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Organisation capital and sticky behaviour of selling, general and administrative expenses

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ABSTRACT

This study investigates how a firm's view towards intangible-related economic sacrifices affects the stickiness of selling, general and administrative (SG&A) expenses. The sticky cost phenomenon is an alternative pattern of cost behaviour which attributes an explicit role to managerial deliberate resource-commitment decisions. We speculate that, in a sales decline, firms with high levels of intangible assets increase the slack of their unutilised resources more than firms with low levels of intangible assets. This is because a high level of intangible investments increases the level of adjustment costs and drives managers to shape more optimistic expectations regarding whether future sales growth will absorb the slack of unutilised resources. The level of organisation capital is selected as the primary variable of a firm's intensity of intangible investments in order to examine the relation between the cost behaviour of SG&A expenses and intangible investments. The data sample consists of 55,769 firm-year observations of US listed firms for the period 1979–2009. Our empirical findings suggest that in the case of firms with high (low) organisation capital, SG&A expenses exhibit sticky (anti-sticky) cost behaviour.

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1. Introduction

A fundamental assumption in cost accounting literature is that the relationship between costs and activity volume is symmetrical for both volume increases and decreases, implying that the magnitude of a change in costs depends solely on the extent of a change in the level of activity, regardless of the direction of the change. Anderson et al. (2003) challenged this assumption by providing evidence for the sticky cost phenomenon in the case of selling, general and administrative (SG&A) expenses. Specifically, they documented that the magnitude of an increase in SG&A expenses, associated with an increase in economic activity, is greater than the magnitude of a decrease in SG&A expenses associated with an equivalent decrease in economic activity.

The current study explores the relationship between organisation capital and the cost behaviour of SG&A expenses. We speculate that in the case of high (low) intangible-intensive firms, SG&A expenses exhibit cost-stickiness (anti-stickiness) behaviour. Organisation capital is selected as a major indicator of a firm's commitment to intangible investments since it is considered the most important unreported intangible resource (Lev et al., 2009). Furthermore, the development of organisation capital is associated with SG&A expenses (Edvinsson and Malone, 1997; Lev et al., 2009).

We rationalise the relationship between organisation capital and the cost behaviour of SG&A expenses within the context of Banker and Byzalov's (2015) integrated explanatory framework for the sticky cost phenomenon. During a

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sales decline, firms with high levels of organisation capital increase the slack of unutilised resources more than firms with low levels of organisation capital. A possible reason for the increased slack of unutilised resources is that the presence of high levels of organisation capital increases the relevant period's level of adjustment costs and causes managers to shape more optimistic expectations regarding whether future sales growth can absorb this increased slack of unutilised resources. The increased slack of unutilised resources affects the cost behaviour of SG&A expenses.

Our empirical evidence suggests that firms with high (low) organisation capital exhibit SG&A cost-stickiness (anti-stickiness) behaviour. We also document that relatively large economic activity changes (over 10%) motivate managerial behaviour to a greater extent than relatively small ones and therefore the difference in the cost behaviour of SG&A expenses between firms with high and low organisation capital is more profound. Our results are robust in relation to various contributing factors associated with the intensity of the sticky cost phenomenon. Additional evidence supports the generalisation of our findings to include other types of expenses (i.e. advertising expenses) or other measures associated with a firm's level of intangibles (i.e. R&D capital).

Management accounting literature assumes that the sticky cost phenomenon is attributed to managerial behaviour. However, the sticky cost-related literature appears to ignore the importance of intangible investments in managerial resource-allocation decisions and, consequently, in asymmetric cost behaviour. The current study contributes to the management accounting literature by expanding our understanding of cost behaviour in the light of a firm's intensity of intangible investments and the underlying managerial behaviour. Our findings demonstrate that resource-allocation decisions regarding the development of intangibles trigger the sticky cost phenomenon. In firms with high organisation capital, it is plausible to assume that managers have a relatively long-term orientated performance horizon and, thus, they decide to maintain the level of SG&A expenses in the face of sales declines since SG&A expenses are viewed as investments that are associated with high adjustment costs and expectations for increased future sales.

Furthermore, our study extends the empirical results of intangible-related literature in two ways. Firstly, it provides evidence for the role of intangible investments within a firm's cost structure by documenting a strong relationship between organisation capital and SG&A cost asymmetric behaviour. Secondly, our findings suggest that the behaviour of intangible-related expenses deviates from the traditional microeconomic cost model.

Our data sample consists of 55,769 firm-year observations of US listed firms over the period 1979–2009. Data are obtained from North America Compustat. We calculate organisation capital using an approach similar to that proposed by Lev et al. (2009) and we examine SG&A stickiness in the presence of organisation capital following the methodology proposed by Anderson et al. (2003).

The paper proceeds as follows: In Section 2 we describe the sticky cost phenomenon and intellectual capital theory. The motivation and the research hypothesis are presented in Section 3. Section 4 discusses the sample selection and the methodology. Section 5 presents the empirical results. Sections 6 and 7 develop the additional analysis and the robustness tests respectively. Finally, Section 8 concludes.

2. Background

2.1. Sticky cost phenomenon

The traditional view of cost behaviour is based on the microeconomic distinction of costs as fixed versus variable with respect to changes in the activity volume of the current fiscal year (Noreen, 1991). Within this mechanistic setting, the behaviour of total variable costs is contemporaneous, linear and symmetric as regards both increases and decreases in sales volume. The magnitude of changes occurring in the variable costs is independent of the costs and activity volume of the prior fiscal year. Moreover, managers do not play an explicit role in affecting cost behaviour with their deliverable decisions.

The sticky cost phenomenon is an alternative pattern of cost behaviour (Anderson et al., 2003). Sticky cost literature distinguishes between costs that move mechanistically with changes in volume and the costs that are determined by resources committed by managers. Costs are sticky if the magnitude of their increase (which is associated with an increase in economic activity), is greater than the magnitude of their decrease associated with an equivalent decrease in economic activity. In some cases, costs exhibit anti-sticky behaviour, that is, the cost response to an activity level decrease is greater than in the case of an activity increase (Balakrishnan et al., 2004). Sticky cost behaviour has been attributed to deliberate resource-commitment decisions made by managers to maintain idle resources after volume declines[3] and it has been observed in different cost categories such as: SG&A expenses (Anderson et al., 2003; Chen et al., 2012); cost of goods sold (COGS); and operating costs (Balakrishnan and Gruca, 2008; Kama and Weiss, 2013). The same literature has attempted to explain the sticky cost phenomenon using economic factors such as adjustment costs, magnitude of economic activity change, anticipations of future sales and managerial empire-building behaviour.

2.1.1. Adjustment costs

According to Anderson et al. (2003), cost stickiness is positively correlated with the magnitude of adjustment costs. Adjustment costs are economic sacrifices, social, contracting or psychological costs which emerge during the resource-adjustment process (e.g. severance payments, diminished morale, disruptions to on-going work, human resource development costs relating to increasing demand). A high level of adjustment costs prevents managers from reducing discretionary-resource consumption proportionally to reductions in the firm's level of economic activity (Anderson et al., 2003; Banker and Byzalov, 2015; Calleja et al., 2006). Adjustment costs,

[3] The retention of idle resources is used by a few studies in order to explain the relationship between cost change and future profitability (Banker and Chen, 2006; Baumgarten et al., 2010).

and subsequently cost stickiness, are affected by: firm-level characteristics such as asset intensity and employee intensity (Anderson et al., 2003); country or environmental characteristics such as labour market characteristics and systems of corporate governance (Banker et al., 2013a,b; Calleja et al., 2006); and organisational factors such as the criticality of the cost for the central activities of the enterprise (Balakrishnan and Gruca, 2008).

2.1.2. Magnitude of economic activity change

The magnitude of economic activity change has been viewed as a possible cause of cost stickiness. Relatively large changes in sales revenues interrupt the linear pattern of cost behaviour. For example, Balakrishnan et al. (2004) found that managers do not significantly change staff hours in response to small (3% or less) changes in activity levels. On the other hand, there is a significant response for large changes, independent of direction. Subramaniam and Weidenmier (2003) report that revenue changes greater than 10% trigger sticky behaviour in SG&A expenses and COGS.

2.1.3. Anticipation of future sales

Managerial expectations for the anticipated level of sales affect deliberate resource-adjustment decisions and cost behaviour. Pessimistic (optimistic) expectations regarding the permanence of decline in sales should reduce (increase) the cost stickiness (Banker and Byzalov, 2015; Banker et al., 2014). Anderson et al. (2003) found that the cost stickiness of SG&A expenses is lower after two consecutive declines in sales and higher during periods of macroeconomic growth. A similar pattern of cost behaviour has been confirmed for COGS, SG&A expenses (Subramaniam and Weidenmier, 2003; Banker et al., 2014) and for other operating costs (Banker et al., 2013a,b).

A possible reason, which could account for the association between cost stickiness and managerial expectations of sales, relies on managers' interpretation of the persistence of demand changes (Balakrishnan et al., 2004). In cases of excess capacity, a demand decrease is interpreted by managers as a signal of a permanent reduction in the firm's activity and it triggers a more intensive change (decrease) in cost than the corresponding change would be if demands increased (i.e. anti-sticky cost behaviour). On the other hand, in cases of constrained capacity, a demand increase would trigger sticky cost behaviour.

2.1.4. Managerial empire-building behaviour

Managerial decisions to maintain unutilised resources, which lead to cost stickiness, can also be caused by personal considerations (e.g. to avoid the personal consequences of cost reductions such as loss of status) and can result in agency costs (Anderson et al., 2003). Chen et al. (2012), also find that managerial empire-building behaviour is an important source of sticky cost behaviour. This problem is mitigated by good corporate governance and proper incentives. Dierynck et al. (2012) find that earnings management via discretionary accruals causes higher cost stickiness. On the other hand, Wiersma (2011) argues that sticky cost behaviour is not a bad phenomenon and finds that long-term rewards, which lead to an alignment between the firm's goals and the managers' incentives, increase the degree of cost stickiness. Kama and Weiss (2013) argue that when managerial decisions are driven by incentives to avoid losses or meet earnings targets, managers adjust resources faster when the activity level decreases than they do when it rises. Following Chen et al. (2012) and Kama and Weiss (2013), Banker and Byzalov's (2015) study provides further evidence that incentives to meet an earnings target diminish cost stickiness.

2.2. Intellectual capital

This section provides the basis of the study concerning intangible assets and intellectual capital. Firstly, we attempt to define intellectual capital and to examine its principal ontological dimensions. Secondly, we present the prior empirical evidence regarding the relationship of intellectual capital with operating and subsequent market performance. We also analyse the current debate over accounting reporting practises as related to intellectual capital and discuss the possibility of developing reliable financial measures to reveal and study a firm's intangible value. Finally, we consider the financial implications of organisation capital.

2.2.1. Definition of intellectual capital

Intangible assets are sources of future economic benefits that lack a physical embodiment (Lev et al., 2009). Initially, research interest in the economic implications of intangible investments focused on specific types of expenses relating to advertising and R&D activities (e.g. Sougiannis, 1994; Lev and Sougiannis, 1996; Eberhart et al., 2004). Progressively, the relationship between intangible assets and operating or market performance has been examined through the prism of more sophisticated concepts such as human capital (Hansson, 2004; Pantzalis and Park, 2009) or organisation capital (Lev et al., 2009), which constitute parts of a broader and more abstract concept, that is, intellectual capital. However, relevant research has not yet developed a commonly accepted definition for intellectual capital.

In endeavouring to clarify the substance of intellectual capital, the literature demonstrates an abundance of theoretical propositions and definitions (Martín-de-Castro et al., 2011). Through the diversity of opinion regarding the nature of intellectual capital, we are able to draw some conclusions (Swart, 2006). First, intellectual capital concerns the organisational knowledge of the human assets, internal structures and external economic partners of an organisation. Second, it creates economic value through organisational action. Third, it is credited with the development of a competitive advantage since it enhances a firm's environmental responsiveness and ability to implement strategy effectively. The ability to manage knowledge with the intention of improving environmental responsiveness is associated with organisational learning (Argyris and Schön, 1996). For the purposes of this study, the term "intellectual capital" is employed to denote the stock of organisational knowledge and the collective ability to transform this knowledge into action and economic value through leveraging organisational-learning phenomena (Reinhardt et al., 2001). According to the literature, three main components of intellectual capital can be found:

human capital, organisation or structural capital and relational or costumer capital (Martín-de-Castro et al., 2011; Swart, 2006).

Human capital refers to the knowledge and learning capabilities of human assets and their ability to generate tangible and intangible assets (Edvinsson and Malone, 1997). This knowledge includes formal education, specific training, experience and personal development. Abilities and behaviours are also dimensions of human capital (Martín-de-Castro et al., 2011). Abilities are the skills that a person develops as a result of experience and practice (Subramaniam and Youndt, 2005), whereas behaviours guide individuals in performing their tasks and include mental models, paradigms and beliefs such as: commitment, self-motivation, job satisfaction and creativity (Martín-de-Castro et al., 2011).

Relational capital is viewed as a firm's ability to absorb, explore and exploit the knowledge of its business environment in order to achieve and sustain competitiveness (Martín-de-Castro et al., 2011). A firm's relationship with its environment can be analysed on two levels: The first refers to the firm's relations with customers, suppliers, partners and competitors; and the second refers to its relations with society in general (Swart, 2006).

