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Investigating the Effect of Intellectual Capital on Stickiness of Companies' Operation Expenses

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ABSTRACT

One of the fundamental issues in the section of management accounting is to explain the expenses' behavior and estimating the amount of expenses in order to compute the companies' operation budget. This research intends to investigate the effect of Intellectual Capital on stickiness of companies' operations expenses. Also, the research studies the effects of Intellectual Capital on expenses' asymmetric behavior using of 101 firms over the period 1387-1396 (1010 firm-year) selected from Tehran stock exchange. Following the Anderson's and Banker's base model, the dependent variable is considered the growth of operation expenses. The independent variables include the intellectual capital, organization capital, financial capital and human capital. Also, the variable of decreasing in sales for one period considered as a dummy variable. The hypotheses of research analyzed with using multi-regression and Panel Data methods. Results indicate the existence of stickiness behavior in firms of Tehran stock exchange. In spite of confirming the hypothesis of stickiness, there is no meaningful relation between intellectual capital and its components with stickiness of expenses. In other words, the intangible assets have no significant effect on the asymmetric behavior of firms' expenses of Tehran stock exchange.

Keywords:

Expense stickiness, Intellectual Capital, Organization Capital, Financial & Physical Capital and Human Capital.

1. Introduction

The general and initial hypothesis which plays an important role in accounting technics' development is the systematic and linear relation between expense and expense drivers. Broadly, it is assumed that expenses are whether independent from expense drivers' changes (fixed expenses) or in accordance to the changes of expense drivers (variable expense). Regarding the latter, the direction and continuation of change in expense drivers has no relation with expense changes. Systematic and linear behavior of expense hypothesis was accounted as the foundation of accounting management in the past.

Expense stickiness hypothesis was suggested by Anderson et al. in 2003 as an alternative theory to the traditional expense behavior. According to this theory, expense changes are a consequence of measured management decisions, their personal motives, and long-term contracts in which features of new expense drivers, such as direction, size, and continuation are taken into consideration. In this regard, adjustment rate of expenses due to action volume decrease is lower than increase rate of expenses on account of activity rise at the same volume. This asymmetric behavior of expenses is called expense stickiness (Weiss, 2010).

Since companies' expenses (including: general, administrative and operation expenses) has the biggest share in profit and loss statement, wrong analysis of them can cause miss-interpretation of financial statement. One of the appropriate approaches in financial statement interpretation and time, probability, and future cash flow speculation is evaluation of the company expenses' behavior. Traditional expense behavior, not considering managers' role in resource adjustment, links expenses to different levels of activity.

Furthermore, recognizing the expense behavior toward activity level changes with paying attention to the financial information of companies is of high importance for intra- and extra-organization users (Khani and Shafie, 1392). Managers in order to make optimized decisions for the company, and also investors and financial analyzers with the aim of assessing managers and auditors' performance in an analytic evaluation, need the expense information and its relation with the activity level alteration. Managers who understand the expense behavior, have better position in expense trend forecasting in operational circumstances. This situation provides them with

better planning of their activities and operational revenues. Expenses behavior in relation with activity level estimation without considering expense stickiness would be baffling. In fact, in traditional expensing system, product specified expenses were distorted and the main reason for that was choosing the same basis (united product level) for specifying all the product expenses (Ghaemi and Nemat-olahi, 1385).

In this regard, profit planning, codifying policies, and making the necessary decisions require the organization manager to know the relation between the cost, volume of activity, and profit. Also, for the sake of management goals, it has to be determined which items of cost with what intensity would change in case of activity volume alteration; conversely, which ones will not change (Anderson, 2003).

Given the importance of examining expense behavior in order to plan companies for the future, the main issue of this research is to find an appropriate answer to the question of whether companies' operating expenses have a stickiness feature or follow a symmetrical behavior pattern; and in case of stickiness feature presence, how intense it is. Also, what effect will various characteristics of companies, such as intellectual capital, along with other intangible assets, have on the intensity of these expenses' stickiness?

This study is of importance due to providing empirical evidence on the effect of intangible investments in companies listed on the Tehran Stock Exchange on their expense structure, citing the effect of intellectual capital on the expenses asymmetric behavior of general, distribution and sales as the most important operating expense of companies.

Since expenses' behavior evaluation in order to codify policies and make the necessary decisions by the managers is of remarkable importance, the main topic of the present study is to evaluate the subject that whether general, administrative, and operation expenses have an expense stickiness feature or not and if they obey a symmetric behavior pattern. In case of possessing the expense stickiness feature, how intense it is and also, this study is set out to find an answer to the problem that whether intangible assets exert an influence on expense stickiness or not. Moreover, if intellectual capital and its components contribute to expense stickiness, it will be studied that which component of the intellectual capital has more effect on expenses stickiness.

In this study, intellectual capital has been chosen as an important criterion of companies' commitment to investment in intangible assets. Hence, this intangible asset is considered as unreported intangible resources and, in this respect, preservation and development of such intangible assets, which are categorized as general, administrative, and sales expenses in companies' financial statements, are related to the operation expenses. Regarding the theoretical basis, companies with higher intellectual capital, bear sales, general, and administrative expenses in order to develop the company and as an investment, which this would increase the abilities and accessible intangible resources of the organization.

