

The Multidimensional Nature of Sustained Competitive Advantage: Test at a United States Airline

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We show that evaluating the sustained competitive advantage (SCA) of a firm according exclusively to superior economic performance sustained for a given period of time hides, in fact, alternative manifestations of SCA. We suggest that SCA is a multidimensional construct that may be subject to different, complementary operationalizations in empirical tests. We propose an untapped dimension of SCA related to the degree of autonomy of a firm relative to its industry rivals and present a new measure, inspired in the CAPM (capital asset pricing model), to capture it. This measure reflects the resilience of a firm against economic recessions and industry turmoil. We show the benefits of the proposed alternative measure of SCA based on firm autonomy through its application to the position of Southwest Airlines in relation to the US airline industry (1982-2003).

Introduction

The concept of competitive advantage (CA) has a long tradition in the strategy literature (Ansoff, 1965; Porter, 1980, 1985; Barney, 1991, 2002; Peteraf, 1993; Besanko, Dranove and Shanley, 2000; Ghemawat and Rivkin, 1999; Grant, 2005; Barney and Hesterly, 2006) and in recent years it has become one of the key concepts in business strategy. Similarly, the more recent concept of sustained competitive advantage (SCA) has become also a major area of research mainly in theoretical and empirical studies based on the resource-based view of the firm (Barney, 1991; Wiggins and Ruefli, 2002; Foss and Knudsen, 2003; Peteraf and Barney, 2003).

Management scholars assume, implicitly or explicitly, that a firm earning *above average accounting* or *above normal economic performance* for a sufficiently long period of time enjoys a SCA (Porter, 1985: 11; Wiggins and Ruefli, 2002; Barney and Hesterly, 2006: 22). One main problem in identifying SCA with superior profitability (whatever the measure of profitability used and the time span considered) is that a CA may not be revealed in higher profitability because, for example, a firm may forgo current profits in order to invest in human capital, technology, customer and employee loyalty, executive perks and so on (Grant, 2005). Indeed, Coff (1999) has shown how and when CA does not lead to financial performance in situations when stakeholders have certain bargaining power.

If SCA does not lead *always* to superior performance (Coff, 1999; Ray, Barney and Muhanna, 2004), how can we identify, then, firms with SCA in empirical studies? A plausible solution may be to avoid narrow conceptualizations of SCA and to enlarge our current operationalizations of SCA to include not only superior performance-related measures as dependent variables in empirical studies (Ray, Barney and Muhanna, 2004).

In this paper we argue that SCA is a multidimensional construct, meaning that different definitions and operationalizations may be capturing different relevant aspects of the competitive positions of firms. In particular, we present an alternative and complementary measure that captures particular outcomes of SCA, not captured in traditional performance measures. Our proposed measure is based on the correlation between the performance of a firm and the performance of all the other rivals in an industry. The notion of correlation between a firm's performance and its rivals is intrinsic to the notion of competition and SCA because the very idea of advantage must be always related to a group of competitors. Depending on such a correlation, a firm can be said to have a high or low degree of independence within its industry.

Inspired in the CAPM model, the measure presented in this paper is a simple but powerful way to assess rigorously such degree of independence of a firm in empirical tests of SCA. As we illustrate in the paper, our method allows researchers to discover manifestations of SCA that remained "hidden" using traditional measures, based mainly on superior performance.

The rest of the paper is structured as follows. In the next section we review prior empirical and analytical work studying SCA. Next, we introduce the notion of firm autonomy as a particular measure of SCA. Then, we illustrate the usefulness of this measure in the specific case of Southwest Airlines and the U.S. airlines industry for the period 1982-2003. After that, we discuss some of the limitations of this paper as well as avenues for future research. The paper closes with some conclusions.

Sustained competitive advantage and superior economic performance

Research investigating SCA and studies on competitive heterogeneity (Hoopes, Madsen and Walker, 2003) aim at answering the major question of why firms in the same industry vary systematically in performance over time. The way this systematic variation in performance has been operationalized in previous empirical works varies across studies of different firms and sectors, generating inconsistencies in the empirical testing of alternative theories.