According to Lev et al. (2009), organisation capital is the most important intangible asset incorporated into a firm's organisational structure and the technological infrastructure that facilitates the flow of knowledge in order to improve the firm's operational efficiency. It represents unique structural and organisational designs and business processes which generate sustainable competitive advantages (Lev, 2001). Martín-de-Castro et al. (2011) argue that organisation capital results from the combination of intangible assets that are, by nature, explicit and implicit, formal as well as informal, and which, in an effective and efficient way, give structure and organisational cohesion to different activities and business processes developed by the firm. Organisation capital includes capabilities and knowledge used to combine human skills and physical capital into systems for producing and delivering want-satisfying products. It also includes elements such as organisational culture, values, attitudes, structure, and information and telecommunications technology (Martín-de-Castro et al., 2011).

2.2.2. *Intangible assets and financial performance*

Existing empirical evidence documents the growing economic significance of intangible assets (e.g. R&D investments, advertising expenses, human capital, organisation capital, etc.) regarding a firm's operating and subsequent market performance (Al-Horani et al., 2003; Eberhart et al., 2004; Hansson, 2004; Lev et al., 2009; Lev and Sougiannis, 1996; Pantzalis and Park, 2009; Sougiannis, 1994). The theoretical underpinning for explaining the positive relation of intangible assets with operating performance stems from the resource-based view of strategy (Martín-de-Castro et al., 2011), i.e. intangible assets represent the firm's unique internal capabilities that improve its economic performance and its crucial competitive advantage within the context of a knowledge-based society (Lev et al., 2009). However, there is no conclusive empirical insight into whether positive market performance associated with intangible investments is driven by excess risk taking (see, e.g. Chan et al., 2001) or by market underreaction to the real value of the firm's intangible assets (see, e.g. Eberhart et al., 2004).

2.2.3. *Intangible assets, financial reporting and metrics*

Regardless of the economic significance of intangible assets, accounting conservatism treats resource consumption for the development of intangible assets as expenses. The absence of explicit financial accounting information for significant categories of intangible assets has been recognised by a part of the research community as a deficiency in the existing accounting reporting paradigm (Canibano et al., 2000; Lev and Zarowin, 1999; Mohd, 2005). It has also triggered a debate within academic forums, professional communities and policy making institutions over whether it is necessary to reform current accounting reporting practises and policies regarding intangible assets (Lev, 2008; Skinner, 2008a,b). The underlying argument for the reformation of existing accounting rules is that financial information for unreported intangible investments will improve a firm's capability to create sustainable economic value; also various stakeholders will be able to shape more rational economic decisions. Within the context of management control systems, a number of attempts for shaping intellectual capital reporting frameworks have been recorded (Andriessen, 2004; Andriesson, 2005; Edvinsson and Malone, 1997).

The quest for relevant financial information regarding unreported intangible assets has been a central theme for a major stream of intellectual capital research, recognised as the IC1-ostensive research stream. Mouritsen (2006) distinguishes two central themes within intellectual capital research: IC1-ostensive and IC2-performative. The IC1-ostensive research stream adopts a positivistic view and argues that intellectual capital can be systematically analysed through its components (i.e. human, organisation and relational capital). Furthermore, the contribution of each intellectual capital component to organisational performance can be observed and measured in terms of its impact on various financial fundamentals (e.g. risk and returns, market-to-book, etc.). In other words, the IC1-ostensive research stream attempts to trace causality between intellectual capital, strategy and operating performance. On the other hand, the IC2-performative research stream recognises that intellectual capital is part of the configuration of a firm's knowledge-management policies and, consequently, its nature is idiosyncratically defined within a firm's organisational context. Moreover, intellectual capital's effect on organisational performance is realised by interpreting its role in making firms capable of performing effectively according to endogenously defined values. In endeavouring to shed light on the information problem of intellectual capital, the IC2-performative research stream emphasises narratives, qualitative information and descriptions, and opposes any possibility of developing economic variables that can provide relevant and reliable financial information for intangible assets.

This study is anchored within the IC1-ostensive research stream. The development of economic theories for

intellectual capital should be grounded on solid empirical, quantitative evidence regarding its financial implications for a firm's economic operation. Such quantitative evidence can be collected using primarily intellectual capital-related data of a financial nature. Since intangible assets are characterised by a complex nature defined idiosyncratically within the context of specific settings (e.g. organisational values, employee motivation, reputation, etc.), it is difficult to link intangible entities and financial measurements in a similar way to the method that existing financial accounting reporting systems use for tangible assets. However, the economic interest in intellectual capital emerges when its financial implications are realised in a firm's cost structure or future value and, for this reason, it can be introduced as a variable in an economic model. In other words, a firm's intellectual capital becomes an economic factor to the extent that its presence can be traced in the firm's accounting figures.

In line with the IC1-ostensive school of thought, the relevant literature has developed financial proxies in order to construe the unreported economic value of unobserved intangibles and to facilitate research designs. For instance, measures focusing on innovation and advertisement-related intangible assets are derived by capitalising and amortising a firm's R&D and advertisement expenses over a five-year period (e.g. Lev and Sougiannis, 1996). Hansson (2004) calculated the rent of human capital as the weighted average wage change. Pantzalis and Park (2009) measured the excess value of human capital as the natural logarithm of a firm's common equity market value to its imputed market value, with the latter defined as the number of employees times the industry median market value of common equity to number of employees. Lev et al. (2009) estimated the economic value of organisation capital by capitalising and amortising the abnormal profits attributed to organisation capital over a five-year period. Although it seems overly optimistic to argue that the aforementioned examples of financial measurements for intangible assets provide definitive solutions to the valuation problem of intellectual capital, they can serve as reliable proxies for ranking firms according to their exposure to intangible investments, enabling researchers to study the economic implications of intellectual capital.

3. Motivation and research hypothesis

In Section 2, we noted that a part of the research community recognises that the lack of explicit financial accounting information for internally developed intangibles constitutes a deficiency in the existing accounting reporting paradigm (Canibano et al., 2000; Lev and Zarowin, 1999; Mohd, 2005). However, the development of financial information for intangible assets should be grounded on proper economic theoretical propositions that shed light on the value-generating processes associated with intangible assets. These theoretical explanations will enable interested parties to formulate an interpretation rationale for intangible-related information that will improve its reliability and its relevance.

The development of economic theories for intangible investments requires empirical evidence of the financial implications for the firm's value-generating process, as these financial implications can be perceived in terms of cost behaviour and revenue growth. Existing empirical evidence is limited regarding the association of the level of intangible assets with operating performance and subsequent market performance. There is limited evidence of the nature of the explicit role of intangible investments within a firm's value-generating process. Furthermore, the idiosyncratic nature of intangible economic resources encourages potential research initiatives to search for empirical evidence within the context of phenomena that deviate from traditional economic accounting thinking.

The sticky cost phenomenon is an alternative pattern of cost behaviour (Anderson et al., 2003) that contradicts traditional cost accounting literature. The sticky cost phenomenon has been attributed to deliberate resource-commitment decisions made by managers to maintain idle resources after volume declines. Among other factors, these decisions might be driven by managerial perceptions of resource commitments to the development of intangible assets and their effect on the firm's performance. Managers, who view deliverable resource commitments to the development of intangible assets as investments contributing to long term growth, are reluctant to reduce these investments following a temporary decline in sales volume – resulting in the cost-stickiness of intangible-related expenses. Conversely, firms that view resource consumptions for internally developed intangibles as expenses are eager to reduce these expenses in a temporary decline in sales volume, in order to improve the reported income and to smooth earnings volatility between accounting periods – resulting in a lower degree of cost stickiness or anti-stickiness of intangible-related expenses.

We examine the relationship between the sticky cost phenomenon and intangibles in the case of SG&A expenses and organisation capital. According to Lev et al. (2009), organisation capital represents the unique structural and organisational designs and business processes which generate sustainable competitive advantages and, thus, it consists of elements (e.g. organisational culture, tacit knowledge) that cannot be connected directly with a specific cost or revenue item. However, once firms attempt to manage it with deliverable resource-allocation decisions, organisation capital can be associated with the economic consequences of such decisions. More specifically, activities that are connected to the development and maintenance of organisation capital consume resources that are classified as a firm's SG&A expenses (Edvinsson and Malone, 1997; Eisfeldt and Papanikolaou, 2013; Lev et al., 2009). The relation between SG&A cost stickiness and organisation capital can be rationalised within the context of the theoretical framework proposed by Banker and Byzalov (2015) to explain the sticky cost phenomenon.

Sticky cost research relies on the asymmetric relation between levels of sales and costs. Banker and Byzalov (2015) formed an integrated framework for the sticky cost phenomenon by incorporating all the recent theoretical developments. This theoretical framework is presented graphically in Fig. 1(Panel A). When current sales ($Sales_t$) exceed available resource capacity, which is determined by resources carried over from the prior period ($Resources_{t-1}$),

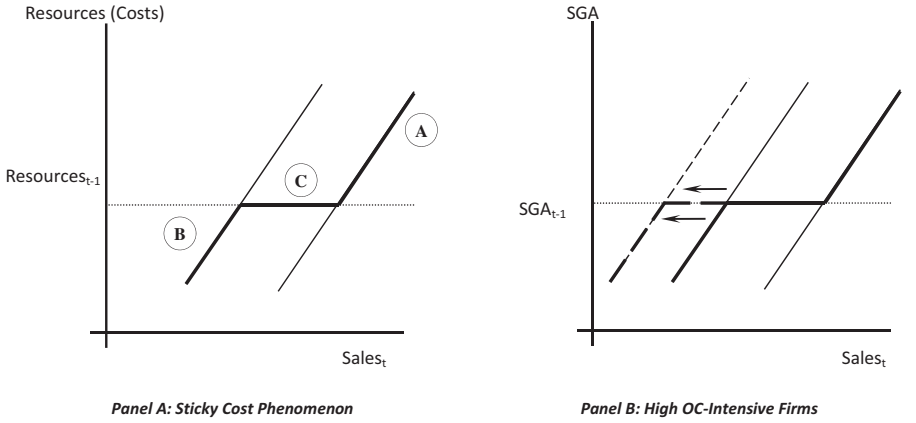

Fig. 1. Sticky cost phenomenon and organisation capital. Panel A: Sticky cost phenomenon. Notes – Panel A: When current sales (Sales$_t$) exceed available resource capacity, determined by resources carried over from the prior period (Resources$_{t-1}$), managers will add the required resources (Scenario A). When current sales are far below capacity, managers will cut resources to reduce slack capacity to an acceptable level (Scenario B). At intermediate sales levels, available resources are sufficient to accommodate current sales and the unused capacity is positive, but acceptably low. In this case, managers maintain the original resource level (Scenario C). Panel B: High OC-intensive firms. Panel B: Firms with high levels of organisation capital increase the slack of unutilised resources more than firms with low levels of organisation capital. The presence of high levels of organisation capital increases the level of current adjustment costs and causes managers to shape more optimistic expectations regarding whether future sales growth will absorb this slack.

firms will add resources in a proportional way (Fig. 1 – Panel A – Scenario A). When current sales fall, firms weigh the costs of maintaining a slack of unutilised resources against the adjustment costs associated with disposing of these resources. At intermediate sales levels, unutilised capacity is positive but acceptably low and, thus, firms maintain the original resource levels (Fig. 1 – Panel A – Scenario C). Banker and Byzalov (2015) argue that this slack of unutilised resources depends not only on concurrent sales but also on: (i) prior period resource levels, which affect the adjustment costs of the current period; (ii) expected future sales, which affect future adjustment costs; and (iii) agency and behavioural factors. Finally, in the case of current sales levels being far below minimum acceptable unutilised capacity, firms will cut resources to reduce the slack (Fig. 1 – Panel A – Scenario B).

Drawing on the above-integrated framework, we suggest two reasons associated with adjustment costs and managerial expectations which indicate why, in the case of firms with high organisation capital, SG&A expenses are expected to exhibit cost stickiness. We speculate that firms with high levels of organisation capital increase the slack of unutilised resources more than firms with low levels of organisation capital, since higher levels of organisation capital increase the level of adjustment costs and shape more optimistic managerial expectations regarding whether future sales growth will absorb this slack.

Firms with high organisation capital view SG&A expenses for development as investments which increase the firm's available intangible resources and capabilities. In these firms, higher levels of prior period SG&A expenses for the development of organisation capital increase the perceived level of accumulated organisation capital stock and, thus, the current period's adjustment costs. Managers are more eager to retain slack resources in response to a decrease in economic activity, since this course of action will enable firms to maintain their accumulated stock of organisation capital investments and to preserve their ability to extract future economic benefits from these investments. Typical examples of these adjustment costs include expenditures on hiring and developing a key-talent labour force. For instance, according to Eisfeldt and Papanikolaou (2013), organisation capital is embodied in highly specialised labour inputs. Thus, firms with high organisation capital are more human-orientated and require higher labour adjustment costs[4] in their efforts to retain valuable human capital resources.

Additionally, managers of firms with high organisation capital shape more optimistic expectations for future sales than managers of firms with low organisation capital. The fact that high organisation capital firm managers are more optimistic makes them more willing to increase the slack of unutilised SG&A expenses for two reasons. Firstly, the economic rationale of firms increasing SG&A expenses for the development of organisation capital is that, although increased SG&A expenses reduce current period profits, in the long run increased levels of organisation capital will enable firms to improve their sales growth rate. Thus, any reduction in the level of SG&A expenses for the development of organisation capital in the current period is anchored by a future adjustment cost – i.e. the opportunity cost of potentially reduced sales in the future. Secondly, expectations for higher future sales enable firms to retain a higher slack of SG&A expenses in the current period which is expected to be absorbed by the increased future sales. Consequently, the optimistic expectations of firms with high organisation capital will cause a behavioural effect regarding the importance of resource commitments to the development of intangible assets, which deviates from low organisation capital-intensive firms. That is, firms with

[4] Similarly, Banker et al. (2013b) provide country-level evidence regarding the role of resource adjustment costs in asymmetric cost behaviour. Their evidence indicates that countries with a high development level are more human-intensive and, as a result, they entail higher labour adjustment costs.

high organisation capital are expected to be more reluctant to reduce the intangible investments in a temporary decline in sales volume, resulting in SG&A cost stickiness.