In expenses stickiness literature, the impact of intangible assets on managers' decision making in resource allocation and expenses' asymmetrical behavior formation, is neglected. Furthermore, in most of the previous studies, this hypothesis is evaluated using other assets. Whereas companies' effort in the path of expanding their share in the market under the competitive situation and implementing innovation, human, and organizational knowledge have led to a remarkable role for intellectual capital in the enhancement of companies' performance. In this respect, the goal of this study is to evaluate the effect of intellectual capital and its components on general, administrative and sales expenses' behavior.

2. Literature Review

The idea of a relation between expenses and activity was given in the late 1960s and early 1970s in some researchers work such as Salomon and Staubus. Afterwards, several other theories have been suggested in this subject. Traditional models in expense behavior explanation divide expenses onto fixed and variable. This categorization is based on the distinction microeconomics make according to the expense changes due to activity volume alteration (Alavi and Ghorshi, 1394).

Expense stickiness indicates economic asymmetry in the expense response to increase and decrease in sales. Expense stickiness means that the increase in expense when the sales increase is greater than the decrease in the same amount of expenses when the sales decrease. In other words, increasing administrative, general and sales expenses when demand increases (sales) has a greater slope than decreasing it when demand drops. Simply put, expense

stickiness occurs when the increase in sales and administrative expenses, as the variable part of the total cost, is greater when the firm's sales level increases than the time it plummets (Anderson, 2007).

Cooper and Kaplan (1992) believed that expenses are made with resource consumption. Therefore, to understand expenses' behavior, it is crucial to be aware of how basic resources level change in accordance to activity level changes (Cooper and Kaplan, 1992).

Based on Weiss (2010) definition, expense behavior is pointing at how expenses react to activity level changes. Traditional expense behavior models elaborate the relation of expenses and activity level in both increase and decrease of activity level as asymmetric (or linear). In other words, in these models the expense change rate, regardless of the change direction, is solely dependent on activity level (as the most important expense driver) changes. Anderson (2003) challenged this theory by providing some evidence on sales, general, and administrative expenses stickiness.

Based on expense stickiness suggested by Anderson et al., this phenomenon stems from measured decisions of managers and their personal motives. When a company's sales plunges, some managers assume it as transitional and expect a return to the previous sales level in near future. Therefore, in a measured decision, they maintain the resources related to operational activities of the company in the sales reduction period. This process happens with this logic; if resources are cut in response to sales reduction and re-acquired in sales rise period, company's expenses will increase in long run. Higher future sales expectations enable companies to go through more expenses regarding their unused resources, with hope of expense absorbance, at current period. To put it in other words, companies go through sales adjustment (including assets sale expenses, paying fired employees, and future fines of contract breach) inevitably in order to put the resources aside and replace the same amount of resources in case that demand returns to its previous state (Anderson, 2003).

Among contributing factors in managers' measured decisions, the amount of intangible assets and its impact on the company's performance is of significant importance (Venieris et al., 2015).

Weiss (2010) in his research at some companies, witnessed that the increase rate of expenses based on

activity level rise is lower that its reduction rate in response to the same decrease rate of activity level. In this respect, he introduced another form of asymmetric expense behavior called expense anti-stickiness.

Due to unused resources preservation in sales reduction period, expenses stickiness brings about expense rise and a bigger plummet of profit. This greater decrease in profit would increase the volatility of the speculated profit. That is why analyzers estimate the profit of a company which has sticky expenses lower in activity level rise periods. Hence, profit estimation error would be more in times of activity level increase and also decrease (Ramezani, 1395).

Expense stickiness model suggested by Anderson confirms that incurred expenses in one period is partially dependent on expenses beared in previous periods. Activity level in the current period and expense and activity level in the previous periods exert an influence on incurred expenses in the current period. Conversely, traditional expense behavior models claim that incurred expenses of the current period merely depend on the activity volume of the same period (Anderson, 2003).

Based on expense stickiness model, realized expenses in the current period depends on the realized expenses of previous periods. In fixed/variable expense model, current period expense relies only on the activity level in the same period. Whereas, in expense stickiness model, activity level realized expenses in previous periods have an impact on current period's expenses. In this model the strategic behavior of expenses is taken into consideration (Balakrishnan and Grossa, 2008).

In literature, there is a fundamental difference between stickiness of expenses which change mechanically with activity volume changes and expenses which are made through resources' consumption commitments by the management. So based on traditional expense behavior theories, expense changes are solely dependent on activity level alteration and these changes are symmetrical. In this approach, variable expenses change in accordance to alterations of the activity driver. Meanwhile, expenses stickiness theory has challenged the latter subject and states that expense reduction rate in times of activity decrease, is lower than increase rate in case of activity rise. This is formed through commitments in order to consume resources by the management. The sticky behavior of expenses can be related to the made

decisions by managers in order to preserve company's unused resources and after activity level reduction, in order to avoid production capacity adjustment expenses and decreasing operational assets level (Anderson et al., 2003).

With rise in demand, managers in order to achieve more sales, increase the company's resources, remarkably. On the contrary, in times of sales reduction, managers by considering factors such as adjustment expenses and expectation level from future sales increase, preserve the existing resources so as to create intangible assets profitability in future (Zanjirdar and Ashtiani, 1393).

Preservation of resources in such circumstances is done with the logic that in case of discarding and replacing the same amount of resources during the time demand returns to its initial state, companies incur adjustment expenses, inevitably. When demand rises, managers increase resources just as enough to achieve more sales. However, when sales reduce, some resources are technically not usable. Companies with high levels of intangible assets preserve unused resources more than companies with lower levels of these assets because high levels of intangible assets would lead to more optimistic expectation of the management toward future sale increase to absorb these resources (Venieris, 2015).