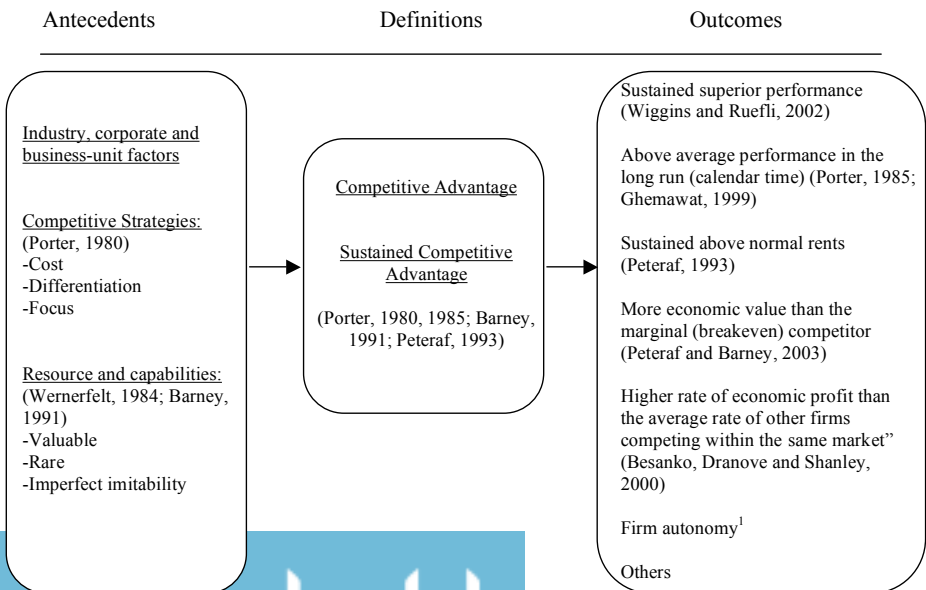
Previous research falls into two groups: analytical models and empirical studies. On the one hand, analytical models go from the early works of Eaton and Lipsey (1978) and the later contributions of Lippman and Rumelt (1992) to more recent developments by scholars such as Makadok and Barney (Makadok, 2001; Makadok and Barney, 2002) and Zott (2003) among others. These approaches elaborate formal models that explain how SCA can emerge and persist under certain conditions of firms and their industries. On the other hand, empirical studies analyze variance in performance among firms in order to explain SCA (Schmalensee, 1985; Mueller, 1986; Rumelt, 1991; Brush and Bromiley, 1997; McGahan and Porter, 1997, 1999, 2003; James, 1998; Brush, Bromiley, and Hendrickx, 1999; Bowman and Helfat, 2001; Wiggins and Ruefli, 2005; Hawawini, Subramanian and Verdin, 2003). Most of these studies examine, in general, performance variance attributable to different levels of analysis: industry, parent corporation, and business unit.

Our paper seeks to contribute to the research based on the empirical and analytical studies that examine sustained and systematic performance differences over time. Both research streams aim at explaining the antecedents and consequences of SCA and developing appropriate measures of SCA (Hoopes et al., 2003).

In Figure 1 we show the antecedents, definitions and outcomes of SCA. *Antecedents* of SCA are industry, corporate and business-unit factors that may explain the financial performance of a given firm. Porter’s generic competitive strategies and the RBV provide general frameworks to better understand and classify some of these antecedents at different levels. *Definitions* of SCA are somehow related to Porter’s original conceptualization of competitive advantage (1980, 1985) and have been developed mainly by Barney (1991) and Peteraf (1993). According to Barney (1991: 102) “a firm is said to have a CA when it is implementing a value creating strategy not simultaneously implemented by any current or potential competitors and a SCA when it is implementing a value creating strategy not simultaneously implemented by any current or potential competitors *and* when these other firms are unable to duplicate the benefits of this strategy”. Peteraf (1993) defines SCA as “sustained above normal returns”, mixing somehow the definition of SCA with its outcomes. Finally, the *outcomes* of SCA refer, in general, to different measures of financial performance (see figure 1).

Importantly, the question of operationalization and measurement of SCA *outcomes* has

Figure 1. Antecedents, Definitions and Outcomes of SCA



¹ Measure proposed in this paper.

proven to be very challenging (Rumelt, 2003; Barney and Hesterly, 2006). When we look at current operationalizations of SCA outcomes we realize that value creation is a common theme (Rumelt, 2003). Value creation has been defined in previous research as “above-normal returns” (Peteraf, 1993); “a higher rate of economic profit than the average rate of economic profit of other firms competing within the same market” (Besanko, Dranove and Shanley, 2000); “being able to create more economic value than the marginal (breakeven) competitor in its product market” (Peteraf and Barney, 2003: 314) or “having an above-average performance in the long run” (Porter, 1985; Ghemawat, 1999; Barney and Hesterly, 2006: 22).

All of the previous definitions refer in one way or another to some sort of superior performance measure. However, Barney (1991: 102) ambiguous definition of SCA based on a “value creating strategy” opens the possibility to alternative operationalizations of “value creation” in empirical tests. Which measure of value creation? Value creation for whom? Over which time horizon? Value creation dependent or independent from the business cycles? All these are questions that have not been explored in depth in the strategic management field yet (Rumelt, 2003).

As stated in the introduction, our thesis is that evaluating the SCA of a firm exclusively according to superior economic performance (relative to a reference set of competitors or an industry) sustained for a given period of time can, in fact, hide the SCA of those firms whose advantage does not materialized in higher performance (Coff, 1999; Ray, Barney and Muhanna, 2004).