Fig. 1 illustrates the above analysis. In the case of firms with high organisation capital, SG&A expenses are expected to exhibit cost-stickiness behaviour which becomes more apparent for firms that have accumulated a higher stock of organisation capital over time (Fig. 1 – Panel B). Summarising the above analysis, we introduce the following hypothesis:

H_1. Firms with high organisation capital exhibit greater SG&A cost stickiness than firms with low organisation capital.

4. Data and methods

4.1. Cost stickiness

Most empirical studies employ Anderson et al.'s approach (2003) to measure cost stickiness which estimates the magnitude of variation in SG&A expenses with respect to contemporaneous variations in sales by estimating the following model:

$$\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t} \quad (1)$$

The primary variables used in this model are the annual log change in SG&A expenses ($\text{SG\&A}_{i,t}$) and the annual log change in sales revenue ($\text{Rev}_{i,t}$) of firm i in year t. It also incorporates a dummy variable ($d_{i,t}$) for the direction of sales of firm i in year t, which equals 1 if the sales of firm i decreased in year t and 0 otherwise.

The coefficient b_1 measures the percentage increase in SG&A costs following a 1% increase in sales revenue (because the value of $d_{i,t}$ is 0 when revenue increases). The coefficient b_2 is a cost stickiness measure and the sum of the coefficients $b_1 + b_2$ measures the percentage decrease in SG&A costs following a 1% decrease in sales revenue (because the value of $d_{i,t}$ is 1 when revenue decreases). The empirical hypothesis for stickiness implies that $b_1 > 0$ and $b_2 < 0$ ($b_1 > b_1 + b_2$).

The basic model of Eq. (1) is extended by Anderson et al. (2003) to include factors that the literature proposes as contributing to the sticky cost phenomenon (see Section 2 above). The coefficient of the sticky cost term b_2 of Eq. (1) may be expanded as follows:

$$b_2 = b_2 + b_3 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 ds_{i,t} + b_6 \text{GNP}_t \quad (2)$$

Consistent with the adjustment costs view, Eq. (2) employs the log of the ratio of number of employees ($\text{Emp}_{i,t}$) to sales revenue ($\text{Rev}_{i,t}$) and total assets ($\text{Assets}_{i,t}$) to sales revenue ($\text{Rev}_{i,t}$) of firm i in year t, as measures of a firm's employee intensity and asset intensity respectively. Anderson et al. (2003) argue that firms with higher employee intensity face higher adjustment costs, since they use more employees to support a given volume of sales. Similarly, the costs of adjusting committed resources are higher for firms with higher asset intensity, since this relies more on the firm's own resources rather than on materials and services purchased by the company.

In order to capture the effects of anticipations of future sales on the degree of cost stickiness, Eq. (2) includes a dummy variable $ds_{i,t}$ that takes the value of 1 if a firm's sales revenue decreases for two consecutive periods, and 0 otherwise. Additionally, in order to capture the effect of macroeconomic activity on the sticky cost phenomenon, Eq. (2) includes the variable GNP_t, which is the percentage growth in real Gross National Product during year t.

Substituting the relations in Eq. (2) into Eq. (1) gives:

$$\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t} \quad (3)$$

The regression model of Eq. (3) will be referred to as the ABJ model for the rest of this study. Later, Chen et al. (2012), following prior literature (Richardson, 2006; Shleifer and Vishny, 1997; Stulz, 1990), use free cash flows to proxy for managerial empire-building incentives. For this reason, we also include the variable $\text{FCF}_{i,t}$ to Eqs. (2) and (3). Managerial empire-building behaviour is modelled with the variable $\text{FCF}_{i,t}$ which represents the free cash flows of firm i in year t. Free cash flows are measured as cash flow from operating activities minus common and preferred dividends, scaled by total assets.

Subsequent studies (Dierynck et al., 2012; Chen et al., 2012; Kama and Weiss, 2013) have expanded the ABJ model in order to avoid specification bias for the coefficient b_0. More specifically, the coefficient b_0 is expanded thus:

$$b_0 = b_0 + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} \quad (4)$$

Expanding Eq. (3) to include free cash flows ($FCF_{i,t}$) and combining it with Eq. (4), the extended model becomes:

$$\log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + b_7 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) FCF_{i,t} + b_8 \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_9 \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} GNP_t + b_{12} FCF_{i,t} + \varepsilon_{i,t} \quad (5)$$

4.2. Organisation capital

A significant methodological issue of our research design is the definition of a proper variable for ranking the firms in our data sample according to the economic value of their organisation capital. In the background section we stated that part of the intellectual capital literature recognises the difficulties of developing financial measurements. Nevertheless, within the context of the IC1-ostensive research stream, many research initiatives have developed financial proxies in order to construe the unreported economic value of unobserved intangibles and to facilitate research designs. In particular, the proposed financial proxies for intangible assets, such as organisation capital, attempt to trace the financial implications of a firm's cost structure or economic value.

A financial proxy for the economic value of organisation capital can be input-based, output-based or a combination of these two approaches.[5] An input-based financial proxy focuses on the amount of resources consumed for the development and maintenance of organisation capital. An output-based financial proxy attempts to capture the effects of organisation capital on a firm's performance in terms of abnormal revenues or cost containments. Both approaches can be combined in order to formulate a more integrated methodology for measuring the economic implications of organisation capital on a firm's financial performance.

The construction of an input-based financial measure for the economic value of organisation capital is associated with the level of a firm's SG&A expenses. Organisation capital represents unique structural and organisational designs and business processes generating sustainable, competitive advantages (Lev, 2001). It seems that a firm's activities regarding the development of organisation capital have a direct effect on SG&A expenses and, as such, they increase the level of SG&A expenses more than any other category of operating cost (Lev et al., 2009).

It is plausible to assume that firms with higher levels of organisation capital report systematically higher levels of SG&A expenses than firms with lower levels. A common approach for the development of input-based financial measures for intangible assets within intellectual capital literature is to capitalise the relevant expenses. More specifically, SG&A expenses, which are related to the development of intangible assets such as organisation capital, are capitalised and amortised for a time window, which might range from three to five years (e.g. Lev et al., 2009; Lev and Sougiannis, 1996). This approach enables researchers to evaluate the inter-temporal evolution of SG&A expenses that are related to intangible assets and to narrow the effects of any temporal fluctuations of annual SG&A expenses on the study of the relation of intangible assets and a firm's economic behaviour.

The development of an output-based financial proxy for the economic value of organisation capital relies on the definition of its implications on the firm's cost structure and revenues. Investments in organisation capital are expected to make firms capable of achieving an operating efficiency superior to their competitors (Lev et al., 2009) by providing firms with the capabilities and knowledge to combine human skills and physical capital into systems for producing want-satisfying products (Martín-de-Castro et al., 2011). Superior operating efficiency could be measured in terms of abnormal revenues and cost containments according to specific benchmarks. In the case of organisation capital, these benchmarks should take into consideration the normal level of revenues and costs that a firm could expect, assuming it utilises its available tangible factors of production (e.g. physical capital and labour) under conditions of industrial-average economic efficiency. Within this context, any observed favourable divergence from the normal level of revenues and costs can be attributed to the intangible side of a firm's economic circuit. Furthermore, it is plausible to assume that firms with high organisation capital levels would be anchored with high levels of favourable abnormal revenues and cost containments.

For the research purposes of this study, we rank the firms in our data sample according to the economic value of their organisation capital using a methodology proposed by Lev et al. (2009) that combines characteristics from both the input-based and output-based intangible investment measurement approaches. Specifically, we measure

[5] In a similar way, within the field of labour economics, human capital can be measured by employing a cost-based approach, income-based approach or a combination of these two approaches (e.g. Kuruscu, 2006; Bowlus and Robinson, 2012). A cost-based approach emphasises the economic sacrifices required to develop human capital. An income-based approach attempts to measure the economic implications of human capital on future income streams.

the economic value of the organisation capital ($OC^j_{i,t}$) of firm i operating in j industry in year t, using Eq. (6):

$$OC^j_{i,t} = \frac{\sum_4^{k=0}(1-0,2k)\text{AbProfit}^j_{i,t-k}}{\text{Assets}^j_{i,t}} \quad (6)$$

where $\text{AbProfit}^j_{i,t}$ is the sum of the contribution of $OC^j_{i,t}$ to revenues ($\text{AbSALE}^j_{i,t}$) and to cost containment ($\text{AbCOST}^j_{i,t}$) of firm i operating in j industry in year t; and $\text{Assets}^j_{i,t}$ is the total assets of firm i operating in j industry in year t.

$\text{AbSALE}^j_{i,t}$ of firm i in year t is the difference between a firm's actual revenues and the predicted revenues according to the average efficiency without organisation capital. Revenues are modelled as a function of physical capital (plants, property and equipment) and labour (number of employees):

$$\text{Rev}^j_{i,t} = c^j_{0,i,t}\text{EMP}^{j\,c^j_{2,i,t}}_{i,t}\text{PPE}^{j\,c^j_{3,i,t}}_{i,t}e^j_{i,t} \quad (7)$$

where $\text{Rev}^j_{i,t}$ is the annual revenue; $\text{EMP}^j_{i,t}$ is the number of employees; and $\text{PPE}^j_{i,t}$ is the net plan, property and equipment of firm i operating in j industry in year t. Parameters $c^j_{0,i,t}$, $c^j_{2,i,t}$ and $c^j_{3,i,t}$ of Eq. (7) are obtained by estimating the following model of Eq. (8):

$$\log\left(\frac{\text{Rev}^j_{i,t}}{\text{Rev}^j_{i,t-1}}\right) = c^j_{0,i,t} + c^j_{1,i,t}\log\left(\frac{\text{SG\&A\_CAP}^j_{i,t}}{\text{SG\&A\_CAP}^j_{i,t-1}}\right) + c^j_{2,i,t}\log\left(\frac{\text{EMP}^j_{i,t}}{\text{EMP}^j_{i,t-1}}\right) + c^j_{3,i,t}\log\left(\frac{\text{PPE}^j_{i,t}}{\text{PPE}^j_{i,t-1}}\right) + \log\left(\frac{e^j_{i,t}}{e^j_{i,t-1}}\right) \quad (8)$$

where $\text{SG\&A\_CAP}^j_{i,t}$ is the annual SG&A expenses capitalised and amortised over the last three years. Thus, $\text{SG\&A\_CAP}^j_{i,t}$ is calculated as

$$\text{SG\&A\_CAP}^j_{i,t} = \text{SG\&A}^j_{i,t} + \frac{2}{3}\text{SG\&A}^j_{i,t-1} + \frac{1}{3}\text{SG\&A}^j_{i,t-2} \quad (9)$$

Eq. (8) is estimated annually and cross-sectionally for each industry setting.

$\text{AbCOST}^j_{i,t}$ is the difference between a firm's actual costs and the predicted costs according to the average efficiency without organisation capital and it is calculated in a similar way as $\text{AbSALE}^j_{i,t}$ using the operating cost of firm i operating in j industry in year t ($\text{Cost}^j_{i,t}$), as the dependent variable in Eq. (8).

The aforementioned procedure measures the contribution of organisation capital to a firm's revenues and costs, taking into account normal levels according to the industrial-average economic efficiency and the particular firm's available tangible resources of capital and labour. This procedure also integrates $\text{SG\&A\_CAP}^j_{i,t}$ in the estimation of Eq. (8), that is, an input-orientated measure of accumulated investments in organisation capital.

We rank and classify the firms in our data sample into subgroups according to their level of organisation capital using the variable $\text{MOC}^j_{i,t}$ which is the median value of the variable $OC^j_{i,t}$ of firm i operating in j industry in year t. Regardless of its accuracy as a measure of the true economic value of organisation capital, $\text{MOC}^j_{i,t}$ enables us to separate firms according to their organisation capital intensity. The calculation of $\text{MOC}^j_{i,t}$ is based on the variable $OC^j_{i,t}$ which is a measure of the output of organisation capital, since it accumulates the abnormal profits of the current and previous four years while taking into consideration the resource consumptions for its development (measured as the level of capitalised SG&A expenses for a three-year time window). For this reason, using $\text{MOC}^j_{i,t}$ as a ranking variable of a firm's organisation capital enables us to examine the cost behaviour of SG&A expenses in a specific time period in light of the firm's level of cumulative past abnormal profits as well as past SG&A expenses for the development of organisation capital. It is plausible to assume that the level of a firm's cumulative past abnormal profits (due to past investments in organisation capital) shapes management perceptions regarding expectations of future operating performance and, thus, shapes the way that managers view resource commitments regarding the development of organisation capital, i.e. as investments or as resource consumptions.