2.1. Factors and reasons of expense stickiness

One of the most important reasons of expenses stickiness is incurring the current expenses in order to avoid more loss in future, gaining more profit subsequently, preserving the unused capacity in revenue reduction periods so as to circumvent production capacity expenses, and reducing operational assets level which the subject in whole depends on the management decisions (Zanjirdar and Ghafari, 1393).

According to the previous studies, the reason behind expenses asymmetry can be divided into four main categories: (Medeiros, 2004; Anderson, 2007; Zanjirdar and Ghafari, 1393; Sepasi, 1393; Sadri and Tamimi, 1394; Ramezani and Taheri, 1395; Banker and Byzalov, 2014; Fazeli and Taheri, 1396; Venieris, 2015)

1) Managerial Deliberate Decision within the framework of economic factors contributing to

expenses stickiness and in order to use the organization resources undesirably (reduction in activity volume) and also amount of intangible assets as corporate governance theory.

2) Managers personal motives, Empire-Building Behavior, and using adjustment expenses as influencing agents in expenses behavior asymmetry.

3) Managers' optimistic expectations regarding activity level changes and economic status within expectation theory framework.

4) signing long term contracts, workforce with special abilities, and regarding information asymmetry of companies within information economics theory

2.2. Intellectual capital and expense stickiness

Intellectual capital is a combination of intangible assets and inter-related flows. On the other hand, intangible assets are contributing factors in producing value in the company (Bontis, 1998).

Stewart (1997) believes intellectual capital contain knowledge, information, intellectual assets, and experience which can be implemented to produce wealth. In his opinion, intellectual capital is an intangible asset which gives a company competitive advantage.

According to Cooper's idea (1992), expenses are made by resources and based on this opinion, intellectual capital is a strategical resource which enables companies to come up with competitive advantages and better financial performance (Namazi and Ebrahimi, 1390).

Edwinson and Malone (1997) introduce intellectual capital as a combination of structural and human capital including employed experiences, organization technology, customer relations, and professional skills, which provide the organization with market survival through empowering them with competitive advantage (Alavi and Ghorshi, 1394).

Among influencing factors in managers' decisions, their perspective toward resource consumption in order to create intangible assets and the effect of such assets on the company performance is of high importance. The amount of intangible assets of a company is one of the contributing factors in the company managers'

decision making so as to preserve unused resources related to the operational activities of the firm in the activity level reduction period. In companies with high levels of intangible assets, managers have a long-term orientation. Hence, in activity level reduction period, they preserve the expenses. Managers of such companies believe these expenses would lead to investments which are related to future sales raise expectation and high adjustment expenses. Managers who consider resource consumption to create intangible assets as effective investments in long term growth of the company, has no willingness to reduce these investments following transitional decrease in sales volume. Therefore, in such companies, expenses related to intangible investments have a sticky behavior (Venieris, 2015).

In the contrary, managers who presume resource consumption in order to create intangible assets inside the company as an expense, so as to enhance the reported profit and abolishing profit volatilities in different fiscal periods, after evanescent reduction in sales volume, are willing to reduce these expenses. In such companies, expenses behavior in relation with intangible investments are scarcely sticky or anti-sticky. Unused resources recession is more in companies with high levels of intangible investments compared to companies with low level of them. They justify this as possessing high levels of intangible investment would increase the adjustment expenses and forms optimistic expectations for the managers toward covering this recession through future sales raise. In other words, managers of these companies have optimistic expectations toward absorbing adjustment expenses relying on future sales growth. On the other hand, unused resources affect expenses behavior. In other words, in such companies and in long run, preserving intellectual capital leads to expense reduction due to the fact that in case of intellectual capital decrease in response to reduction or raise of sales in future periods, some expenses are incurred by the company for acquiring the same strategic resources. This fact that the managers of companies with higher intellectual capital are more optimistic, and this produces a willingness in them to increase the expenses in order to preserve the unused resources for two reasons: First, even though the current period's profit would decrease, in a situation in which expenses rise, so as to expand intangible assets, but in long run, intellectual capital raise would enable

the company to enhance the sales revenue. Therefore, any reduction in expenses in order to develop intellectual capital in the current period is considered as a future expense adjustment and in this respect, sales expenses in the future will potentially decrease. Second, expectation of more sales in the future, enables the company to preserve higher unused resources and also increasing the expenses at the current period, which is expected to be absorbed with sales raise in the future. On this account, optimistic expectations of companies with high intellectual capital cause managers to pay attention to the resources commitment in intangible assets development and in this way, intellectual capital deviation decreases. Therefore, managers tend to preserve intellectual capital so as to decrease expenses and as a result, increase the company's profit in long-term (Venieris, 2015).

Companies with high intellectual capital possess structural and organizational designs plus human workforce and a share of the market (potential and actual). These intangible assets bring about stable competitive advantages so it is expected that managers of such companies disagree more with lowering intangible investments in times of transient sales volume reduction. In this respect, these companies would have more expense stickiness (Lev et al., 2009).