For instance, in an often quoted study of persistent superior performance, Wiggins and Ruefli (2002: 93-94) found that no firm in the airlines industry, telephone and telegraph equipment, operative builders, television broadcasting and advertising agencies achieved even 10 years of persistent superior economic performance. However these results contrast with the well-known story of Southwest Airlines remarkable SCA, based on a strategy of short-haul flights, no meals and a set of consistent institutionalized organizational practices that support a high level of intra-firm trust, cooperation among employees and managers and commitment of the workforce. Southwest Airlines’ has shown a record of more than thirty years of successful operations and a record of consistent profitability in each year other than its first, while other airlines were suffering recurrent losses (Gittell, 2003). The Southwest model is taught in business schools as an example of excellence, and its strategy has been imitated --sometimes unsuccessfully-- by many competitors (e.g. Continental, US Airways, Delta Airlines, JetBlue Airways) in the airline industry (Gittell, 2003). Southwest’ competitive advantage has been argued to be based on its short-haul, point-to-point strategy and relational coordination (Gittell, 2003), its human resource management and its workforce loyalty (Pfeffer, 1996) and its unique activity system (Porter, 1996). Michael Porter in an often quoted paper --“what is strategy?”-- describes in detail the resources, capabilities and unique activities that give Southwest Airlines a sustainable competitive advantage (Porter, 1996: 73). Based on Southwest’ records and the literature review it seems hard to argue that this company has not achieved some form of a CA over a long period of time.

It may be the case that Wiggins and Ruefli (2002) used a methodology in their study that was unable to capture the superior performance of Southwest. For instance, the arbitrary 10 years of persistent superior economic performance these two authors chose for their study could have been a bad choice. Had they chosen shorter periods of time (e.g. five years) their results might have been different.

However, what we assert in this paper is that there are other complementary ways of measuring a firm's SCA over time. We suggest that SCA is a multidimensional construct that may be subject to different operationalizations in empirical tests. In particular, we propose a measure based on the degree of independence a given firm has relative to its industry. This particular way of measuring a firm's performance emphasizes those aspects of a firm's performance that are related to its internal autonomy and isolation from the industry fluctuations and to its internal resilience, allowing it to outperform rivals even in situations of economic turmoil (Hamel and Välikangas, 2003). While most SCA operationalizations emphasize value creation 'sustained' *over periods of calendar time*, the proposed measure of firm autonomy emphasizes a constant value creation 'sustained' both during *the expansion and recession cycles in the industry*. If we analyze carefully Barney's definition of SCA (Barney, 1991: 102) we will see that there is nothing in that definition that prevents such a measure of performance --the ability of a firm to sustain a constant level of performance over time against business cycles-- from being consistent with Barney's notion of SCA because the ability to sustain a constant level of performance against industry cycles while the other competitors in the industry fail to do so is also a "value creating strategy" whose benefits cannot be duplicated by current or potential competitors. Most importantly, this alternative measure of SCA offers a plausible potential explanation of why some excellent companies like Southwest Airlines might be excluded from studies where superior performance over a period of time is the only dependent variable used.

An alternative outcome of SCA: Firm autonomy

Building on previous work by Ariño, Ariño and Garcia-Castro (2008), our approach is based on the idea of *firm autonomy* which we define as *the degree of independence a firm has in relation to its industry*. Firm autonomy captures the variability of a firm's performance that is independent of the variability of the whole industry.

Previous empirical research on SCA typically analyze long periods of time – generally more than 10 or 20 years – to identify firms showing persistent superior performance (e.g. Mueller, 1986; Wiggins and Ruefli, 2002). These studies tend to ignore, or treat marginally, the effect of industry cycles on the performance of firms. Ignoring these cycles means that performance differentials among firms should be sustained both during the upward and downward part of the industry cycle (Figure 2).

However, such an approach to firm performance may hide the sustained ability of a firm to generate income and profits independently of the evolution of its industry (see Figure 3). The dashed line in Figure 3 is independent of the business cycle and can be above (point A) or below (point B) the average performance of the firms in a particular industry

at a point of the cycle. This alternative perspective on performance evolution over time may be a first step towards a better understanding of cases such as Southwest Airlines where performance might not be *persistently superior* (given the cyclicity) but might be *autonomous*. Using the traditional approach to persistent superior performance (e.g. Wiggins and Ruefli, 2002), it is extremely difficult to identify empirically a case such as the one described in figure 3, because the superior performance is not persistent –i.e., the line representing firm autonomous performance in that figure is outperformed on a regular basis by the industry average performance line as a consequence of cyclicity.

Although it is highly unlikely that a firm can achieve absolute independence in relation to its industry, it is precisely the relative differences among firms competing in the same industry what constitutes the focus of our analysis as we show next.