In addition, we repeat our tests by ranking and classifying the firms in our data sample using the variable $\text{MAOC}^j_{i,t}$ which is the median value of the adjusted organisation capital $\text{AOC}^j_{i,t}$ of firm i operating in j industry in year t. Adjusted organisation capital $\text{AOC}^j_{i,t}$ is calculated using the methodology followed to calculate the variable $\text{MOC}^j_{i,t}$ but properly modified to exclude selling expenses from the calculation of $\text{SG\&A\_CAP}^j_{i,t}$. The reason for this exclusion is that selling expenses are related to a firm's relationships with customers and, to a lesser extent, with the development of the firm's organisation capital. Thus, in Eq. (8), variable $\text{SG\&A\_CAP}^j_{i,t}$ is replaced by the variable $\text{A\_SG\&A\_CAP}^j_{i,t}$, which represents the annual adjusted SG&A expenses of firm i operating in j industry in year t, capitalised and amortised over three years, and is expressed thus:

$$\text{A\_SG\&A\_CAP}^j_{i,t} = \text{A\_SG\&A}^j_{i,t} + \frac{2}{3}\text{A\_SG\&A}^j_{i,t-1} + \frac{1}{3}\text{A\_SG\&A}^j_{i,t-2} \quad (10)$$

where $\text{A\_SG\&A}^j_{i,t}$ is the annual SG&A expenses minus advertising expenses $\text{AE}^j_{i,t}$ of firm i operating in j industry in year t, that is

$$\text{A\_SG\&A}^j_{i,t} = \text{SG\&A}^j_{i,t} - \text{AE}^j_{i,t} \quad (11)$$

4.3. Data

The variable data used in our analysis are downloaded from the North America Compustat database. For the

Table 1
Sample selection and descriptive statistics.

Panel A – Sample selection

Sample	Observations deleted	Observations remaining
Initial sample: firm-year observations with valid data on Compustat, 1979–2009	–	201,140
Exclude financial firms	48,954	152,186
Exclude observations where SG&A expenses are greater than sales revenue and observations for firms that have no positive sales revenues and SG&A costs	23,940	128,246
Exclude those firm-years in which the revenue changes by more than 50% from one year to the next	52,021	76,225
Exclude observations where SG&A expenses move in the opposite direction to sales	15,864	60,361
Exclude all firms with sales and total assets lower than $5 million	4592	55,769

Panel B – Descriptive statistics

	Number of observations	Mean	Median	Standard deviation	Min	Max
SG&A	55,769	438.44	49.98	1072.64	0.06	4738.00
SG&A_CAP	55,769	1573.46	262.17	2438.79	0.12	9476.00
Sales	55,769	1733.98	252.87	3937.79	5.01	26,993
Assets	55,769	2278.83	208.84	6737.78	5.00	58,001
Emp	55,769	20.24	2.63	36.44	0.01	112
GNP	55,769	2.87	3.20	2.22	−4.75	7.57
FCF	55,769	22.02	0.09	82.92	−132.56	834.24
MOC	55,769	42.87	0.32	148.01	−7.11	1349.65
AbCost	55,769	−1551.02	−232.70	3535.03	−27,096.19	3332.15
AbProfit	55,769	185.02	16.56	508.39	−91.00	3382.81
AbSale	55,769	1736.04	254.13	3939.89	5.04	27,064.35
AE	55,769	974.79	1297.50	549.73	0	1297.50
A_SG&A	55,769	−536.35	−1189.38	1200.44	−1297.44	4737.85
MAOC	14,902	22.70	0.29	102.08	−5.80	1336.26

primary variables SG&A expense and sales revenues, the data item numbers are 189 and 12 respectively. The data items also include: total assets (data item 6); plant property and equipment costs (data item 30); and number of employees (data item 29). The variable that represents free cash flow is measured as cash flow from operating activities (data item 308), minus common and preferred dividends (data items 9 and 21), scaled by total assets (Lang et al., 1991; Core and Guay, 1999). Finally, operating costs are calculated as annual sales (data item 12) minus income from operations (data item 178).

The data sample covers the time period from 1979 to 2009. Because of comparability problems we exclude financial firms (four-digit SIC codes 6000–6999). We reduce the effect of outliers on our analysis by winsorising each individual data element to the 1st and 99th percentile of the respective distribution (Balakrishnan et al., 2004; Banker et al., 2013a,b). We also exclude the observations where SG&A expenses are greater than sales revenue and the observations for firms that have no positive sales revenues and SG&A costs. To remove the effects of mergers, acquisitions and divestitures, we eliminate those firm-years in which the revenue changes by more than 50% from one year to the next (see Calleja et al., 2006; Subramaniam and Weidenmier, 2003). We also discard observations where SG&A expenses move in the opposite direction to sales (Anderson and Lanen, 2009; Chen et al., 2012). In keeping with Lev et al. (2009), we also delete all firms with sales and total assets lower than $5 million. The total number of firm-year observations is 55,769. We classify and rank the firms according to their intensity of organisation capital into two subgroups (i.e. low versus high organisation capital intensive firms). More specifically, we perform our initial analysis using observations that correspond to firms classified within the lowest (i.e. low MOC/MAOC-intensive firms) and the highest (i.e. high MOC/MAOC-intensive firms) quintile of the distribution of the median values of the (adjusted) economic value of organisation capital ($MOC^{j}_{i,t}/MAOC^{j}_{i,t}$) (Table 1).

5. Results

5.1. Organisation capital and SG&A cost behaviour

Following Petersen (2009), the models of Eqs. (1), (3) and (5) are estimated with either the annual log change in SG&A or adjusted SG&A expenses as the dependent variable (both for low and high MOC- and MAOC-intensive firms) by using firm-clustered standard errors to control for autocorrelation and heteroscedasticity.[6] Results are reported in

[6] In the case of correlated residuals across observations, the true variability of the coefficient estimates can be overestimated or underestimated by OLS standard errors. On the other hand, the clustered standard errors are unbiased and produce confidence intervals that are correctly sized (Petersen, 2009). Furthermore, current literature on accounting, and more specifically the growing body of work on the sticky cost phenomenon, uses Petersen's (2009) methodology to choose the most appropriate econometric estimation procedure for a regression model on a panel dataset (Chen et al., 2012; Dierynck et al., 2012; Kama and Weiss, 2013). We apply Petersen's (2009) methodology which indicates that the most accurate estimation procedure is to estimate our models by using firm-clustered standard errors, due to the presence of the firm effect. The firm effect is a general form of dependence, common in accounting and finance literature, according to which the residuals of a given firm may be correlated across years. Consequently, we provide firm-clustered standard errors that are unbiased as they account for the residual dependence created by the firm effect, as suggested by Petersen (2009).

Table 2
SG&A cost stickiness and organisation capital (MOC).

	Coefficient estimates (t-stat)					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	0.0109***	0.0046***	0.0167***	−0.025***	−0.0324***	−0.0617***
	(8.119)	(2.919)	(3.801)	(−8.646)	(−8.478)	(−8.573)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	0.789***	0.855***	0.717***	1.299***	1.366***	1.307***
	(41.00)	(42.83)	(32.14)	(42.72)	(36.33)	(36.10)
Two-way interaction term						
b_2: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	0.156***	0.0947***	0.226***	−0.341***	−0.401***	−0.360***
	(7.575)	(4.129)	(8.865)	(−10.94)	(−10.31)	(−9.553)
Three-way interaction terms						
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		−0.0193*	−0.0119***		−0.00842	−0.0149***
		(−1.853)	(−3.201)		(−1.370)	(−9.534)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		−0.185***	−0.0154		−0.294***	0.00902
		(−5.655)	(−1.492)		(−2.964)	(1.355)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		−0.0018	−0.367***		−0.003***	−0.282**
		(−0.738)	(−9.016)		(−3.264)	(−2.010)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		0.000180	−0.000965		−5.74e−05	−0.00353***
		(1.280)	(−0.374)		(−1.311)	(−3.248)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			0.000195			−3.36e−05
			(1.477)			(−0.747)
Main terms						
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			−0.00126			−0.0195***
			(−0.727)			(−7.571)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			0.00378			0.0523***
			(1.071)			(7.669)
b_{10}: $ds_{i,t}$			−0.0528***			−0.00311
			(−13.08)			(−0.233)
b_{11}: GNP_t			−0.000859**			−0.00122**
			(−2.489)			(−1.966)
b_{12}: $FCF_{i,t}$			3.38e−05***			0.000124***
			(4.619)			(11.73)
No. of observations	11,158	11,158	11,148	11,151	11,151	11,069
Adj. R-squared	0.963	0.963	0.963	0.967	0.968	0.968

Notes:

[a] Low MOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of organisation capital of the firms in the data sample.

[b] High MOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of organisation capital of the firms in the data sample.

[c] $\log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + b_7 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) FCF_{i,t} + b_8 \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_9 \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} GNP_t + b_{12} FCF_{i,t} + \varepsilon_{i,t}$.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

Variable definitions:

MOC, median value of the economic value of Organisation Capital, which is calculated using the annual SG&A expenses capitalised and amortised over three years.

$SG\&A_{i,t}$, the annual SG&A expenses of firm i in year t.

$Rev_{i,t}$, sales revenues of firm i in year t.

$Emp_{i,t}$, number of employees at firm i in year t.

$Assets_{i,t}$, total assets of firm i in year t.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm i decreased in year t and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$FCF_{i,t}$, free cash flows of firm i in year t.

GNP_t, the percentage growth in real Gross National Product during year t.

Table 3
SG&A cost stickiness and organisation capital (MAOC).

	Coefficient estimates (t-stat)					
	Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
$\mathbf{b_0}$: constant	0.0169***	0.0172***	0.0188**	0.00903***	0.0116***	−0.0284***
	(8.718)	(9.194)	(2.499)	(2.742)	(3.409)	(−3.660)
$\mathbf{b_1}$: $\log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1})$	0.529***	0.525***	0.515***	0.692***	0.690***	0.725***
	(222.5)	(177.9)	(200.8)	(22.59)	(22.32)	(30.87)
Two-way interaction term						
$\mathbf{b_2}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1})$	0.162***	0.163**	0.171**	−0.316***	−0.334***	−0.381***
	(4.641)	(1.985)	(2.012)	(−10.27)	(−10.79)	(−16.20)
Three-way interaction terms						
$\mathbf{b_3}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \log(\text{Emp}_{i,t}/\text{Rev}_{i,t})$		−0.0099***	0.0173		−0.0131***	−0.0192***
		(−2.919)	(0.431)		(−11.68)	(−13.09)
$\mathbf{b_4}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \log(\text{Assets}_{i,t}/\text{Rev}_{i,t})$		−0.00410	0.368***		0.00130	0.0370***
		(−0.372)	(5.611)		(0.259)	(6.400)
$\mathbf{b_5}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times ds_{i,t}$		0.420***	0.175***		0.200*	0.193
		(9.101)	(2.633)		(1.946)	(1.563)
$\mathbf{b_6}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \text{GNP}_t$		−0.00397	−0.0138		0.00392***	0.00454***
		(−1.285)	(−1.415)		(4.221)	(4.937)
$\mathbf{b_7}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \text{FCF}_{i,t}$			−0.0399			−0.000114***
			(−0.822)			(−5.207)
Main terms						
$\mathbf{b_8}$: $\log(\text{Emp}_{i,t}/\text{Rev}_{i,t})$			−0.00133			−0.0190***
			(−0.439)			(−6.079)
$\mathbf{b_9}$: $\log(\text{Assets}_{i,t}/\text{Rev}_{i,t})$			0.0864***			0.0888***
			(12.94)			(9.952)
$\mathbf{b_{10}}$: $ds_{i,t}$			−0.0263***			−0.00438
			(−4.944)			(−0.528)
$\mathbf{b_{11}}$: GNP_t			0.000852			0.00151*
			(0.958)			(1.853)
$\mathbf{b_{12}}$: $\text{FCF}_{i,t}$			−0.000106***			−4.92e−06
			(−3.697)			(−0.128)
No. of observations	5870	5867	5868	5870	5866	5866
Adj. R-squared	0.935	0.916	0.937	0.902	0.905	0.908

Notes:

[a] Low MAOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[b] High MAOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[c] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{ds}_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{FCF}_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

Variable definitions:

MAOC, median value of the economic value of adjusted organisation capital which is calculated using the annual modified SG&A expenses, capitalised and amortised over three years.

Adjusted SG&A, SG&A expenses minus advertising expenses.

$\text{SG\&A}_{i,t}$, the annual SG&A expenses of firm i in year t.

$\text{Rev}_{i,t}$, sales revenues of firm i in year t.

$\text{Emp}_{i,t}$, number of employees at firm i in year t.

$\text{Assets}_{i,t}$, total assets of firm i in year t.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm i decreased in year t and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$\text{FCF}_{i,t}$, free cash flows of firm i in year t.

GNP_t, the percentage growth in real Gross National Product during year t.

Table 4
Adjusted SG&A Cost Stickiness and Organisation Capital (MOC).