Under the circumstances of sales reduction, companies which have more intangible assets (including intellectual capital), would use their resources more undesirably. Here, reasons for stickiness can be found in higher adjustment costs and also more optimistic expectations of the managers in order to absorb the undesirable expenses through future sales growth. In this respect, it is expected that intellectual capital affect operation expenses stickiness. Companies with higher intellectual capital, bear sales, general, and administrative expenses for the company's growth sake and as an investment, which this would increase the capabilities and accessible intangible resources of the organization. In this case, high administrative, general and sales expenses of the previous period used in intellectual capital development can raise the stored intellectual capital. With stored intellectual capital rise, adjustment expenses increase in accordance. Moreover, managers tend to keep using resources undesirably under economic activity reduction. This would not only does enable the company to preserve the investment in

stored intellectual capital, but also empowers it in using the future profit of these investments. Therefore, even though operation expenses in order to develop intellectual capital would decrease the company's profit, it would increase intangible assets in long run and enables the company to raise its sales (rate and amount). That is all the more reason why managers are willing to preserve unused resources during economic activity reduction. This action would enable the companies' management board to preserve stored organizational resources investments and their ability to extract economic profit out of these investments (Venieris, 2015). This refers to the definition of stickiness and it is the theoretical basis of this study.

It worth mentioning that since intangible assets, including intellectual capital, is an abstract definition, the way intellectual capital components comprised of human, financial, and organization capital exert their influence would obey the literature and theoretical backbone of this definition.

Very few studies have been conducted about the effect of intangible assets on expense stickiness so little empirical evidence is present for this matter. In the following, some recent studies about expenses stickiness will be investigated:

Cheung, Kim, Kim and Huang (2016) scrutinized the matter in a study that whether asymmetric expense behavior is under the influence of competitive factors. Results showed sales, administrative, and general expenses in different competitive medias are stickier. Moreover, asymmetric behavior is affected by internal and external factors (Cheung, 2016).

Venieris et al. (2015) in a study titled as organization capital and sticky behavior of selling, general and administrative expenses, discussed this topic. This study investigates how companies' expenses behave in response to economic performance and its impact on selling, general, and administrative expenses stickiness. In this study, organization capital level is chosen as the main variable in order to investigate the relation between expenses stickiness behavior and intangible investments. Statistical sample of this study contains 55769 year/company observations during 1979-2009. Results suggest that for companies with higher organization capital expenses are stickier.

Results of Banker et al. (2014) study showed that expenses stickiness has a positive and meaningful relation with information asymmetry, which this is

influential on the relation of conditional conservatism and information asymmetry, as well. Also, the experiment's results demonstrated that expenses stickiness act as an interferer in time profit asymmetry model and in the upcoming studies about conditional conservatism, the potential impact of expenses stickiness should be controlled.

Fazeli and Taheri (1396) evaluated the efficiency of different economic value assessment models for organization capital and sticky behavior of sales, general, and administrative expenses in Tehran stock exchange. Results showed that companies with high organization capital (low), possess sticky (anti-sticky) sales, general, and administrative expenses and deciding on resources allocation cause intangible investment development and sticky expenses raise.

Ramezani and Taheri (1395) investigated the relation between organization capital and administrative, distribution, and sales expenses stickiness in companies accepted in Tehran stock exchange during 1389 until 1393. This study showed that companies with higher organization capital, bear the sales, general, and administrative expenses for company development and as an investment. This would increase the capabilities and accessible intangible resources of the organization.

Sadri and Tamimi (1394) in a study titled as investigating influential factors on behavior and stickiness of expenses in Tehran stock exchange, dug this matter. The main goal of the study is to investigate general, administrative, and sales expenses stickiness. Results of this experiment, which was conducted in a 6-year period from early 1396 up to the end of 1391 by panel data method and through utilizing the information from 14 accepted companies in Tehran stock exchange, shows that in exchange of 1% increase in sales, administrative, general, and sales expenses raise by 66%. Whereas, in exchange of 1% decrease in sales, administrative, general, and sales expenses drop by 34%.

Kamyabi (1394) in a study entitled as expense stickiness and asymmetry in expense, volume, and profit model, investigated asymmetrical expenses model in 140 stock companies during 1385 until 1392. Results demonstrated that in case of using Anderson's stickiness model and also the total amount of expenses and revenues, regarding their insusceptibility to profit management actions for categorization, expense, volume, and profit models require adjustment due to

expenses stickiness. In other words, regarding the achieved sales level, if sales are experiencing a rise compared to the previous period, more profit will be gained than in a situation where sales have dropped in comparison to the previous period.

AliAhmadi and SoroushYar (1394) in a study about evaluation of organization capital's role in a company's sticky expense, the asymmetrical behavior of administrative, general, and sales expenses in 150 accepted companies in Tehran stock exchange during 1388 until 1392 was studied. Results showed that there is a sticky behavior in the latter expenses. Moreover, it was determined that increasing organization capital would lead to more stickiness in operation expenses.

In the present study, intellectual capital and its components have been used as a new and influential variable on expense behavior, which was not available in previous studies. Therefore, the intangible asset mentioned as a new cost driver and in this regard, the research is innovative and it will be enlightening.

3. Methodology

The present study has a practical goal and its research method is a past-event study. This research can be categorized as a correlation study. Moreover, this research is inductive in respect of induction and it is data mining (archival) in terms of research data. The research time territory is based on the studied data time frame of 10 years from 1387 until 1396. The research place territory is all accepted companies in Tehran stock exchange. For analyzing this research, descriptive and inferential statistics are used. In order to evaluate the hypotheses tests and the research model, multi-variable regression and panel are used. After data collection, Excel 2010 is used to calculate the variables and Eviews 201· is used to analyze the descriptive data, data normalization, errors normalization, and investigate independent variables, Limer, Hausman, and hypotheses tests' non-correlation.