Figure 2. Persistent Superior Performance

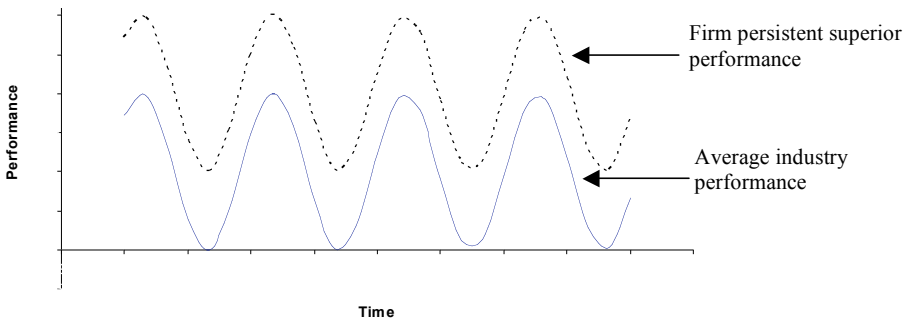
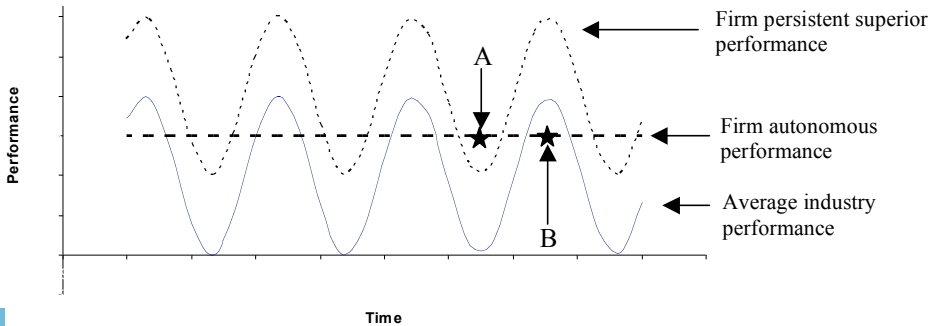


Figure 3. Firm Autonomy



A: Autonomous *and* above average performance
B: Autonomous *and* below average performance

Firm autonomy = exposure and intensity

Our approach is based on a simple linear regression equation in which a selected indicator of activity in the industry (*industry activity indicator*) is regressed onto the observed firm ROA or any other accounting- or market-based measure of a firm's financial performance for a long time series (Ariño et al., 2008). Examples of industry activity indicators are the revenue passenger per mile (RPM) in the case of the airlines industry or the number of bottles of beer consumed in the case of the brewing industry.

The specified *exposure-intensity* equation is:

$$R_i = \alpha_i + \beta_i X_j + e;$$

R_i represents a particular measure of financial performance for the selected firm i in time t ; X_j represents the activity indicator for industry j in time t ; and e is the regression error. The fit of the regression model (the R-squared of the model) is what we call *exposure* to the business cycle. The parameter β_i is our measure of *intensity* of the business cycle for firm i . The *exposure* indicates how much does the industry cycle explain the performance of firm i . The *intensity of the exposure* measures the impact of a percentage point change in the industry activity indicator on firm financial performance.

The proposed measure of firm autonomy is inspired in the CAPM (Sharpe, 1964; Lintner, 1965) but it differs in that our measure focuses on the industry where the firm operates and that the inputs we use in the regression models are not just financial returns but the industry activity indicator. It is important to note that the industry activity indicator we use is firmly rooted in the industry where the firm competes whereas the CAPM is rooted in the capital markets. In other words: firm autonomy measures independence from industry activity cycles whereas CAPM measures independence from capital market cycles (i.e. systematic market risk). Thus, firm autonomy is especially suitable for strategic analysis.

Firm autonomy measures the ability of a firm to sustain performance independently from the specific evolution of the industry to which it belongs. However, a firm can be industry-independent and present a systematic above normal performance, or just the opposite: a systematic below normal performance. Whereas the measure of sustained superior performance is a measure of the relative success of a firm operating in a given industry relative to its competitors, the firm autonomy measure aims at capturing the firm's ability to sustain over time a given level of performance (be it high or low) independent of external conditions. In this way, firm autonomy can be seen as a relative measure of the risk of a firm relative to its rivals. Higher autonomy indicates lower exposure to the industry cycle, and hence it reduces the risks associated with that particular firm. Both, *high returns* and *low risk* are desirable attributes in the performance of any firm and this is the reason why we insist in the complementary character of the firm autonomy measure and traditional measures of SCA.

Although firm autonomy is a relatively simple measure, some difficulties arise when one tries to define the industry, choose the appropriate industry activity indicator or collect a

sufficiently long time series to allow a longitudinal estimation of firm performance. To illustrate how some of these difficulties can be overcome in practice, we apply next the proposed measure of firm autonomy to the analysis of the US airline industry.

An illustration: The US airline industry (1982-2003)

As an illustrative example, we examine the US airline industry for a period of 21 years, from 1982 to 2003. Data was collected from *Thomson One Banker* (Worldscope data, Datastream and Thomson financial data). Different databases were used in order to access the most complete time series possible for the period 1982-2003. Ten airlines were included in the analysis: Southwest Airlines, US Airways, America West Airlines, American Airlines (AMR), Continental Airlines, United Airlines (UAL), Alaska Airlines, Air Canada, Northwest Airlines and Delta Airlines (see Table 1 for a summary of the main ratios for these ten companies). Thus our data set includes ten airlines for a period of 21 years each.

We selected US firms or firms operating mainly in the U.S. in order to control for country effects, general country economic cycles and the development of the industry. In the case of Air Canada all these three factors also held and it was included in the analysis as well. The criterion for our sampling was size: we chose passenger airlines classified as major carriers (revenues greater than \$1 billion). These airlines together accounted for nearly 80% of the US's market share of passenger transportation in 2005. Our final sample is consistent with previous studies of this industry (Gittell et al., 2004).

Measures

Consistent with the work of Wiggins and Ruefli (2002) we use an accounting measure (ROA) of firm performance. The ROA, net income divided by total assets, has also been used in most of the studies of superior economic performance (Schmalensee, 1985; Rumelt, 1991; McGahan and Porter, 1997; Bowman and Helfat, 2001).