	Coefficient estimates (t-stat)					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	0.00332***	0.0114*	0.0152**	0.00313**	0.00293*	0.0324***
	(2.713)	(1.809)	(2.447)	(1.991)	(1.830)	(5.137)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	0.531***	0.535***	0.496***	0.867***	0.870***	0.846***
	(16.10)	(16.42)	(14.59)	(37.10)	(36.74)	(33.12)
Two-way interaction term						
b_2: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	0.130***	0.118**	0.113**	−0.210***	−0.251***	−0.228***
	(3.717)	(2.189)	(2.259)	(−4.326)	(−3.722)	(−3.194)
Three-way interaction terms						
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		0.00378	-0.0137		−0.00416	−0.00619
		(0.301)	(−1.261)		(−0.270)	(−0.306)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		−0.00546	0.00310		0.0572	0.174
		(−0.134)	(0.0752)		(0.663)	(1.549)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		0.0724***	−0.00965		0.104***	0.0892*
		(3.668)	(−0.399)		(3.128)	(1.910)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		−0.0112***	−0.0119***		−0.00789*	−0.00858
		(−2.845)	(−3.327)		(−1.683)	(−1.463)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			−0.268***			−0.0179
			(−2.998)			(−1.596)
Main terms						
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			0.00217			0.0105***
			(0.844)			(4.091)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			0.00570			0.0185***
			(1.484)			(3.907)
b_{10}: $ds_{i,t}$			−0.0129***			−0.00660*
			(−5.152)			(−1.870)
b_{11}: GNP_t			−0.00110***			−0.000446
			(−2.795)			(−1.194)
b_{12}: $FCF_{i,t}$			−0.0150***			0.000158
			(−2.588)			(1.201)
No. of observations	1722	1722	1722	1659	1659	1659
Adj. R-squared	0.498	0.517	0.509	0.600	0.602	0.619

Notes:

[a] Low MOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of organisation capital of the firms in the data sample.

[b] High MOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of organisation capital of the firms in the data sample.

[c] $\log\left(\frac{A\_SG\&A_{i,t}}{A\_SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{A\_SG\&A_{i,t}}{A\_SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{A\_SG\&A_{i,t}}{A\_SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + b_7 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) FCF_{i,t} + b_8 \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_9 \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} GNP_t + b_{12} FCF_{i,t} + \varepsilon_{i,t}$.

[*] Significance at the 10% level.

[**] Significance at the 5% level.

[***] Significance at the 1% level.

Variable definitions:

MOC, median value of the economic value of organisation capital which is calculated using the annual SG&A expenses, capitalised and amortised over three years.

$SG\&A_{i,t}$, the annual SG&A expenses of firm i in year t.

A_SG&A, SG&A expenses minus advertising expenses.

$SG\&A_{i,t}$, the annual SG&A expenses of firm i in year t.

$Rev_{i,t}$, sales revenues of firm i in year t.

$Emp_{i,t}$, number of employees of firm i in year t.

$Assets_{i,t}$, total assets of firm i in year t.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm i decreased in year t and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$FCF_{i,t}$, free cash flows of firm i in year t.

GNP_t, the percentage growth in real Gross National Product during year t.

Table 5
Adjusted SG&A cost stickiness and organisation capital (MAOC).

	Coefficient estimates (*t*-stat)					
	Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	0.0322***	0.0361***	0.0378***	0.0366***	0.0408***	0.0422***
	(20.48)	(21.97)	(4.742)	(15.94)	(13.64)	(5.787)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	0.282***	0.293***	0.267***	0.470***	0.545***	0.455***
	(95.28)	(95.85)	(88.33)	(16.26)	(15.03)	(17.99)
Two-way interaction term						
b_2: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	0.174***	0.286***	0.163**	−0.283***	−0.399***	−0.298***
	(7.223)	(3.141)	(1.985)	(−10.59)	(−4.775)	(−4.249)
Three-way interaction terms						
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		0.0436	−0.210***		−0.0554**	−0.272***
		(1.149)	(−8.266)		(−2.001)	(−8.574)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		−0.347***	0.121**		−0.206***	−0.0673*
		(−6.579)	(2.168)		(−3.980)	(−1.711)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		0.126***	−0.151***		0.293***	−0.108**
		(3.460)	(−4.507)		(5.201)	(−2.493)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		−0.00666	0.00407		−0.0160***	−0.00662*
		(−1.125)	(0.817)		(−3.059)	(−1.689)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			0.153**			−0.00379
			(2.330)			(−1.113)
Main terms						
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			−0.00274			−0.00536*
			(−0.794)			(−1.893)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			0.0505***			0.0251***
			(9.149)			(4.423)
b_{10}: $ds_{i,t}$			−0.0517***			−0.0350***
			(−13.94)			(−8.092)
b_{11}: GNP_t			0.00259***			0.00142***
			(4.441)			(3.013)
b_{12}: $FCF_{i,t}$			0.00741			0.00409
			(1.333)			(0.824)
No. of observations	7515	7515	7515	6791	6791	6791
Adj. *R*-squared	0.66	0.658	0.680	0.294	0.354	0.319

Notes:

[a] Low MAOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[b] High MAOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[c] $\log\left(\frac{A\_SG\&A_{i,t}}{A\_SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{A\_SG\&A_{i,t}}{A\_SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{A\_SG\&A_{i,t}}{A\_SG\&A_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) GNP_t + b_7 d_{i,t} \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) FCF_{i,t} + b_8 \log\left(\frac{Emp_{i,t}}{Rev_{i,t}}\right) + b_9 \log\left(\frac{Assets_{i,t}}{Rev_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} GNP_t + b_{12} FCF_{i,t} + \varepsilon_{i,t}$.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

Variable definitions:

MAOC, median value of the economic value of adjusted organisation capital which is calculated using the annual modified SG&A expenses, capitalised and amortised over three years.

A_SG&A, SG&A expenses minus advertising expenses.

$SG\&A_{i,t}$, the annual SG&A expenses of firm *i* in year *t*.

$Rev_{i,t}$, sales revenues of firm *i* in year *t*.

$Emp_{i,t}$, number of employees at firm *i* in year *t*.

$Assets_{i,t}$, total assets of firm *i* in year *t*.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm *i* decreased in year *t* and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$FCF_{i,t}$, free cash flows of firm *i* in year *t*.

GNP_t, the percentage growth in real Gross National Product during year *t*.

Tables 2–5. Additionally, we estimate the models of Eqs. (1), (3) and (5) in keeping with Anderson et al. (2003) with no substantive differences in our results.

Table 2 presents the estimated models of Eqs. (1), (3) and (5) with the annual log change in SG&A expenses for low and high MOC-intensive firms as the dependent variable.[7] Analysing the estimated coefficients of the basic model, it seems that low MOC-intensive firms are associated with SG&A cost anti-stickiness behaviour and high MOC-intensive firms with SG&A sticky cost behaviour. In the case of low MOC-intensive firms, the estimated value of b_1 is 0.789, indicating that SG&A costs increased 0.789% per 1% increase in sales revenue defined for one-year periods. The estimated value of b_2 is 0.156, providing strong support for SG&A cost anti-stickiness behaviour. The combined value of $b_1 + b_2 = 0.945$ indicates that SG&A costs decreased 0.945% per 1% decrease in sales revenue. High MOC-intensive firms confirm SG&A cost-stickiness behaviour. The estimated value of b_1 is 1.299, indicating that SG&A costs increased 1.299% per 1% increase in sales revenue defined for one-year periods. The estimated value of b_2 is −0.341, providing strong support for SG&A cost-stickiness behaviour. The combined value of $b_1 + b_2 = 0.958$ indicates that SG&A costs decreased 0.958% per 1% decrease in sales revenue.

The reported results of Table 2 provide strong support that hypothesis H_1 holds even if the effects of various contributing factors on the sticky cost phenomenon are taken into consideration. This conclusion is based on the estimated coefficients of the extended (and the ABJ) model. In the case of low MOC capital-intensive firms, the estimated value of coefficient b_1 is 0.717 (0.855), indicating that SG&A costs increased 0.717% (0.855%) per 1% increase in sales revenue defined for one-year periods. The estimated value of b_2 is 0.226 (0.0947), providing support for SG&A cost anti-stickiness behaviour. The combined value of $b_1 + b_2 = 0.943$ (0.9497) indicates that SG&A costs decreased 0.943% (0.9497%) per 1% decrease in sales revenue. High MOC-intensive firms confirm SG&A cost-stickiness behaviour. The estimated value of b_1 is 1.307 (1.366), indicating that SG&A costs increased 1.307% (1.366%) per 1% increase in sales revenue defined for one-year periods. The estimated value of b_2 is −0.360 (−0.401), providing strong support for SG&A cost-stickiness behaviour. The combined value of $b_1 + b_2 = 0.947$ (0.965) indicates that SG&A costs decreased 0.947% (0.965%) per 1% decrease in sales revenue.

Table 3 presents the estimated models of Eqs. (1), (3) and (5) using the dependent variable of annual log change in SG&A expenses for low and high MAOC-intensive firms. In addition, Tables 4 and 5 present the estimated models of Eqs. (1), (3) and (5) using the dependent variable of annual log change in adjusted SG&A expenses for both low and high MOC- and MAOC-intensive firms. For all combinations of dependent variables (i.e. SG&A and adjusted SG&A) and firm classifications (i.e. according to MOC or MAOC), estimated results indicate that (adjusted) SG&A expenses exhibit cost anti-stickiness for low MOC- or MAOC-intensive firms and cost stickiness for high MOC- or MAOC-intensive firms.

The estimated b_1 coefficients of the regression models in Tables 3–5 are lower than 1 which indicates that (adjusted) SG&A expenses increase less than 1% for a 1% increase in sales revenue. However, in the case of the estimated model on Table 2, the corresponding estimated coefficient b_1 for high MOC-intensive firms is higher than 1, which indicates that SG&A expenses increase more than 1% for a 1% increase in sales revenue.[8] It is probable that the inclusion of advertising expenses in the dependent variable (i.e. SG&A expenses) is responsible for this difference in the estimations. It appears that advertising expenses are very sensitive to sales increases and thus a certain increase in sales revenue causes a greater increase in SG&A expenses than in the case of adjusted SG&A expenses.

Regarding employee intensity and asset intensity, the reported coefficients of our estimated models are inconsistent with those of Anderson et al. (2003). However, this inconsistency was also noticed by some other studies (Anderson and Lanen, 2009; Chen et al., 2012). A possible reason is the differentiation of the samples. In our sample, which covers a more recent period (encompassing the financial crisis), firms may use more part-time or temporary employees. This kind of labour is associated with lower firing and rehiring costs and consequently lower adjustment costs. Concerning asset intensity, during a crisis firms may invest less in technological hardware (technology, production machinery), causing lower adjustment costs. Consequently (to the extent that firms with higher employee intensity in our sample have a greater percentage of part-time or temporary employees and firms with higher asset intensity prefer more flexible investments), employee and asset intensity can be negatively (or not) associated with asymmetric cost behaviour.

5.2. Magnitude of economic activity change

The magnitude of economic activity change has been viewed as a possible cause of the sticky cost phenomenon. Subramaniam and Weidenmier (2003) report that revenue changes of over 10% trigger sticky behaviour in SG&A expenses. Furthermore, Balakrishnan et al. (2004) find

[7] The explanation power of the estimated regression models reported in Table 2, and later in this study in Tables 3, 6, 8 and 12, exceeds 90%. This explanation power appears to be much higher than is common in accounting literature. However, there are a few empirical studies in the field of the sticky cost phenomenon that report estimated regression models with an explanation power ranging from 65% to 95% (e.g. Banker et al., 2013a; Calleja et al., 2006; Chen et al., 2012). The inclusion of another independent variable (i.e. organisation capital) is expected to increase the explanatory power of the estimated regression models. Finally, no econometric problem, that might cause a spurious increase in the explanatory power of the estimated regression models, is detected.

[8] The fact that the estimated coefficient b_1 exceeds 1 does not necessarily indicate that the absolute amount of the SG&A expenses increase is higher than the contemporaneous increase in sales revenues. An increase in sales revenues by 1% might represent a higher absolute increase than an increase of SG&A expenses by 1.299%, since the level of the prior period's sales revenues might be higher than the corresponding level for SG&A expenses. As noted, in our data sample we excluded the observations where SG&A expenses are greater than sales revenue and the observations for firms that have no positive sales revenues and SG&A costs.

Table 6
Changes in the magnitude of economic activity, degree of SG&A cost stickiness and organisation capital (MOC).

	Coefficient estimates (*t*-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]			Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	0.00309	0.00317	0.0243***	0.0205***	0.0204***	0.0333***	0.0186***	0.00807***	0.0175***	−0.062***	1.734***	
	(1.491)	(1.533)	(4.197)	(5.737)	(5.649)	(3.803)	(8.374)	(2.643)	(2.721)	(−11.56)	(25.38)	(−11.49)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	1.497***	1.494***	1.054***	1.442***	1.446***	0.939***	0.699***	0.800***	0.663***	1.594***	1.734***	1.794***
	(15.72)	(15.68)	(11.42)	(10.23)	(10.17)	(6.452)	(26.77)	(24.05)	(18.77)	(31.96)	(25.38)	(28.57)
Two-way interaction term												
b_2: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	0.133	−0.0815	1.055***	1.166***	1.591**	2.601***	0.249***	0.139***	0.280***	−0.650***	−0.790***	−0.868***
	(0.849)	(−0.287)	(3.210)	(3.893)	(2.390)	(3.536)	(8.943)	(3.820)	(7.317)	(−12.60)	(−11.21)	(−13.26)
Three-way interaction terms												
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		0.0270	0.157		0.347	0.367		−0.0112***	−0.0127***		−0.0079***	−0.0148***
		(0.253)	(1.207)		(1.263)	(1.172)		(−3.109)	(−3.372)		(−5.815)	(−8.950)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		0.0135	−0.120		1.553***	2.967***		−0.0181*	−0.0138		−0.00859	0.0169**
		(0.0683)	(−0.494)		(2.696)	(4.561)		(−1.729)	(−1.339)		(−1.385)	(2.47)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		0.319***	−1.716***		0.137	−2.517***		−0.194***	−0.363***		−0.455***	−0.219
		(3.125)	(−7.680)		(0.517)	(−6.001)		(−5.376)	(−7.117)		(−3.857)	(−1.199)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		0.0525***	0.0524*		0.110***	0.142***		−0.000459	−0.00117		−0.0031***	−0.00381***
		(2.602)	(1.705)		(2.784)	(3.189)		(−0.182)	(−0.447)		(−2.948)	(−3.476)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			−0.000226			−0.000132			0.000210			−2.41e−05
			(−0.367)			(−0.108)			(1.584)			(−0.539)
Main terms												
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			0.00406*			−0.00064			−0.00335			−0.0213***
			(1.706)			(−0.178)			(−1.429)			(−6.774)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			−0.00226			0.0366***			0.00682			0.0693***
			(−0.605)			(4.155)			(1.339)			(8.189)
b_{10}: $ds_{i,t}$			−0.061***			−0.078***			−0.0562***			0.0666**
			(−10.14)			(−9.016)			(−7.628)			(2.493)
b_{11}: GNP_t			−0.000107			0.000863			−0.0012**			−0.00190**
			(−0.159)			(1.24)			(−2.566)			(−2.243)
b_{12}: $FCF_{i,t}$			3.42e−06			5.27e−05**			4.79e05***			0.000141***
			(0.282)			(2.541)			(5.013)			(10.94)

Table 6 (*Continued*)

	Coefficient estimates (*t*-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]			Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
No. of observations	3889	3889	3889	1713	1696	1696	7269	7259	7259	9438	9373	9373
Adj. *R*-squared	0.243	0.245	0.245	0.334	0.344	0.344	0.967	0.968	0.968	0.964	0.965	0.965

Notes:

[a] Low MOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of Organisation Capital of the firms in the data sample.