3.1. Hypothesis development and study model

In line with achieving the study's goals, the hypotheses can be named as below:

Main hypothesis: Intellectual capital has a meaningful effect on operation expenses stickiness of companies

Sub-hypothesis 1: Organization capital has a meaningful effect on operation expenses stickiness of companies

Sub-hypothesis 2: Financial and physical capital have a meaningful effect on operation expenses stickiness of companies

Sub-hypothesis 3: Human capital has a meaningful effect on operation expenses stickiness of companies

In order to investigate expense stickiness, initially, Anderson's suggested model is analyzed:

$$SGAG_{it} = \beta_0 + \beta_1 REVG_{it} + \beta_2 DD_{it} REVG_{it}$$
Model (1)

Following that, regarding suggested models in previous studies and by considering independent variables, intellectual capital and its components including organization, financial, physical, and human capital, and also control variables, model (2) of the study can be determined as below:

$$SGAG = \beta_0 + \beta_1 REVG_{it} + \beta_2 DD_{it} REVG_{it} + \beta_3 DD_{it} REVG_{it} (IC_{it}, SCE_{it}, HCE_{it}, CEE_{it}) + \beta_4 DD_{it} REVG_{it} ASINT_{it} + \beta_5 DD_{it} REVG_{it} EMP_{it} + \beta_6 DD_{it} REVG_{it} FCF_{it} + \beta_7 DD_{it} REVG_{it} DD_{it-1} + \beta_8 DD_{it} REVG_{it} QT_{it} + \beta_9 DD_{it} REVG_{it} RET_{it} + \beta_{10} DD_{it} REVG_{it} DebtR_{it} + \beta_{11}(IC_{it}, SCE_{it}, HCE_{it}, CEE_{it}) + \beta_{12} ASINT_{it} + \beta_{13} EMP_{it} + \beta_{14} FCF_{it} + \beta_{15} DD_{it-1} + \beta_{16} QT_{it} + \beta_{17} RET_{it} + \beta_{18} DebtR_{it} + \varepsilon_{it}$$
Model (2)

It worth mentioning that since studied companies are from different industries and sizes, in order to increase the capability to compare variables and unify the estimated coefficients interpretation, relative and logarithmic indexes are used in this model. Furthermore, Anderson (2003) and Chen (2008) elaborate the reason of using the logarithm of ratios as reducing the concern regarding variance incompatibility. Moreover, using logarithms would lead to better economic interpretation of coefficients, abolish multi-collinearity between the research variables, and increase capability of variables comparison.

3.2. Research variables

The dependent variable used in this research is used in order to investigate the main hypothesis and sub-hypotheses 1,2, and 3 of sales, general, and administrative expenses stickiness and for its assessment, growth index of sales, general, and administrative expenses regarding Anderson's research (2003) and Banker and Byzalov (2014) study, is utilized:

$$SGAG = Log\left(\frac{SG\&A_{it}}{SG\&A_{it-1}}\right)$$

$SGAG_{it}$ = sales, general, and administrative expenses growth of company i in the fiscal period t

$SG\&G_{it}$ = sales, general, and administrative expenses of company i in the fiscal period t

$SG\&G_{it-1}$ = sales, general, and administrative expenses of company i in the fiscal period t-1

Independent variables in this study are intellectual capital and its components which their elaboration and method of measurement is determined in the following:

Intellectual capital: In order to measure intellectual capital in this study, intellectual value-added coefficient model was used. The latter model was introduced by Ante Pulik (2000) and it is one of the return on assets models and is an analytic tool to measure a company's performance. This model is formed with the aim of increasing managers, shareholders, and other organization stakeholders' capability in evaluation and monitoring value. It is designed through intellectual capital for the organization, total resources, and major components of organization resources and developed throughout years after introduction. Pulik names three important elements in distinction of businesses in the past and today:

a) Knowledge penetration into production and service,
b) General change of capital costs,
c) Price reduction is more under the influence of information context increase (rather than increase in quantity)

Regarding these elements, Pulik suggested intellectual value-added determination model as a solution to the latter problems; value-added calculation is the first step of this model. Based on Pulik's primary model, value-added driven from a company's resources use for each year includes: total operational profit of the company, workforce expense, tangible assets depreciation, and also intangible assets

amortization. This definition is used to calculate independent variables of this study (Hemati, 1392).

In contrast to traditional accounting which it is mainly focused on expenses and controlling them, Pulik emphasized on value creation in companies and stated that there are two main resources for value creation in companies: 1- Employed capital (comprising financial and physical capital) and 2- intellectual capital (including human and structure capital). Pulik defines the measurement criterion as human capital, structure capital efficiency, and physical and financial capital efficiency which they include each organization's share of intangible assets (Namazi, 1390).

Regarding the explanations above and also the presented model, all variable used in the study including independent, explanation, and control alongside their calculation method is showed in table (1) (in order to control other contributing factors in the research, influential variables on stickiness in the previous papers are chosen as control variables).