We use two alternative measures to operationalize the industry cycle or industry level of activity: an accounting measure (ROA) and an industry activity indicator such as the revenue passenger mile (RPM growth). Data on U.S. passengers and activity level indicators were collected from the U.S. Department of Transportation. The ROA used in our model is just the average ROA obtained by these ten airlines for each year from 1982 to 2003. RPM is calculated as one paying passenger flown one mile. Technically it is computed as the summation of the products of the revenue aircraft mile flown on each inter-airport hop multiplied by the number of revenue passengers carried on that hop (US Department of Transportation). The RPM indicator is widely used within the airline industry as the main measure of traffic, so it is a good proxy for industry activity level (Gittell et al., 2004). Both, ROA and RPM, are significantly correlated for this time period in our sample (-.60; P-value \leq 0.01).

Results

In Table 2, we present the correlation table for the ROA of the ten carriers, the industry average ROA and RPM growth for the period considered. The time series include

Table 1. Comparison of Top Ten Airlines (Thompson Financial One, 2003). In million \$

Company	Southwest Airlines Company	Air Canada Inc	Alaska Air Group Inc	America West Holdings Corp.	AMR (American Airlines)	Continental Airlines Inc	Delta Air Lines Inc	Northwest Airlines Corp.	United Air Lines, Inc.	US Airways Group Inc
Sales	5,521.77	6,250.61	2,224.10	2,047.12	17,299.00	8,402.00	13,305.00	9,489.00	13,916.00	6,977.00
EBITDA	884.60	122.17	136.50	-66.42	-1,895.00	149.00	-175.00	-279.00	-1,794.00	-1,305.00
Net Income	240.97	-858.78	-118.60	-387.91	-3,511.00	-441.00	-1,272.00	-773.00	-3,327.00	-1,646.00
Market Cap	11,485.63	133.44	719.77	402.51	2,423.68	968.41	1,208.69	960.66	#N/A	238.16
Total Assets	8,953.75	4,715.00	2,880.70	1,438.95	30,267.00	10,740.00	24,720.00	13,289.00	24,744.00	6,543.00
Total Liabilities	4,532.13	9,725.00	2,225.00	1,370.78	29,310.00	9,720.00	23,563.00	14,772.00	25,583.00	11,464.00
Common Equity	4,421.62	-1,550.88	655.70	68.18	957.00	760.00	893.00	-2,262.00	-841.00	-4,921.00
Free Cash Flow Per Share	0.25	-1.25	-1.83	-2.27	-19.08	-7.46	-10.94	-18.19	#N/A	-14.84
1982-2003 ROA Average	7.7%	1.8%	4.4%	1.3%	2.9%	0.1%	2.5%	3.4%	1.4%	1.9%
1982-2003 ROA Std. Deviation	2.7%	4.8%	4.6%	9.5%	4.8%	9.3%	5.6%	4.7%	7.1%	10.9%
Number of Years U.S. Market	22	21	22	12	22	16	22	9	14	22
Market Share	10.8%	-	2.5%	4.0%	15.8%	7.2%	12.9%	7.3%	11.8%	5.1%

more than twelve years of analysis in all cases, with the only exception of Northwest Airlines with nine observations. For six airlines 22 observations are available. In total 225 observations were included in our OLS regressions. It is possible in this preliminary approach to roughly confirm the hypothesis of the autonomy of Southwest in relation to its competitors in the industry. Southwest's correlation coefficient between firm ROA and industry average ROA and RPM growth is, together with Continental's, the lowest in the industry. This low correlation coefficient is a first indicator of *firm autonomy*. Given these initial correlations, one could expect to find consistent results when applying the exposure-intensity regression model.

Figure 4 presents the ROA of the ten airlines from 1982-2003. Figure 4 can be seen as a first visual approximation to firm autonomy. The thickest line in this figure represents the return on assets (ROA) of Southwest for the period from 1982 to 2003. We can observe in the figure how other airlines (US Air, UAL, America West for instance) outperformed Southwest for specific periods of time at the end of the 1980s, in the mid-1990s and in the late 1990s. The companies mentioned seem also to be more negatively affected by the downturn in the industry cycle (early 1990s and late 2001, after the 9/11 terrorist attacks), with their ROAs reaching high negative values in Figure 4. Southwest, by contrast, apparently seems to be much less affected by environmental forces.