[b] High MOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of Organisation Capital of the firms in the data sample.

[c] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{ds}_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{FCF}_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$.

[*] Significance at the 10% level.

[**] Significance at the 5% level.

[***] Significance at the 1% level.

Variable definitions:

MOC, median value of the economic value of organisation capital which is calculated using the annual SG&A expenses, capitalised and amortised over three years.

$\text{SG\&A}_{i,t}$, the annual SG&A expenses of firm *i* in year *t*.

$\text{Rev}_{i,t}$, sales revenues of firm *i* in year *t*.

$\text{Emp}_{i,t}$, number of employees at firm *i* in year *t*.

$\text{Assets}_{i,t}$, total assets of firm *i* in year *t*.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm *i* decreased in year *t* and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$\text{FCF}_{i,t}$, free cash flows of firm *i* in year *t*.

GNP_t, the percentage growth in real Gross National Product during year *t*.

Table 7
Changes in the magnitude of economic activity, degree of adjusted SG&A cost stickiness and organisation capital (MOC).

	Coefficient estimates (t-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]			Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	0.00293	0.00281	0.0264**	0.000503	−0.00069	0.0337***	0.00572*	0.0156***	0.0239***	−0.00722*	−0.00802**	0.0292***
	(0.863)	(0.807)	(2.532)	(0.124)	(−0.163)	(3.486)	(1.807)	(2.637)	(2.751)	(−1.846)	(−2.001)	(3.208)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	0.535***	0.536***	0.534***	0.869***	0.883***	0.869***	0.490***	0.477***	0.467***	0.982***	0.991***	0.983***
	(10.15)	(9.878)	(9.123)	(17.06)	(16.63)	(16.16)	(10.37)	(9.874)	(8.970)	(21.62)	(21.35)	(20.73)
Two-way interaction term												
b_2:$d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	0.059	0.045	0.227**	−0.215**	−0.323**	−0.175	0.167***	0.134*	0.212**	−0.401***	−0.492***	−0.376***
	(0.827)	(0.459)	(2.214)	(−2.520)	(−2.515)	(−1.265)	(2.593)	(1.669)	(2.478)	(−4.928)	(−4.739)	(−3.303)
Three-way interaction terms												
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		0.0163	0.0342		−0.0156	0.0108		0.00184	−0.000446		−0.0164	0.00897
		(0.892)	(1.376)		(−0.688)	(0.336)		(0.193)	(−0.0295)		(−0.978)	(0.376)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		−0.155***	−0.0714		0.111	0.360***		0.0207	0.0259		0.0773	0.210*
		(−2.662)	(−0.771)		(1.136)	(2.755)		(0.494)	(0.584)		(0.838)	(1.747)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		0.0999***	0.172***		0.125***	0.198**		0.075***	0.0467		0.1000***	0.206***
		(4.732)	(3.558)		(2.994)	(2.004)		(4.388)	(1.323)		(2.797)	(3.337)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		−0.00757	−0.028***		−0.00275	−0.00583		−0.005*	−0.013***		−0.00804	−0.00959
		(−1.618)	(−3.717)		(−0.532)	(−0.730)		(−1.896)	(−2.998)		(−1.642)	(−1.465)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			−0.404***			−0.0321***			−0.358***			−0.0169
			(−3.816)			(−2.598)			(−4.930)			(−1.558)
Main terms												
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			0.00533			0.0125***			0.00397			0.0143***
			(1.299)			(3.414)			(1.187)			(4.078)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			0.0112			0.0259***			0.0109*			0.0192***
			(1.593)			(3.748)			(1.877)			(3.174)
b_{10}: $ds_{i,t}$			0.00994			0.00989			−0.00411			0.0130
			(1.633)			(0.895)			(−0.839)			(1.556)
b_{11}: GNP_t			−0.00286***			−0.000697			−0.00172***			−0.000676
			(−4.225)			(−1.231)			(−2.799)			(−1.262)
b_{12}: $FCF_{i,t}$			−0.027***			0.000217**			−0.0257***			0.000185**
			(−3.745)			(2.024)			(−3.676)			(2.000)

Table 7 (*Continued*)

	Coefficient estimates (*t*-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]			Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
No. of observations	954	954	954	1020	1020	1020	974	974	974	1006	1006	1006
Adj. *R*-squared	0.525	0.536	0.563	0.546	0.549	0.576	0.552	0.565	0.576	0.585	0.589	0.610

Notes:

[a] Low MOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of Organisation Capital of the firms in the data sample.

[b] High MOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of Organisation Capital of the firms in the data sample.

[c] $\log\left(\frac{\text{A\_SG\&A}_{i,t}}{\text{A\_SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{\text{A\_SG\&A}_{i,t}}{\text{A\_SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{\text{A\_SG\&A}_{i,t}}{\text{A\_SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{FCF}_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$.

[*] Significance at the 10% level.

[**] Significance at the 5% level.

[***] Significance at the 1% level.

Variable definitions:

MOC, median value of the economic value of organisation capital which is calculated using the annual SG&A expenses, capitalised and amortised over three years.

A_SG&A, SG&A expenses minus advertising expenses.

$\text{SG\&A}_{i,t}$, the annual SG&A expenses of firm *i* in year *t*.

$\text{Rev}_{i,t}$, sales revenues of firm *i* in year *t*.

$\text{Emp}_{i,t}$, number of employees of firm *i* in year *t*.

$\text{Assets}_{i,t}$, total assets of firm *i* in year *t*.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm *i* decreased in year *t* and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$\text{FCF}_{i,t}$, free cash flows of firm *i* in year *t*.

GNP_t, the percentage growth in real Gross National Product during year *t*.

Table 8
Changes in the magnitude of economic activity, degree of SG&A cost stickiness and organisation capital (MAOC).

	Coefficient estimates (*t*-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]			Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	−0.00417	−0.00278	0.0158	0.0146**	0.016***	0.0112	0.0334***	0.034***	0.0353***	0.00699	0.0104**	−0.0429***
	(−0.696)	(−0.465)	(1.344)	(2.498)	(2.715)	(1.087)	(10.43)	(10.97)	(3.070)	(1.478)	(2.123)	(−4.426)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	0.735******	0.722***	0.667***	0.866***	0.854***	0.839***	0.522***	0.522***	0.505***	0.695***	0.692***	0.739***
	(9.896)	(9.708)	(7.598)	(13.34)	(13.15)	(12.86)	(207.5)	(208.2)	(174.5)	(21.09)	(20.73)	(29.91)
Two-way interaction term												
b_2: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	−0.174	−0.225	−0.0461	−0.306**	−0.436	−0.468	0.240***	0.144	0.134	−0.320***	−0.336***	−0.400***
	(−1.436)	(−1.273)	(−0.231)	(−2.293)	(−1.540)	(−1.590)	(6.183)	(1.574)	(1.226)	(−9.545)	(−9.956)	(−16.05)
Three-way interaction terms												
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		0.000733	0.0436		0.0460	0.0327		0.0198	0.0252		−0.0131***	−0.0208***
		(0.0138)	(0.651)		(0.470)	(0.310)		(0.553)	(0.606)		(−11.61)	(−12.69)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		−0.320**	−0.0999		−0.194	0.0502		0.00379	0.427***		0.00143	0.0450***
		(−2.534)	(−0.710)		(−0.864)	(0.216)		(0.0371)	(6.260)		(0.282)	(7.176)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		0.198***	0.0940		0.549***	0.644***		0.305***	0.148*		0.188*	0.0700
		(3.180)	(0.864)		(4.885)	(2.978)		(5.568)	(1.817)		(1.789)	(0.452)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		−0.0239**	−0.0213		0.000830	0.0198		−0.0130	−0.0181*		0.00392***	0.00453***
		(−2.408)	(−1.321)		(0.0557)	(1.194)		(−1.556)	(−1.661)		(4.221)	(4.847)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			−0.0185			0.0107**			−0.0333		−0.00011***	
			(−0.741)			(2.214)			(−0.752)			(−4.993)
Main terms												
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			0.00622			−0.000961			−0.000596			−0.0242***
			(1.378)			(−0.281)			(−0.129)			(−6.204)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			0.0308***			0.0358***	0.117***					0.108***
			(3.486)			(4.170)			(12.24)			(10.28)
b_{10}: $ds_{i,t}$			−0.0151			0.0134			−0.0340***			−0.0264
			(−1.212)			(0.619)			(−3.633)			(−1.307)
b_{11}: GNP_t			0.000327			0.0026***			0.000101			0.00150
			(0.192)			(2.956)			(0.0798)			(1.336)
b_{12}: $FCF_{i,t}$			−0.000123***			−1.32e−05	−0.000188***			5.54e−06		
			(−5.655)			(−0.407)			(−2.824)			(0.145)

Table 8 (*Continued*)

	Coefficient estimates (*t*-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]			Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
No. of observations	2621	2620	2620	2203	2202	2202	4024	4023	4023	4604	4602	4602
Adj. *R*-squared	0.282	0.290	0.294	0.290	0.305	0.312	0.937	0.938	0.940	0.904	0.907	0.911

Notes:

[a] Low MAOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[b] High MAOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[c] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{ds}_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{FCF}_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$.

[*] Significance at the 10% level.

[**] Significance at the 5% level.

[***] Significance at the 1% level.

Variable definitions:

MAOC, median value of the economic value of adjusted organisation capital which is calculated using the annual adjusted SG&A expenses, capitalised and amortised over three years.

A_SG&A, SG&A expenses minus advertising expenses.

$\text{SG\&A}_{i,t}$, the annual SG&A expenses of firm *i* in year *t*.

$\text{Rev}_{i,t}$, sales revenues of firm *i* in year *t*.

$\text{Emp}_{i,t}$, number of employees of firm *i* in year *t*.

$\text{Assets}_{i,t}$, total assets of firm *i* in year *t*.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm *i* decreased in year *t* and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$\text{FCF}_{i,t}$, free cash flows of firm *i* in year *t*.

GNP_t, the percentage growth in real Gross National Product during year *t*.

Table 9
Changes in the magnitude of economic activity, degree of adjusted SG&A cost stickiness and organisation capital (MAOC).