In model 1, in case of expenses stickiness, it is expected that β_1 regression coefficient would be positive, β_2 regression coefficient would be negative, and also β_1 regression coefficient absolute value would be significantly bigger than β_2 regression coefficient absolute value. Moreover, since the dummy variable value is zero in case of income raise, β_1 coefficient shows expenses change (growth) rate in response to 1% of sales raise. Furthermore, since the dummy variable value is 1 in case of income decrease, β_1 and β_2 coefficient total would show expenses change (reduction) rate in response to 1% of sale drop. Hence, β_2 coefficient which demonstrates the difference between sales change rate in times of sales raise and reduction; would calculate expenses stickiness amount. In this respect, by having expense stickiness, a negative β_2 coefficient would be expected. In other words, if the dependent variable is sticky, sales raise percentage in revenue increase periods (β_1) will certainly be more than sales reduction percentage in revenue decrease periods ($\beta_1 + \beta_2$).

Table (1): Research variables and their calculation method

Variable	Symbol	Explanation	Method of calculation
Independent	IC	Intellectual capital	Human, structure, physical, and financial capital efficiency total
	HCE	Human capital efficiency	Value-added divided by salary paid to employees
	SCE	Structure capital efficiency	Subtracted from salary paid and value-added and then divided by value-added
	CEE	Physical and financial capital efficiency	Ratio between value-added and total company assets (after subtracting intangible assets)
Dummy	DD_{it}	Dummy variable of one sales reduction period	If sales reduce in comparison to the previous year, its value is 1, otherwise assumed as 0
Explanation	$REVG_{it} = \text{Log}\left(\frac{Rev_{it}}{Rev_{it-1}}\right)$	Sales raise	ratio between current year's sales logarithm and the previous year
Control	$EMP_{it} = \text{Log}\left(\frac{TEMP_{it}}{Rev_{it}}\right)$	employees instensity	Ratio between number of employees logarithm and sales
	$ASINT_{it} = \text{Log}\left(\frac{ASSETS_{it}}{Rev_{it}}\right)$	Assests intensity	Ratio between asset logarithm and sales
	$FCF_{it} = \left(\frac{CFO_{it} + NFI_{it} - TAX_{it} - CFI_{it}}{ASSETS_{it}}\right)$	free cash flow ratio	Cash flow from operational activities (CFO_{it}) ratio plus Net cash inflow from investments returns and paid profit for financing (NFI_{it}) minus taxes (TAX_{it}) minus payment to finances for capital expenditures (CFI_{it})
	DD_{it-1}	Dummy variable of two sales reduction periods in a row	If sales reduce in two years in a row, its value is 1, otherwise assumed as 0
	$QT_{it} = \frac{\text{Value of Stock Market}}{\text{Book Value}}$	Q-Tobin's ratio	Ratio between market value on book value
	$Ret_{it} = \log\left(1 + \frac{P_{it} - P_{it-1} + D_{it}}{P_{it-1}}\right)$	Stock returns ratio	Ratio between dividend returns logarithm and stock price
	$DebtR_{it} = \log\left(\frac{Debt_{it}}{Rev_{it}}\right)$	Debt to sales	Ratio between debts logarithm and sales

In model (2), β_3 shows increase or decrease rate of expenses stickiness per 1% sales reduction at a time when intellectual, organization, human, and financial and physical capital change. In this way, negativity of

the latter coefficients expresses a rise in expenses asymmetrical behavior and their positivity would show a reduction in the asymmetry of expenses behavior. When stickiness intensity increases with intellectual capital and its components rise, β_3 would be negative.

3.3. Statistical population, sampling method, and sample size

Statistical population of this study includes all the accepted companies in Tehran stock exchange during 1387 until 1396 (a 10-year period) and its statistical sample comprises companies with features below, which are chosen through systematic elimination sampling method:

1) In order to increase comparison capability, their fiscal period ends on 29th of Esfand.
2) Accessible financial data
3) Not being loss-making during the studied time period

4) Not eliminated from the accepted companies of stock exchange during the studied time period
5) "Production" activity of the sample companies
6) Based on the latter conditions, 101 companies were chosen for each fiscal year.

4. Results
4.1. Descriptive statistics

Regarding table (2), mean intellectual capital is 6.4, its median is roughly 4.7 and domains of changes is approximately 107.6. Intellectual capital standard deviation is almost 8 which this high distribution (among other intangible assets variable) demonstrates its variation between accepted companies in Tehran stock exchange. The biggest range of variance amongst intellectual capital is for human capital, with 107.2, and also the biggest mean and median with 5.4 and 3.6, respectively.

Table (2): Variables' descriptive statistics during 1387 until 1396

Variable/index	Mean	Median	Maximum	Minimum	Standard deviation	Skewness	Kurtosis
Operation expenses growth	0/07	0/07	1/3	-0/7	0/1	1/0	17/4
Sales revenue growth	0/06	0/06	0/6	-0/6	0/1	-0/1	5/7
Intellectual value-added	6/42	4/68	101/8	-5/8	8/0	6/9	65/5
Organization capital efficiency	0/70	0/73	15/4	-4/2	0/5	20/0	588/7
Human capital efficiency	5/41	3/64	100/4	-6/8	7/9	7/1	68/5
Financial capital efficiency	0/31	0/29	0/9	-0/1	0/1	0/9	4/2
Asset ratio	0/08	0/10	0/9	-0/8	0/2	-0/4	4/7
Number of employees ration	-3/36	-3/33	-2/2	-5/5	0/4	-1/1	7/1
Free cash flow ratio	-0/01	-0/01	0/4	-0/5	0/1	-0/3	5/4
Tobin's q ratio	2/31	1/95	18/3	-23/4	1/8	-0/7	52/2
Capital returns ratio	0/06	0/04	1/0	-1/0	0/2	0/3	4/1
Debts on sales ratio	-0/18	-0/16	0/9	-1/3	0/3	-0/2	4/0

One of the reasons of human capital's variable statistical indexes is its high importance and divergence among accepted companies in Tehran stock exchange. It worth mentioning that intellectual capital and its components' mean is positive which it could be interpreted as their probable usage for efficiency and productivity enhancement of accepted companies in Tehran stock exchange. Moreover, growth distribution of operation expenses (0.1) is almost equal to sales' growth distribution (0.1) which can mean that

production companies accepted in stock exchange in order to smooth profitability, manage their operation expenses in accordance to the company's periodic performance, simultaneously.