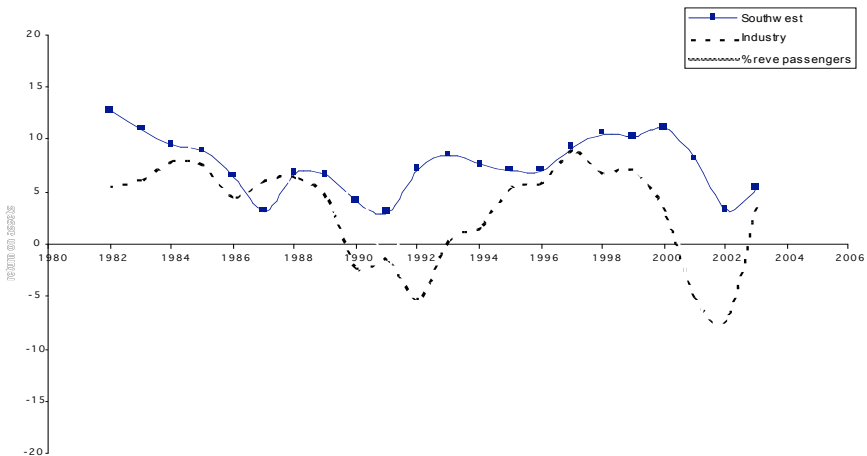
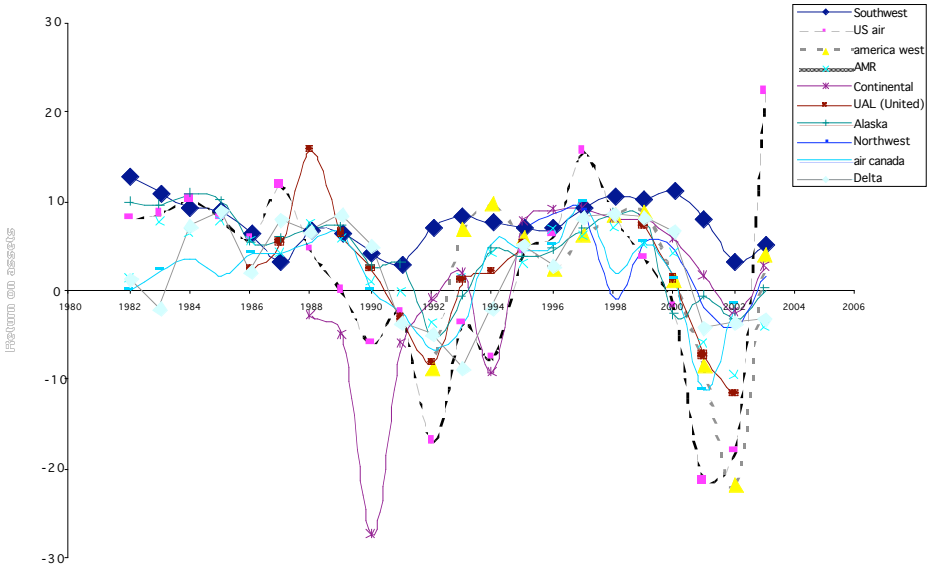
Table 2. Correlation Matrix, ROA U.S. Airline Industry (1982-2003)

Variable	Mean	Std.	1	2	3	4	5	6	7	8	9	10	11
1. Southwest	7.67	2.72											
2. US Airways	1.92	10.8	0.223										
3. America West	1.32	9.47	0.617	0.678									
4. AMR	2.88	4.82	0.433	0.593	0.837								
5. Continental	0.10	9.33	0.609	0.384	0.343	0.221							
6. United	1.43	7.11	0.217	0.815	0.936	0.913	0.021						
7. Alaska	4.44	4.63	0.396	0.635	0.716	0.765	0.120	0.805					
8. Northwest	3.42	4.72	0.347	0.582	0.670	0.739	0.820	0.966	0.471				
9. Canada	1.82	4.82	0.095	0.752	0.604	0.745	0.189	0.767	0.615	0.765			
10. Delta	2.52	5.56	0.214	0.491	0.446	0.668	0.168	0.711	0.614	0.588	0.693		
11. Industry ROA	3.26	4.68	0.476	0.865	0.843	0.859	0.494	0.897	0.813	0.781	0.781	0.702	
12. RPM % growth	4.56	4.02	0.200	0.612	0.543	0.663	0.004	0.505	0.434	0.781	0.533	0.436	0.600

ROA and RPM exposure

Results of the *intensity-exposure* regression equations are provided in table 3. In Table 3 we observe that two firms present a clear under-exposure to industry activity: Southwest and Continental. The *exposure* of Southwest to the industry ROA is 0.23 and the exposure to RPM is 0.04. What does this mean? According to our model, 0.23 means that 23 % of Southwest’ ROA variations are dependent on the industry cycle. In other words,

Figure 4. U.S. Airline Industry. ROA Evolution (1982-2003)



77 % of Southwest’s performance can be considered to be autonomously generated by the firm. In contrast, firms such as US Airlines or United Airlines have a level of *exposure* to the industry cycle of 75% and 81% respectively (Table 3).

