1a*	Dep var = fixed effects from IV panel estimation *1b*	Dep var = fixed effects from LSDVC panel estimation *2a*	Dep var = fixed effects from LSDVC panel estimation *2b*
Est. $\overline{S}_i + \overline{IK}_i$ **(firm)**	0.000**	0.000**	0.000**	0.000**
	(8.09)	(8.87)	(12.79)	(13.41)
Uncertainty (markets volatile) (firm)	0.834**	1.021**	0.553*	0.791**
	(3.39)	(3.69)	(2.23)	(2.84)
Industry collusion (Herfindahl) (ind)	1.008**	0.859**	1.000**	0.830**
	(5.64)	(4.65)	(5.59)	(4.49)
Firm efficiency (market share) (firm)	0.138**	0.136**	0.119**	0.117**
	(47.64)	(46.29)	(38.09)	(37.02)
Inimitability (firm)				
Patents		-1.245**		-1.205**
		(8.63)		(8.31)
Secrecy		-0.535**		-0.480**
		(2.89)		(2.58)
Lead time		0.849**		0.647**
		(3.54)		(2.63)
Organisational complexity		0.185		0.183
		(0.71)		(0.68)
Distribution & branding		-0.355+		-0.139
		(1.80)		(0.69)
Internal capabilities (firm)				
Staff with valuable skills		0.001**		0.001**
		(4.19)		(3.66)
Competitive strategy (firm)				
Cost efficiency		0.001*		0.001**
		(2.57)		(2.79)
Customer focus		-0.001**		-0.001**
		(3.21)		(3.45)
Product leader		0.00		0.00
		(1.22)		(1.52)
Price cutter		0.00		0.00+
		(1.20)		(1.67)
Constant	11.149**	11.146**	11.149**	11.148**
	(11206.38)	(5245.12)	(11160.71)	(5213.05)
AIC	22.07	21.67	22.0	21.5
Log likelihood	-3471.5	-33.98.6	-3490.2	-3408.4
Observations	318	318	315	315

Notes: Z statistics in brackets, † significant at 10% level; * significant at 5% level; ** significant at 1% level

(firm) and (ind) indicate whether the variables are measured at the firm- or industry-level respectively.

In Table 5 presents the results when we regress the estimates of abnormal profits from the two different panel estimations (from Table 3) on first, a limited set of variables which represent the absolute size of each firm's assets, the volatility of its markets, industry concentration and the firm's market share, and secondly, on an expanded set of variables which in addition to the first set of variables included the variables for inimitability, internal capabilities and competitive strategy. Our results show that in each estimation, abnormal profits were higher in firms which operated in more volatile internal and external markets (as expected *a priori*). In other words, firms do earn a premium for operating in markets where there is abnormally high levels of risk. Furthermore, in all estimations, abnormal profits were higher the more concentrated the 2-digit industry even after controlling for market share. This suggests that, to the extent the 2-digit industry measure captures the potential for (tacit) collusion, there is credence in the theory that industry-wide barriers to entry enable price collusion.

However, the results appear to provide much stronger support the *firm-efficiency* hypothesis. All models in all estimations found that the firm's market share had a positive and significant effect on abnormal profits. This contrasts with Slade (2004) who does not find market share significant. Of course, there is an important caveat to this conclusion since, as stated previously, market share represents the effects of *past* efforts to increase efficiency, behave strategically and successfully rent seek. Thus, market share is not a perfect proxy for firm efficiency.