4.2. Variables' Reliability test
Stability means that variables' mean and variance throughout time and variable's co-variance through different years are constant. In this study, in order to

investigate the research variables' stability, Levene, Li, and Chu tests were performed which their results are illustrated in table (3). Regarding the latter tests'

results, the probable amount for all the research variables is less than 0.05. Hence, the research variables during the study period are reliable.

Table (3): The research variables' stability test results using Levene, Li, and Chu test

Variable	Variable's symbol	Statistic	Probability value	Results
Operation expenses growth	$SGAG_{it}$	-18.5	0.0	Reliable
Sales revenue growth	$REVG_{it}$	-14.9	0.0	Reliable
Intellectual value-added	IC_{it}	-7.9	0.0	Reliable
Organization capital efficiency	SCE_{it}	-4.5	0.0	Reliable
Human capital efficiency	HCE_{it}	-7.7	0.0	Reliable
Financial capital efficiency	CCE_{it}	-12.9	0.0	Reliable
Asset ratio	$ASINT_{it}$	-10.1	0.0	Reliable
Number of employees ration	EMP_{it}	-12.2	0.0	Reliable
Free cash flow ratio	FCF_{it}	-15.7	0.0	Reliable
Tobin's q ratio	QT_{it}	-5.4	0.0	Reliable
Capital returns ratio	Ret_{it}	-14.4	0.0	Reliable
Debts on sales ratio	$DebtR_{it}$	-12.3	0.0	Reliable

4.3. Regression model selection test

Before testing the main hypothesis alongside the sub-hypotheses 1-3, an appropriate pattern for regression models should be chosen. In the panel data, F-Limer test so as to determine the kind of data (panel and pooling), and Hausman test to determine constant and random effects are off importance. In this respect, initially, panel data model versus pooling data model was chosen using F-Limer test. This test's results are listed in table (4) for each hypothesis of the study.

Since F-statistic probability in table (4) for the hypotheses model was more than the 5% significance

threshold, it is suitable for studying the models related to the panel data.

Furthermore, in order to evaluate the linear regression model's defaults, Variance Inflation Factor (VIF) test was performed to investigate any collinearity between independent and control variables, in which variables with a variance inflation factor of more than 10 were eliminated from the research model. Finally, the research model reached 4 final models for the research hypotheses analysis.

Table (4): F-Limer test's results (choosing integrated data versus combined data)

Hypothesis model	Degree of freedom	Test' statistic amount	Test's statistic probability	Appropriate model
Main	(100 & 889)	0.40	1.0	Panel data
Sub-1	(100 & 889)	0.40	1.0	
Sub-2	(100 & 889)	0.41	1.0	
Sub-3	(100 & 889)	0.40	1.0	

4.4. Regression results

Results of regression analysis of the research primary model in order to investigate general, administrative, and sales expenses stickiness are presented in table (5). Regarding table (5), sales growth coefficient (β_1) is positive and roughly 0.35% whose related t-statistic is 0.0 and significant. In other words, with 1% sales increase, a 0.35% growth in operation expenses is expected. Moreover, sales reduction interactive coefficient (β_2) which measures stickiness (anti-

stickiness), is calculated as approximately -0.11. The latter coefficient is also significant regarding the related t-statistic. Regarding β_2 interactive coefficient and its minus sign, per 1% sales reduction, a 0.11 % operation expenses stickiness is predicted. In other words, per 1% sales reduction of the company, general, administrative, and sales expenses would decrease by 0.24% ((+0.35) + (-0.11)), which is lower than sales raise at the same situation of sales growth.

Hence, operation expenses stickiness hypothesis in the time and place range of the study is approved.

Table (5): Results of expenses stickiness primary model investigation

Model	$SGAG_{it} = \beta_0 + \beta_1 REVG_{it} + \beta_2 DD_{it}REVG_{it}$		
Variable/Statistic	Coefficient	t-statistic amount	t-statistic probability
Interception	0.05	6.7	0.0
$REVG_{it}$	0.35	11.8	0.0
$DD_{it}REVG_{it}$	-0.11	-2.2	0.03
F-statistic	104		
F-statistic probability	0.00		
Durbin–Watson statistic	2.2		