	Coefficient estimates (*t*-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]			Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
b_0: constant	0.00956***	0.00906***	0.0126	0.0190***	0.0191***	0.0536***	0.0522***	0.0554***	0.0649***	0.0532***	0.0583***	0.0670***
	(2.722)	(2.589)	(1.097)	(6.616)	(6.649)	(4.383)	(20.42)	(22.94)	(4.735)	(12.43)	(12.77)	(6.890)
b_1: $\log(Rev_{i,t}/Rev_{i,t-1})$	0.488***	0.507***	0.280	0.665***	0.661***	0.925***	0.263***	0.260***	0.252***	0.505***	0.487***	0.498***
	(2.993)	(3.113)	(1.529)	(5.548)	(5.517)	(6.206)	(67.57)	(69.56)	(65.54)	(13.58)	(13.15)	(16.57)
Two-way interaction term												
b_2:$d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1})$	0.261	−0.778	−0.393	−0.125	−0.558	−0.653	0.232***	0.231	0.209	−0.282***	−0.322***	−0.285***
	(0.874)	(−1.194)	(−0.510)	(−0.549)	(−0.906)	(−0.665)	(6.425)	(1.601)	(1.435)	(−7.872)	(−3.503)	(−3.334)
Three-way interaction terms												
b_3: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Emp_{i,t}/Rev_{i,t})$		−0.257	−0.195		0.00282	0.263		−0.00997	−0.00474		−0.0626**	−0.0292
		(−1.027)	(−0.632)		(0.0116)	(0.719)		(−0.178)	(−0.0809)		(−2.059)	(−0.987)
b_4: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times \log(Assets_{i,t}/Rev_{i,t})$		−1.246***	−1.288***		−1.730**	−1.064		−0.352***	−0.0935		−0.216***	−0.0469
		(−3.240)	(−2.625)		(−2.428)	(−1.242)		(−5.305)	(−1.273)		(−3.896)	(−1.041)
b_5: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times ds_{i,t}$		0.709***	−0.409		0.647***	0.551		0.147***	−0.248***		0.320***	−0.0611
		(3.397)	(−1.116)		(3.013)	(0.978)		(3.417)	(−5.332)		(5.180)	(−1.012)
b_6: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times GNP_t$		−0.0266	0.0460		0.00664	0.0129		−0.00281	0.00729		−0.0183***	−0.00812
		(−0.761)	(1.061)		(0.167)	(0.242)		(−0.381)	(1.062)		(−3.135)	(−1.286)
b_7: $d_{i,t} \times \log(Rev_{i,t}/Rev_{i,t-1}) \times FCF_{i,t}$			0.941***			1.313**			−0.0463***			−0.0132***
			(3.261)			(2.056)			(−5.076)			(−3.535)
Main terms												
b_8: $\log(Emp_{i,t}/Rev_{i,t})$			0.00170			0.0182***			0.00599			0.00362
			(0.355)			(3.699)			(1.051)			(0.949)
b_9: $\log(Assets_{i,t}/Rev_{i,t})$			−0.00151			0.00697			0.0311***			0.0619***
			(−0.193)			(0.717)			(4.019)			(7.101)
b_{10}: $ds_{i,t}$			−0.0327***			−0.00622			−0.0824***			−0.0817***
			(−3.910)			(−0.585)			(−12.81)			(−8.997)
b_{11}: GNP_t			0.00231***			0.000877			0.00365***			0.00220***
			(3.183)			(1.119)			(4.227)			(2.879)
b_{12}: $FCF_{i,t}$			0.0144**			0.0227***			0.00157			0.00311
			(2.522)			(3.398)			(0.629)			(0.969)

Table 9 (*Continued*)

	Coefficient estimates (t-stat)											
	Changes <±10%						Changes >±10% <±50%					
	Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]			Low MAOC-intensive firms[a]			High MAOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
No. of observations	2460	2460	2460	2760	2760	2760	4487	4487	4487	4187	4187	4187
Adj. R-squared	0.028	0.041	0.054	0.030	0.035	0.057	0.597	0.604	0.618	0.354	0.371	0.396

Notes:

[a] Low MAOC-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[b] High MAOC-intensive firms are classified as those within the highest quintile of the distribution of the median values of the economic value of adjusted organisation capital of the firms in the data sample.

[c] $\log\left(\frac{\text{A\_SG\&A}_{i,t}}{\text{A\_SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{\text{A\_SG\&A}_{i,t}}{\text{A\_SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{\text{A\_SG\&A}_{i,t}}{\text{A\_SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{FCF}_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$.

** Significance at the 5% level.

*** Significance at the 1% level.

Variable definitions:

MAOC, median value of the economic value of Adjusted Organisation Capital which is calculated using the annual Modified SG&A expenses capitalised and amortised over three years.

A_SG&A, SG&A expenses minus advertising expenses.

$\text{SG\&A}_{i,t}$, the annual SG&A expenses of firm i in year t.

$\text{Rev}_{i,t}$, sales revenues of firm i in year t.

$\text{Emp}_{i,t}$, number of employees of firm i in year t.

$\text{Assets}_{i,t}$, total assets of firm i in year t.

$d_{i,t}$, a dummy variable which equals 1 if sales of firm i decreased in year t and 0 otherwise.

$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.

$\text{FCF}_{i,t}$, free cash flows of firm i in year t.

GNP_t, the percentage growth in real Gross National Product during year t.

Table 10
SG&A cost stickiness and organisation capital: estimation with Weiss' methodology (Weiss, 2010).

Variable	MOC	*n*	Mean	St. dev	Q1	Median	Q3	% Negative
STICKY	Low MOC-intensive firms[a]	3504	0.0747***	0.1925	−0.0483	0.0177	0.1402	42.5
STICKY	High MOC-intensive firms[b]	4124	−0.0485***	0.2708	−0.1607	−0.0267	0.0667	58.6

Notes:
[a] Low MOC-intensive firms are classified as those within the lowest quantile of the median value of the economic value of organisation capital in the data sample.
[b] High MOC-intensive firms are classified as those within the highest quantile of the median value of the economic value of organisation capital in the data sample.
*** Significance at the 1% level.
Variable definitions:
MOC, median value of the economic value of organisation capital which is calculated using the annual SG&A expenses, capitalised and amortised over three years.
$STICKY_{i,t} = \log\left(\frac{\Delta COST}{\Delta SALE}\right)_{i,\underline{\tau}} - \log\left(\frac{\Delta COST}{\Delta SALE}\right)_{i,\bar{\tau}}$, $\underline{\tau}, \bar{\tau} \in \{t, \ldots, t-3\}$, where: $\underline{\tau}$ is the most recent quarter with sales decrease and $\bar{\tau}$ is the most recent quarter with sales increase.
$\Delta COST = SG\&A_{i,t} - SG\&A_{i,t-1}$
$\Delta SALE = Rev_{i,t} - Rev_{i,t-1}$
$SG\&A_{i,t}$, the annual SG&A expenses of firm *i* in year *t*.
$Rev_{i,t}$, sales revenues of firm *i* in year *t*.

that managers do not significantly change staffed hours in response to small changes in activity levels.

Besides the sticky cost phenomenon, the magnitude of economic activity changes might have an effect on the way that organisation capital is associated with managerial behaviour. The underlining rationale of our research hypothesis is based on the assumption that a firm's decisions regarding the level of discretionary SG&A expenses depend on managerial view of intangible investments. The "investment" view of SG&A expenses (i.e. high MOC-/MAOC-intensive firms) triggers SG&A cost stickiness. On the other hand, the "expense" view (i.e. low MOC-/MAOC-intensive firms) is responsible for SG&A anti-stickiness behaviour.

It is plausible to assume that the magnitude of economic activity change may affect the degree to which the investment versus the expense view on SG&A expenses is manifested. Relatively large economic activity changes motivate managerial behaviour to a greater extent than relatively small ones and therefore the difference in SG&A cost behaviour between high and low MOC-/MAOC-intensive firms may be more profound. Furthermore, for relatively small changes in economic activity it is expected that the expense view of SG&A would dominate the behaviour of both low and high MOC-/MAOC-intensive firms.

Tables 6–9 present the estimated the models of Eqs. (1), (3) and (5), with the dependent variable of either the annual log change in SG&A or adjusted SG&A expenses, for both low and high MOC- and MAOC-intensive firms. The models are estimated for small and large changes in economic activity. For methodological reasons we define a small change in the magnitude of economic activity as a 10% increase or decrease in sales volume and a large change as an increase or decrease in sales volume between 10% and 50%.

In the case of large changes in sales, H_1 seems to be confirmed for high MOC-/MAOC-intensive firms and low MOC-intensive firms. Reported results for the basic, ABJ and extended models indicate that, in the case of high MOC-/MAOC-intensive firms, (adjusted) SG&A expenses exhibit sticky cost behaviour and, in the case of low MOC-intensive firms, (adjusted) SG&A expenses exhibit cost anti-stickiness. However, in the case of low MAOC-intensive firms the estimated coefficient b_2 is insignificant for both the ABJ and the extended models.

In the case of small changes in sales, H_1 is confirmed only for the adjusted SG&A expenses of high MOC-intensive firms (basic and ABJ model) and for the SG&A expenses of high MAOC-intensive firms (basic model). In all other cases, the sticky cost phenomenon is either not present or high MOC- and MAOC-intensive firms exhibit cost anti-stickiness behaviour. The estimated extended model confirms that the expenses view of SG&A dominates the behaviour of firms when small changes in sales occur.

6. Additional analysis

We undertake additional analysis in order to determine the sensitivity of our findings and to provide further support to our inference that, in the case of firms with high (low) levels of organisation capital, SG&A expenses are expected to exhibit sticky (anti-sticky) cost behaviour. To this end, we repeat our analysis using an approach which is proposed by Weiss (2010). This model estimates the difference between the change in costs scaled by sales computed

Table 11
Correlation between R&D capital and organisation capital.

Quintiles		
R&D capital	Organisation capital	Pearson correlations
1	1	0.8486
2	2	0.9715
3	3	0.9536
4	4	0.7568
5	5	0.8436

p-Values: 0.0000.

Table 12
SG&A Cost Stickiness and R&D Capital Intensity.

	Coefficient estimates (t-stat)					
	Low R&D capital-intensive firms[a]			High R&D capital-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
$\mathbf{b_0}$: constant	0.0128***	0.0123***	0.0189***	−0.0194***	−0.0226***	−0.0288***
	(9.997)	(9.172)	(4.192)	(−6.416)	(−7.129)	(−3.364)
$\mathbf{b_1}$: $\log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1})$	0.806***	0.812***	0.768***	1.258***	1.289***	1.212***
	(40.31)	(39.74)	(35.45)	(35.31)	(35.16)	(30.27)
Two-way interaction term						
$\mathbf{b_2}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1})$	0.196***	0.163***	0.209***	−0.340***	−0.378***	−0.303***
	(8.837)	(6.279)	(7.731)	(−9.356)	(−10.05)	(−7.266)
Three-way interaction terms						
$\mathbf{b_3}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \log(\text{Emp}_{i,t}/\text{Rev}_{i,t})$		−0.0116*	−0.0109*		−0.0125***	−0.0158***
		(−1.861)	(−1.739)		(−7.677)	(−8.330)
$\mathbf{b_4}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \log(\text{Assets}_{i,t}/\text{Rev}_{i,t})$		−0.0570***	−0.0561***		−0.0553***	−0.0355***
		(−3.012)	(−2.950)		(−4.570)	(−2.826)
$\mathbf{b_5}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times ds_{i,t}$		−0.0757**	−0.196***		−0.394***	−0.444***
		(−2.281)	(−4.079)		(−9.696)	(−9.749)
$\mathbf{b_6}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \text{GNP}_t$		0.000339	0.000680		−0.00304**	−0.00334***
		(0.0875)	(0.174)		(−2.445)	(−2.641)
$\mathbf{b_7}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \text{FCF}_{i,t}$			5.94e−05			6.13e−05
			(0.894)			(0.876)
Main terms						
$\mathbf{b_8}$: $\log(\text{Emp}_{i,t}/\text{Rev}_{i,t})$			0.00214			−0.00983***
			(1.132)			(−2.949)
$\mathbf{b_9}$: $\log(\text{Assets}_{i,t}/\text{Rev}_{i,t})$			0.00198			0.0540***
			(0.592)			(5.934)
$\mathbf{b_{10}}$: $ds_{i,t}$			−0.0260***			−0.0198***
			(−6.887)			(−3.313)
$\mathbf{b_{11}}$: GNP_t			0.000571*			−0.000871
			(1.861)			(−1.569)
$\mathbf{b_{12}}$: $\text{FCF}_{i,t}$			9.05e−06			9.28e−05***
			(1.328)			(6.778)
No. of observations	7121	7101	7101	7119	7111	7111
Adj. R-squared	0.973	0.973	0.973	0.973	0.974	0.974

Notes:

[a] Low R&D capital-intensive firms are classified as those within the lowest quintile of the distribution of the median values of the R&D Capital of the firms in the data sample.

[b] High R&D capital-intensive firms are classified as those within the highest quintile of the distribution of the median values of the R&D Capital of the firms in the data sample

[c] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$.

[d] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{ds}_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$.

[e] $\log\left(\frac{\text{SG\&A}_{i,t}}{\text{SG\&A}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{FCF}_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$.

* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

Variable definitions:
SG&A, the annual SG&A expenses of firm i in year t.
$\text{Rev}_{i,t}$, sales revenues of firm i in year t.
$\text{Emp}_{i,t}$, number of employees of firm i in year t.
$\text{Assets}_{i,t}$, total assets of firm i in year t.
$d_{i,t}$, a dummy variable which equals 1 if sales of firm i decreased in year t and 0 otherwise.
$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.
$\text{FCF}_{i,t}$, free cash flows of firm i in year t.
GNP_t, the percentage growth in real gross national product during year t.

Table 13
Advertising cost stickiness and organisation capital (MOC).