Over and above the market share effect, the results suggest that the current strategic positioning of the firm matters. However, given the cross sectional nature of this analysis, we are not able to determine whether specific behaviours by firms have *caused* high or low profits or are the *result* of high or low profits. Nonetheless, our results show that firms that claim to rely on patents, secrecy, and to a lesser extent, distribution and brands, as a means of protecting their competitive advantage are more likely to be in receipt of abnormally low profits. In contrast, those firms that rely on lead time are associated with

higher abnormal profits. Given the explosion in the use of patents, trade marks and other forms of IP protection in recent years, one might have expected to see that patents have a strong positive effect on generating abnormal profits. However, our results are not inconsistent with the literature on the effectiveness of different appropriation strategies. For example, in their seminal study of appropriability – which has been replicated in many other countries – Levin et al. (1987) demonstrated that patents are much less effective in appropriating returns than keeping ahead of your rivals (by moving down the learning) curve.

The results also indicate that the higher is the proportion of skilled staff possessing valuable knowledge within the firm, the higher is the level of abnormal profits. This result is consistent with the *a priori* conjectures of the resource-based view of the firm. Finally, firms pursuing a cost-efficiency strategy are associated with above-normal profits, while firms that are customer-focused are associated with below-normal profits.

Interpretation of these results on the effectiveness of specific management strategies for profit seeking firms must proceed with care. As we note above, the major problem here is distinguishing causality from correlation. Our results on patenting are a good example. One interpretation is that patenting *causes* below-normal profits, but a valid alternative interpretation is that firms performing badly turn to patenting as a last-ditch effort to resurrect the company's fortunes. In the alternative explanation, below-normal profit *causes* patenting. Given the cross-sectional nature of the second-stage estimation, we can not definitively determine which way the causality runs.

Previous empirical tests of the determinants of abnormal profits have often used simple industry and firm dummies as explanatory variables. However, our estimations allow us to calculate the marginal effects of each variable on abnormal profits. Table 6 presents the addition to the abnormal profits variable as our independent variable changes from one standard deviation below its mean, to one standard deviation

above its mean. This unit-free measure permits us to compare the implied relative importance of the different explanatory variables. Note that the absolute units of the abnormal profits variable have no meaning per se.

These marginal effects show quite clearly that the firm's market share has by far the largest impact on abnormal profits. In contrast, the industry concentration effect is only 12 per cent of the level of the market share effect. Collectively, the absolute magnitude of managerial factors is about two thirds the size of the market share impact. Of these managerial factors, the most important is the reliance on patents, albeit from a negative perspective. The next most important factors are the use of lead time to sustain competitive advantage, reliance on employees with special skills and knowledge and the pursuit of profits through focussing on cost reduction.

Table 6: Marginal effects of determinants of abnormal profits.
Uses estimates from Model 1b (Table 5)

	Change in independent variable	Difference in abnormal profits due to change in independent variable	Level of significance (from Table 5)
Uncertainty (markets volatile) (firm)	$\mu-\sigma$ to $\mu+\sigma$	103.5	**
Industry collusion (Herfindahl) (ind)	$\mu-\sigma$ to $\mu+\sigma$	193.1	**
Firm efficiency (market share) (firm)	$\mu-\sigma$ to $\mu+\sigma$	1519.3	**
Inimitability (firm)			
Patents	$\mu-\sigma$ to $\mu+\sigma$	-294.3	**
Secrecy	$\mu-\sigma$ to $\mu+\sigma$	-105.9	**
Lead time	$\mu-\sigma$ to $\mu+\sigma$	117.1	**
Organisational complexity	$\mu-\sigma$ to $\mu+\sigma$	30.8	
Distribution & branding	$\mu-\sigma$ to $\mu+\sigma$	-27.1	†
Internal capabilities (firm)			
Staff with valuable skills	$\mu-\sigma$ to $\mu+\sigma$	123.3	**
Competitive strategy (firm)			
Cost efficiency	$\mu-\sigma$ to $\mu+\sigma$	103.0	**
Customer focus	$\mu-\sigma$ to $\mu+\sigma$	-140.7	**
Product leader	$\mu-\sigma$ to $\mu+\sigma$	-66.9	
Price cutter	$\mu-\sigma$ to $\mu+\sigma$	47.1	

Notes: † significant at 10% level; * significant at 5% level; ** significant at 1% level. μ =mean σ=standard deviation.