It is possible to argue that the industry average ROA is not a good benchmark because it is a weighted measure of all the individual ROAs for these ten companies. That is the reason why we also use the RPM as a measure of industry activity. The results using the RPM are consistent with the previous analysis: again Southwest and Continental

Table 3. Exposure and Intensity in the U.S. Airline Industry (1982-2003), ROA

Airline	Industry performance indicator (ROA)				Industry activity indicator (RPM, % growth)			
	Exposure	F-test	Intensity	t-test	Exposure	F-test	Intensity	t-test
Southwest	0.23	5.883	0.28	2.426	0.04	0.797	0.14	0.893
p-value		0.025		0.025		0.383		0.383
US Air	0.75	59.784	2.01	7.732	0.38	11.427	1.54	3.380
p-value		0.000		0.000		0.003		0.003
America West	0.71	24.683	1.49	4.968	0.30	3.773	1.36	1.943
p-value		0.001		0.001		0.084		0.084
AMR	0.74	56.343	0.88	7.506	0.44	14.939	0.77	3.865
p-value		0.000		0.000		0.001		0.001
Continental	0.25	4.544	0.93	2.132	0.00	0.000	0.01	0.017
p-value		0.051		0.051		0.987		0.987
UAL (United)	0.81	49.817	1.33	7.058	0.26	4.121	0.83	2.030
p-value		0.000		0.000		0.065		0.065
Alaska	0.66	39.075	0.81	6.251	0.19	4.425	0.50	2.104
p-value		0.000		0.000		0.049		0.049
Northwest	0.61	10.951	0.66	3.309	0.61	9.427	0.90	3.070
p-value		0.013		0.013		0.022		0.022
Air Canada	0.61	29.758	0.78	5.455	0.29	7.559	0.64	2.749
p-value		0.000		0.000		0.013		0.013
Delta	0.49	19.502	0.84	4.416	0.19	4.465	0.60	2.113
p-value		0.000		0.000		0.048		0.048

present the lowest levels of *exposure* to RPM growth (4% and an almost imperceptible effect, respectively). At the other extreme, companies such as Northwest or US Airways, show a high dependence on the evolution of RPM and hence on the industry cycle (61% and 38% respectively). As a consequence, the performance of firms such as Northwest or US Airways can be easily predicted from the RPM index.

It is interesting to note that even firms smaller than Southwest in terms of revenues, such as America West (ROA-exposure of 71% and RPM-exposure of 30%), show a significantly higher levels of exposure to the industry cycle (Table 3). This empirical finding shows that even small firms with a small impact in the overall evolution of the industry ROA and RPM can be highly correlated with the industry cycle, confirming that our results are not driven by the relative size of firms.

The next step is to understand what conclusions we can draw from the statistics regarding the relative firm autonomy of Southwest and Continental. We include the F-test for the ten regression equations for the case of ROA and RPM growth. At the 0.01 level, and for the case of ROA as industry activity indicator, only Southwest, Continental and Northwest can be considered autonomous (their p-values are above the threshold of 0.01, indicating that the regression coefficients are not statistically significant). However, in the case of the RPM as activity indicator, given the lower fitness of the regression equations, the 0.01 level is not very useful for discriminating firm autonomy. Therefore, if we relax the 0.01 criteria to 0.05, only four companies, Southwest, America West, Continental and UAL can be considered to be relatively autonomous. If the benchmark is fixed at the 0.1 level, then again, Southwest and Continental emerge clearly as the only two autonomous firms in this industry.

Given the persistence of Southwest and Continental in different measures of exposure (note also that the F-values and p-values are widely different from the other eight airlines), we conclude that these two companies present a more autonomous behavior than their peers in the industry. Interestingly enough, as discussed earlier, the particular cases of Southwest and Continental show two different patterns of firm autonomy: whereas Southwest's performance is autonomous and above average (the average ROA for the 21 year period is 7.7%), the performance of Continental is autonomous but below average (average ROA 0.1%).

Intensity of the exposure

Given that the regression equations only consider one independent variable, then the significance levels of the F-test and the t-test are the same. This means that the results and analysis made for the statistical tests of the ROA and RPM *exposure* can be extended to the *intensity of the exposure*. For the ROA, only Southwest (P-value=0.025), Continental (P-value=0.051) and Northwest (P-value=0.013) have shown a non-significant intensity of the exposure.

For the RPM case, Southwest and Continental also present a substantial difference in their respective p-values. The 0.383 and 0.987 p-values obtained by Southwest and Continental

respectively do not allow us to reject the null hypothesis that their β_j coefficients are zero, and, therefore, that the *intensity of the exposure* for those two firms is also zero.

Although the significance levels of the F-test and the t-test are the same, the absolute values for the *intensity* are different than the values for the *exposure* and they contain additional information. To illustrate the critical impact of the intensity parameters, consider the difference between the *intensity of the exposure* to RPM growth of Southwest and US Airways. For Southwest the value of the *intensity* is 0.14 and for US Airways, it is 1.54. This means that if the passenger traffic for a given year decreases (increases), let's say by 3%, then Southwest's ROA for that particular year will be reduced (increased) by only 0.42% --all else being equal--, whereas the ROA of US Airways for that year will be reduced (increased) by 4.62% --all else being equal.

From the previous analysis and results we can reasonably conclude that the data supports our initial conjecture: the degree of independence from the environment really distinguishes the behavior of Southwest Airlines (and continental). Drawing from the 20-year time series, the results of the model suggest that Southwest's resources and capabilities and/or strategy create some environmental buffers that effectively insulate this firm from the turbulences of the US airline industry. This independence means that Southwest outperforms its rivals during the "bad times" while some of its rivals are able to outperform Southwest when the "good times" come. These findings may provide a logical explanation of why Wiggins and Ruefli (2002) did not find any company with a sustained superior economic performance in the airlines industry during the 20 years they considered in their study. The fact that our study traces back 21 years of data on ROA and RPM leads us to strongly conclude that the differences found in the levels of exposure and intensity are not casual or anecdotic, but that there is a causal reason for such a difference.