	Coefficient estimates (t-stat)					
	Low MOC-intensive firms[a]			High MOC-intensive firms[b]		
	Basic model[c]	ABJ model[d]	Extended model[e]	Basic model[c]	ABJ model[d]	Extended model[e]
$\mathbf{b_0}$: constant	0.00391**	0.00379*	0.0318***	−0.00992***	−0.0100***	0.0127
	(1.979)	(1.891)	(3.881)	(−4.704)	(−4.681)	(1.401)
$\mathbf{b_1}$: $\log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1})$	0.553***	0.555***	0.523***	1.003***	1.004***	0.995***
	(10.33)	(10.40)	(9.579)	(23.18)	(23.07)	(22.79)
Two-way interaction term						
$\mathbf{b_2}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1})$	0.264***	0.265***	0.366***	−0.359***	−0.366***	−0.341***
	(4.280)	(3.266)	(4.215)	(−4.930)	(−3.577)	(−3.112)
Three-way interaction terms						
$\mathbf{b_3}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \log(\text{Emp}_{i,t}/\text{Rev}_{i,t})$		0.0236	0.0229		0.0158	0.0179
		(1.596)	(1.322)		(0.756)	(0.742)
$\mathbf{b_4}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \log(\text{Assets}_{i,t}/\text{Rev}_{i,t})$		−0.00842	0.0173		−0.124	−0.0352
		(−0.210)	(0.369)		(−0.902)	(−0.233)
$\mathbf{b_5}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times ds_{i,t}$		0.116***	0.00682		0.0990*	0.0937
		(3.860)	(0.144)		(1.784)	(1.316)
$\mathbf{b_6}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \text{GNP}_t$		−0.00979*	−0.00891		−0.00922	−0.0123
		(−1.760)	(−1.263)		(−1.032)	(−1.239)
$\mathbf{b_7}$: $d_{i,t} \times \log(\text{Rev}_{i,t}/\text{Rev}_{i,t-1}) \times \text{FCF}_{i,t}$			−0.505***			0.0343
			(−5.226)			(0.807)
Main terms						
$\mathbf{b_8}$: $\log(\text{Emp}_{i,t}/\text{Rev}_{i,t})$			0.0102***			0.00771**
			(3.280)			(2.045)
$\mathbf{b_9}$: $\log(\text{Assets}_{i,t}/\text{Rev}_{i,t})$			0.0100*			0.0167**
			(1.868)			(2.335)
$\mathbf{b_{10}}$: $ds_{i,t}$			−0.0110**			−0.00457
			(−2.556)			(−0.810)
$\mathbf{b_{11}}$: GNP_t			−0.000505			−0.000586
			(−0.711)			(−1.073)
$\mathbf{b_{12}}$: $\text{FCF}_{i,t}$			−0.00118			−0.000604***
			(−1.442)			(−2.585)
No. of observations	1645	1645	1645	1554	1554	1554
Adj. R-squared	0.360	0.365	0.387	0.458	0.461	0.469

[a] Low MOC-intensive firms are classified as those within the lowest quintile of the median MOC distribution in the data sample.
[b] High MOC-intensive firms are classified as those within the highest quintile of the median MOC distribution in the data sample.
[c] $\log\left(\frac{\text{Advert}_{i,t}}{\text{Advert}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + \varepsilon_{i,t}$
[d] $\log\left(\frac{\text{Advert}_{i,t}}{\text{Advert}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + \varepsilon_{i,t}$
[e] $\log\left(\frac{\text{Advert}_{i,t}}{\text{Advert}_{i,t-1}}\right) = b_0 + b_1 \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_2 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) + b_3 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_4 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_5 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) ds_{i,t} + b_6 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) \text{GNP}_t + b_7 d_{i,t} \log\left(\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right) FCF_{i,t} + b_8 \log\left(\frac{\text{Emp}_{i,t}}{\text{Rev}_{i,t}}\right) + b_9 \log\left(\frac{\text{Assets}_{i,t}}{\text{Rev}_{i,t}}\right) + b_{10} ds_{i,t} + b_{11} \text{GNP}_t + b_{12} \text{FCF}_{i,t} + \varepsilon_{i,t}$
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

Variable definitions:
MOC, the median value of the economic value of organisation capital which is calculated using the annual SG&A expenses, capitalised and amortised over three years.
$\text{Advert}_{i,t}$, the annual advertising expenses of firm i in year t.
$\text{Rev}_{i,t}$, sales revenues of firm i in year t.
$\text{Emp}_{i,t}$, number of employees of firm i in year t.
$\text{Assets}_{i,t}$, total assets of firm i in year t.
$d_{i,t}$, a dummy variable which equals 1 if sales of firm i decreased in year t and 0 otherwise.
$ds_{i,t}$, a dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise.
$\text{FCF}_{i,t}$, free cash flows of firm i in year t.
GNP_t, the percentage growth in real gross national product during year t.

in recent quarters with sales decrease; and the change in costs scaled by sales computed in recent quarters with sales increase:

$$\text{STICKY}_{i,t} = \log\left(\frac{\Delta\text{COST}}{\Delta\text{SALE}}\right)_{i,\underline{\tau}} - \log\left(\frac{\Delta\text{COST}}{\Delta\text{SALE}}\right)_{i,\bar{\tau}},$$
$$\underline{\tau}, \bar{\tau} \in \{t, \ldots, t-3\} \quad (12)$$

where $\underline{\tau}$ is the most recent quarter with a sales decrease and $\bar{\tau}$ is the most recent quarter with a sales increase; ΔCOST is the difference between the SG&A expenses in year t and those in the previous year; and ΔSALE is the difference between sales revenue in year t and that of the previous year.

The results of the Weiss methodology for testing cost stickiness (Weiss, 2010) are presented in Table 10. In the case of high MOC-intensive firms the mean value of the variable STICKY is −0.0485, providing evidence of cost stickiness behaviour. On the contrary, in the case of low MOC-intensive firms STICKY is positive and statistically significant (0.0747), which is indicative of cost anti-stickiness behaviour (Weiss, 2010).

7. Additional robustness tests

This section attempts to control the results of the current study concerning the suitability of organisation capital as a proper control variable for a firm's intensity regarding intangible investments. For this reason, we analyse the relationship of organisation capital with other measures of a firm's intensity of involvement in intangible investments, taking into consideration the sticky cost hypothesis. We then analyse whether the sticky cost hypothesis holds for other types of expenses associated with intangible investments.

To examine the first issue, we employ R&D capital, calculated as the sum of the R&D expenses capitalised and amortised over a five-year time window. R&D capital has been used by the relevant literature to examine various issues associated with intangible investments (e.g. Eberhart et al., 2004; Lev and Sougiannis, 1996). In a similar way to organisation capital, we calculate the R&D capital for each firm in the data sample and obtain the median value. We then match the corresponding quintiles of the distributions of the median value of R&D capital and the median economic value of organisation capital (MOC); we also calculate the Pearson correlation between R&D capital and organisation capital (MOC) for each pair of quintiles.

Table 11 presents the Pearson correlations between R&D capital and organisation capital for each pair of quintiles. All correlations indicate a strong positive relation between R&D capital- and organisation capital-intensive firms.[9] This seems to provide evidence that organisation capital is sensitive to the level of intangible investments associated with R&D capital. Although within the context of intangible-related literature a number of different types of intangibles can be identified, the strong association of R&D capital and organisation capital is an empirical sign that organisation capital constitutes a suitable proxy for a firm's intensity of intangible investments.

In Table 12, we examine whether the SG&A sticky cost hypothesis holds for other measures of a firm's level of intangible investments. More specifically, the estimated models of Eqs. (1), (3) and (5) for low and high R&D capital-intensive firms are presented. Observations where the R&D costs are greater than sales are excluded from the dataset. Low R&D capital-intensive firms correspond to firms in the lowest quintile of the median R&D capital distribution. High R&D capital-intensive firms correspond to firms in the highest quintile of the median R&D capital distribution. The evidence presented in Table 12 indicates that SG&A expenses exhibit cost stickiness in the case of high R&D capital-intensive firms and cost anti-stickiness in the case of low R&D capital-intensive firms.

In Table 13, we continue our examination to determine whether the sticky cost hypothesis holds for other types of expenses associated with intangible investments, such as advertising expenses. Reported evidence indicates that advertising expenses exhibit cost anti-stickiness behaviour for low MOC-intensive firms and cost-stickiness behaviour for high MOC-intensive firms. Furthermore, the estimated coefficient b_2 is above or very close to 1, which verifies our supposition that, for high MOC-intensive firms, advertising expenses are very sensitive to sales revenue changes.

The overall conclusion of the robustness analysis is that the empirical findings regarding the relation of SG&A cost behaviour to organisation capital can be generalised to encompass other types of costs associated with the development of intangible investments. In the case of firms classified as intangible-intensive, expenses related to the development of intangible investments exhibit sticky cost behaviour.

8. Conclusions

This research initiative investigates SG&A cost behaviour relating to the level of a firm's intangible investments in organisation capital. Prior studies have examined the proper accounting treatment of intangible-related resource consumption (i.e. investment versus expense) within the context of financial reporting and its market valuation implications (e.g. Eberhart et al., 2004; Lev, 2008; Lev and Zarowin, 1999; Skinner, 2008a,b). The current study focuses on a firm's view of intangible-related resource consumption as either an investment or an expense and it attempts to shed light on some aspects of the intangible-related value-generating processes associated with the sticky cost phenomenon.

In this study, we speculate that firms with high levels of organisation capital exhibit greater SG&A cost stickiness than firms with low organisation capital. To some extent, we draw insights from Banker and Byzalov's (2015) distinction between "bad" and "good" cost stickiness. The former is consistent with empire-building behaviour and agency costs (Chen et al., 2012; Dierynck et al., 2012; Kama and Weiss, 2013) while the latter is associated with optimal resource planning (Anderson et al., 2003). Our hypothesis focuses on "good" stickiness, which is a result

[9] R&D expenses are part of SG&A expenses. However, the construction of organisation capital (see Section 4.2) generates numerical values which do not include SG&A expenses.

of long-term managerial orientation regarding the firm's economic performance. We discriminate between firms that exhibit efficient cost stickiness (firms with high organisation capital) through desirable managerial behaviour and firms that favour short-term decision making (firms with low organisation capital) which place emphasis on short-term performance at the expense of long-term value.

Empirical evidence indicates that, in the case of firms with high (low) organisation capital, SG&A expenses exhibit cost-stickiness (anti-stickiness) behaviour. Robustness tests support the generalisation of these findings to include other types of expenses or measures associated with a firm's level of intangible investments – such as R&D expenses, advertising expenses and R&D capital. To the extent that the level of the economic value of organisation capital captures a firm's underlying view on intangible-related resource consumption, the aforementioned empirical evidence supports the fact that firms that view deliverable resource commitments for the development of intangible assets as investments, contributing to long-term growth, are reluctant to reduce these investments in response to a decline in sales volume – resulting in cost stickiness. On the other hand, firms that view resource consumption for internally developed intangibles as expenses are more eager to reduce these expenses in response to a decline in sales volume, in order to improve the reported income and to smooth earnings volatility between accounting periods.

The above findings contribute to the sticky cost literature by recognising a firm's intangible investment intensity as another causal factor of the sticky cost phenomenon. Drawing on Banker and Byzalov's (2015) integrated explanatory framework, we offer two significant causes associated with adjustment costs and managerial expectations which indicate that, in the case of firms with high organisation capital, SG&A expenses are expected to exhibit cost stickiness. Firms with high levels of organisation capital increase the slack of unutilised resources more than firms with low levels, since higher levels increase adjustment costs and shape more optimistic managerial expectations regarding whether future sales growth will absorb this slack. Furthermore, this study also contributes to intangible-related literature by providing a strong relationship between organisation capital and SG&A cost asymmetric behaviour. Finally, it documents how the behaviour of intangible-related expenses deviates from the traditional microeconomic cost model, which indicates that the relationship between intangibles and a firm's value-generating processes is too complex to be modelled using traditional economic theories. However, more empirical research is required to fully understand the connection of the sticky cost phenomenon to the value-generating processes associated with intangible-related investments.

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Appendix 1. Variables and definitions

Variable	Description
$AbCOST^{j}_{i,t}$	The difference between firm's predicted cost and actual cost under the average efficiency without organisation capital of firm *i* operating in *j* industry in year *t*
$AbProfit^{j}_{i,t}$	The sum of the $AbSALE^{j}_{i,t}$ and $AbCOST^{j}_{i,t}$ of firm *i* operating in *j* industry, capitalised and amortised over a 5 year-time period and scaled with total assets
$AbSALE^{j}_{i,t}$	The difference between firm's actual revenues and the predicted revenues under the average efficiency without organisation capital of firm *i* operating in *j* industry in year *t*
$AE^{j}_{i,t}$	The annual advertising expenses of firm *i* operating in *j* industry in year *t*
$AOC^{j}_{i,t}$	The economic value of organisation capital of firm *i* operating in *j* industry in year *t* calculated using $A\_SG\&A\_CAP^{j}_{i,t}$
$A\_SG\&A^{j}_{i,t}$	The adjusted annual SG&A expenses of firm *i* operating in *j* industry, calculated as the annual SG&A expenses minus selling expenses
$A\_SG\&A\_CAP^{j}_{i,t}$	The $A\_SG\&A^{j}_{i,t}$ of firm *i* operating in *j* industry, capitalised and amortised over three years
$Assets_{i,t}$	The total assets of firm *i* in year *t*
$Cost^{j}_{i,t}$	The operational cost of firm *i* operating in *j* industry in year *t*
$ds_{i,t}$	A dummy variable that takes the value of 1 if firm's sales revenue decreases for two consecutive periods, and 0 otherwise
$Emp_{i,t}$	Number of employees at firm *i* in year *t*
$FCF_{i,t}$	Free cash flows of firm *i* in year *t*
GNP_{t}	The percentage growth in real Gross National Product during year *t*
$MAOC^{j}_{i,t}$	The median value of $AOC^{j}_{i,t}$ of firm *i* operating in *j* industry in year *t*
$MOC^{j}_{i,t}$	The median value of $OC^{j}_{i,t}$ of firm *i* operating in *j* industry in year *t*
$OC^{j}_{i,t}$	The economic value of organisation capital of firm *i* operating in *j* industry in year *t*, calculated using $SG\&A\_CAP^{j}_{i,t}$
$PPE^{j}_{i,t}$	The plant, property and equipment of firm *i* operating in *j* industry in year *t*
$Rev_{i,t}$	The sales revenues of firm *i* operating in year *t*
$SE^{j}_{i,t}$	The selling expenses of firm *i* operating in *j* industry in year *t*
$SG\&A\_CAP^{j}_{i,t}$	The annual SG&A expenses of firm *i* operating in *j* industry, capitalised and amortised over three years
$SG\&A_{i,t}$	The annual SG&A expenses of firm *i* operating in *j* industry in year *t*

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