VII. Conclusions and Policy Implications

In this paper, we re-examine the two main competing hypotheses of the determinants of abnormal profits using a new way to measure profits. Instead of using accounting-based measures of profitability, such as return on equity or price-cost margins, we derive estimates of persistent abnormal profits from a model which relates realised profits to both tangible and intangible capital. Our proxy variables for intangible capital include multiple indicators of innovation capital as well as variables to capture the broader dimensions of marketing and organisational capital. The resultant estimated firm-specific fixed-effects, which we interpret as estimates of abnormal profits, are used to test for their association with industry barriers to entry (and potential collusive price setting), size-related firm-efficiency factors or strategic behaviour by management.

In the first stage of our estimation we find that including proxy variables to represent unmeasured intangible assets does matter for the estimation of profits. Stocks of IP rights in-force were found to affect firm profits. In the second stage, we found support for both hypotheses, however the *firm-efficiency* effect dominates the *industry-collusion* effect in magnitude. These results are all the more compelling since the data for the variables in these regressions were an amalgam from five independent sources. Support for the managerial variables on how firms build and protect their profits base was however selective and not necessarily in keeping with *a priori* expectations. We found evidence that those firms which seek to defend their abnormal profits through keeping ahead of rivals were associated with abnormally high profits. However, firms that rely on patents, secrecy, brand names and distribution channels as the primary way to maximise profits were actually associated with lower profits than firms which had adopted a more neutral stance.

Our results have some implications for public policy, in particular the regulation of industry. While we present some evidence that increased industry concentration (perhaps via mergers and acquisitions) may facilitate collusive behaviour within an industry, forestalling the rationalisation of industry is likely to

impose considerable efficiency costs upon society. The results presented here suggest that the opportunity costs of foregone efficiency may outweigh the benefits of preventing collusion. The obvious caveat to this is that more analysis should be conducted on concentration and market share in 3-digit ANZSIC industries since one of the weaknesses of our approach is that we are only able to measure concentration and market share at the 2-digit level. Nevertheless, our results suggest that regulators need to do more than simply analyse concentration ratios when they are adjudicating on proposed mergers and acquisitions.

The implications for managerial policy depend on how confident we are that the correlations from Table 5 represent causation. To the extent it represents causation, it suggests that the most successful route to sustained above normal profits is keeping ahead of rival and striving to reduce costs. Reliance on defensive postures such as patenting, secrecy and trade marks is less successful. An important caveat to this conclusion is that the direction of causality is difficult to establish since we treat the firms in the second stage of the analysis as a simple cross section. In the absence of a sufficient panel data set, it is not possible to determine whether firm-specific activities cause abnormal profits or vice versa.

Appendix

Table 7 presents the industry distribution of firms included in the second determinants of abnormal profits equation and compares this with the total population from IBISWorld. It reveals that the sample of 318 firms has an industry distribution that is roughly comparable with its population. Notable differences are a larger sample in manufacturing and a smaller sample in finance and insurance.

Table 7: Industry distribution of sample and population of firms

Major industry	*Survey sample of 315 firms (%)*	*Total population of large Australian firms reporting profit (%)*
Mining	3.8	6.8
Manufacturing	34.9	24.6
Electricity, Gas and Water Supply	4.1	2.8
Construction	3.8	4.1
Wholesale Trade	19.7	15.7
Retail Trade	5.4	7.3
Accommodation, Cafes and Restaurants	0.6	0.9
Transport and Storage	4.8	5.8
Communication Services	1.0	1.3
Finance and Insurance	4.1	11.7
Property and Business Services	12.4	14.5
Health and Community Services	3.8	3.0
Personal and Other Services	1.6	1.7
Total	**100.0**	**100.0**

Table 8 provides a descriptive summary of the sources of data used to construct the variables in Tables 5 and 6. Where data were obtained from the Melbourne Institute Business Survey, we have paraphrased the questions used as items in the construction the variables. In a limited number of cases, data were used from published ABS, ASIC and business telephone book sources. The latter are indicated in the description column.