Limitations and future applications

The limitations of our research are related to both the selected sample and the method itself. From an operational point of view it would be desirable to gather even longer time series data to better observe the patterns in firm autonomy, exposure and intensity in order to obtain more refined measures of those parameters for each firm. Furthermore, extending these initial observations to other industries will certainly provide new insights. For example, in a preliminary analysis we have made of the automobile, video games and the computer peripheral equipment construction industry some companies (e.g., BMW, Electronic Arts and Logitech respectively) clearly emerge as highly autonomous relative to its competitors in the industry for long periods of time after using the intensity-exposure measure as presented in this paper.

A second limitation of our analysis is the presence across our sample of different strategies followed by the ten airlines. For example, Southwest competes with a strategy based on short-haul, point-to-point routes and low cost flights between U.S. cities with a high density of frequent fliers. Obviously not all of the companies in the industry follow the same strategy as Southwest. Other companies, such as Continental or American Airlines

for example, compete on longer routes, serving a large range of cities including domestic destinations as well as international ones. We have not controlled for these factors in our analysis, because we did not attempt to predict the origin and causality of those differences in firms' exposure to the cycle. Our purpose in this paper was to explore alternative measures of SCA *outcomes* by proposing a measure of firm autonomy through which these issues can be studied in future research. Some alternative explanations for these differences in firm autonomy based on organizational attributes or strategies followed have been already suggested in previous literature (Selznick, 1957; Thompson, 1967; Caves and Porter, 1977; Pfeffer and Salancik, 1978; Aldrich, 1979; Rumelt, 1984, 1987; Ghemawat, 1991; Wright, McMahan and McWilliams, 1994; Gittell et al., 2004) and they should be explored in more detail in subsequent empirical research on firm autonomy.

Conclusions

If a SCA does not lead *always* to superior performance (Coff, 1999; Ray, Barney and Muhanna, 2004), how do we identify, then, firms with SCA in empirical studies? Starting from an irregularity in an empirical test of SCA (Wiggins and Ruefli, 2002) we have suggested an alternative perspective for looking at the differences between firms in the same industry. We argued that SCA is a multidimensional construct that may be subject to different operationalizations in empirical studies, rather than using exclusively superior economic performance. In particular, we have argued along the paper for the validity of an alternative and complementary measure of SCA consistent with Barney's original definition of SCA (Barney, 1991: 102) and that we called firm autonomy. Firm autonomy was defined as the degree of independence a firm has in relation to its industry. According to this measure, the autonomy of a given firm can be assessed according to two parameters: the exposure to the industry cycle, and the intensity of that exposure.

From our empirical analysis of the U.S. airline industry, two U.S. carriers, Southwest and Continental, emerge as the two firms with the highest autonomy in the U.S. airline industry for the period of time considered (1982-2003). This autonomy in the case of Southwest means that this company shows a poorer performance than the top performers during the upward part of the industry cycle but it also shows a much better performance than its competitors during the lower part of the cycle. This finding would explain why Wiggins and Ruefli (2002) were not able to find any firm with sustained superior economic performance in the airlines industry. But in fact, Southwest apparently has a SCA that seems to lead to higher isolation from industry turbulences and that makes the firm less vulnerable to economic recessions and industry turmoil as suggested by the results shown in this paper.

We have also argued that sustained differences in firm autonomy, far from being coincidental, can be explained by and related to some theories found in the organization and strategic management literature. The evidence provided by this paper is consistent, for instance, with the debate between opportunistic adaptation of a firm to the environment versus the internal, non-opportunistic development of a distinctive competence (Selznick, 1957). Opportunistic firms will tend to present higher levels of exposure due to a higher

level of dependence on external favorable (unfavorable) opportunities. Our evidence is also consistent with *organizational theory* research on environmental buffering (Cyert and March, 1963; Thomson, 1967; Aldrich, 1979), the *strategic management* literature on commitment (Ghemawat, 1991), mobility barriers (Caves and Porter, 1977; Caves, 1984), isolating mechanisms (Rumelt, 1984, 1987) and resilience (Hamel and Välikangas, 2003) and *human resources management* research on adaptation to environmental changes (Wright, McMahan and McWilliams, 1994; Pfeffer, 1996; Gittell et al., 2004). These autonomy-related concepts have been related to SCA in these previous theoretical works --see for example Rumelt, (1984, 1987), Hamel and Välikangas (2003) ,Wright et al. (1994) or Pfeffer (1996) . To what extent firm autonomy antecedents are related to opportunistic adaptation, organizational structure and culture, strategic factors, human resources practices, or a combination of these or other factors must be formally explored and analyzed in subsequent papers combining quantitative and qualitative approaches.

Finally, our measure of firm autonomy as presented here, offers new understandings for the literature on firm heterogeneity (Hoopes et al., 2003) and the resource-based view (Barney, 1991), where different alternative antecedents, consequences and measures of sustained differences in performance over time among firms are explored.

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