Table 8: Variable definitions

Variable	*Description*	*Survey questions / statements where applicable*
Uncertainty (markets volatile) (firm)	A 5-item, 7 point scale measuring variability in demand, competitors, technologies	The organisation changes its marketing practices extremely frequently; The rate of obsolescence is very high (as with some fashion goods); Actions of competitors are unpredictable; Consumer demand is unpredictable; The production/service technology often changes in a major way.
Industry collusion (Herfindahl) (ind)	The Herfindahl concentration index has been constructed using the formula for each industry $H = \sum_{g=1}^{r} n \times m^2$ where *g* is the size ordered group of firms, and *r* is the total number of groups in each industry, *n* is the number of firms in each groups (in the ABS data this is 4 for the top groups) and *m* is the ratio of sales for the group to total sales for the industry. The data source is ABS Cat. No. 8140.0.55.001 Industry Concentration Statistics.	
Firm efficiency (market share) (firm)	Total company sales as % of sales in company's 2-digit industry. Average for the period 1996-97 to 2002-03.	
Inimitability (firm)		
Patents	2-item, 7-point scale questions measuring the effectiveness of patents for that firm	How effective are patents for protecting the competitive advantages of new or improved products and processes that your organisation has invented?
Secrecy	2-item, 7-point scale questions measuring the effectiveness of patents for that firm	How effective is secrecy for protecting the competitive advantages of new or improved products and processes that your organisation has invented?
Lead time	4-item, 7-point scale questions measuring the effectiveness of lead time and moving quickly down the learning curve for that firm	How effective are lead time and moving quickly down the learning curve for protecting the competitive advantages of new or improved products and processes that your organisation has invented?
Organisational complexity	4-item, 7-point scale questions measuring the effectiveness of organisational know how, capabilities and product and production complexity	How effective are organisation know how and capabilities; product and production complexity for protecting the competitive advantages of new or improved products and processes that your organisation has invented?
Distribution and branding	4-item, 7-point scale questions measuring the effectiveness of control over distribution and brands for that firm	How effective is control over distribution and brand names and marketing for protecting the competitive advantages of new or improved products and processes that your organisation has invented?
Internal capabilities (firm)	5-item, 7-point scale questions measuring the magnitude and importance of staff with valuable knowledge.	How important are staff with especially valuable product, process or organisational knowledge skills for your competitive standing? Would these staff member difficult to replace if they left? What percentage of the following groups possess such skills? Management, Professional specialists (for example, engineers, IT staff, R&D staff), Other employees.
Competitive strategy (firm)		
Cost efficiency	3-item, 7-point scale questions measuring competitive strategy	Statements best describing your organisation's competitive strategy*:* Increases operating efficiencies; Develops new process innovations that reduce costs; Focuses on increasing productivity.
Customer focus	3-item, 7-point scale questions measuring competitive strategy	Statements best describing your organisation's competitive strategy: Tailors and shapes products/services to fit customers' needs; Develops customer loyalty; Has the flexibility to quickly respond to customer needs.
Product leader	4-item, 7-point scale questions measuring competitive strategy	Statements best describing your organisation's competitive strategy: Produces a continuous stream of state-of-the-art products/services; Is 'first to market' with new products/services; Responds to early market signals concerning areas of opportunity; Develops products/services which are considered the best in the industry.
Price cutter	3-item, 7-point scale questions measuring competitive strategy	Statements best describing your organisation's competitive strategy: Produces products/services at a cost level lower than that of our competitors; Prices below competitors; Produces products/services for lower-priced market segments.

Source: ABS, ASIC, telephone listings, Melbourne Institute Business Survey 2001 - 2005

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