4.5. Main and sub-hypotheses test

Results of ordinary least squares regression model, which is used to investigate the main hypothesis of the research alongside sub-hypotheses 1-3, are showed in table (6). β_3 regression coefficient, which calculates the interactive effect of intellectual, structure, physical, financial, and human capital on sales growth and dummy sales reduction variable impact on general, administrative, and sales expenses, in 4 separated regression models in table (6) is -0.01, +0.1, +1.3, and -0.02, respectively. β_3 coefficient's minus sign in intellectual and human capital is the demonstration of the latter variables' stickiness effect on operation expenses of accepted companies in Tehran stock exchange. In other words, per 1% sales reduction when intellectual and human capital change, companies'

operation expenses stickiness would increase by 0.01 and 0.02 percent, respectively. This means operation expenses' asymmetric behavior is sticky. It worth mentioning that despite intellectual and human capital's stickiness effect on operation expenses, regarding the related t-statistic probability, β_3 coefficient would not be significant in 5% error level. In this respect, the main hypothesis and the third sub-hypothesis will not be confirmed. To put it in other words, the impact of intellectual and human capital on operation expenses stickiness of the sample companies is not considered as significant. Also, β_3 coefficient which calculate the interactive effect of structure, physical, and financial capital in sales growth and the effect of dummy sales reduction variable on general, administrative, and sales expenses change, is +0.1 and +1.3, respectively. The positive sign shows the anti-stickiness effect of structure, physical, and financial capital on operation expenses of the accepted companies in Tehran stock exchange. Regarding the positive sign of coefficients related to structure, physical, and financial capital variables, the study's sub-hypotheses 1 and 2 are not confirmed either in 5% significance threshold.

Among the chosen control variables, assets intensity (β_7 coefficient) in models 2 and 4, dummy sales reduction for two years in a row variable (β_8 coefficient) in models 1,2, and 4, debts on sales ratio (β_9 coefficient) in model 3, employees intensity (β_{10} coefficient) in models 1 and 2, Q-Tobin's ratio (β_{12} coefficient) in models 1,2, and 4, and return ratio (β_{13} coefficient) in models 1 and 2 are significant..

Table (6): Results of the study's regression model

Model	$SGAG_{it} = \beta_0 + \beta_1 REVG_{it} + \beta_2 DD_{it}REVG_{it} + \beta_3 DD_{it}REVG_{it}(IC_{it}, SCE_{it}, CCE_{it}, HCEit) + \beta_4 DD_{it}REVG_{it}FCF_{it} + \beta_5 DD_{it}REVG_{it}Ret_{it} + \beta_6 (IC_{it}, SCEit, CCEit, HCEit) + \beta_7 ASINT_{it} + \beta_8 DD_{it-1} + \beta_9 DebtR_{it} + \beta_{10}EMP_{it} + \beta_{11}FCF_{it} + \beta_{12}QT_{it} + \beta_{13}Ret_{it} + \varepsilon_{it}$											
	Main hypothesis 1 (model 1)			Sub-hypothesis 1 (model2)			Sub-hypothesis 2 (model 3)			Sub-hypothesis 3 (model 4)		
Variable/Statistic	Coefficient	t-statistic amount	t-statistic probability	Coefficient	t-statistic amount	t-statistic probability	Coefficient	t-statistic amount	t-statistic probability	Coefficient	t-statistic amount	t-statistic probability
Interception	-0/03	-1/4	0/1	-0/05	-2/4	0/01	-0/03	-0/8	0/3	-0/03	-0/9	0/3
$REVG_{it}$	0/36	10/5	0/0	0/36	10/5	0/00	0/37	6/7	0/00	0/37	11/9	0/00
$DD_{it}REVG_{it}$	-0/16	-1/5	0/1	-0/26	-2/8	0/00	-0/68	-3/1	0/00	-0/13	-2/7	0/01
$DD_{it}REVG_{it}$ (IC_{it}, CCEit, HCEit)	-0/01	-0/4	0/6	0/10	1/9	0/05	1/32	1/8	0/06	-0/02	-0/9	0/3
$DD_{it}REVG_{it}FCF_{it}$	-0/86	-1/7	0/08	-0/84	-1/8	0/06	0/86	0/9	0/3	-0/72	-1/5	0/1
$DD_{it}REVG_{it}Re$	-0/32	-1/1	0/2	-0/33	-1/1	0/2	-0/76	-1/5	0/1	-0/30	-0/8	0/3

Model	$SGAG_{it} = \beta_0 + \beta_1 REVG_{it} + \beta_2 DD_{it}REVG_{it} + \beta_3 DD_{it}REVG_{it}(IC_{it}, SCE_{it}, CCEit, HCEit) + \beta_4 DD_{it}REVG_{it}FCF_{it} + \beta_5 DD_{it}REVG_{it}Ret_{it} + \beta_6 (IC_{it}, SCEit, CCEit, HCEit) + \beta_7 ASINT_{it} + \beta_8 DD_{it-1} + \beta_9 DebtR_{it} + \beta_{10}EMP_{it} + \beta_{11}FCF_{it} + \beta_{12}QT_{it} + \beta_{13}Ret_{it} + \varepsilon_{it}$											
Variable/Statistic	Main hypothesis 1 (model 1)			Sub-hypothesis 1 (model2)			Sub-hypothesis 2 (model 3)			Sub-hypothesis 3 (model 4)		
	Coefficient	t-statistic amount	t-statistic probability	Coefficient	t-statistic amount	t-statistic probability	Coefficient	t-statistic amount	t-statistic probability	Coefficient	t-statistic amount	t-statistic probability
t_{it}												
$(IC_{it}, SCEit, CCEit, HCEit)$	0/001	0/9	0/3	0/02	2/0	0/04	0/08	2/3	0/02	0/0004	0/5	0/5
$ASINT_{it}$	0/03	1/6	0/1	0/03	1/9	0/05	-	-	-	0/03	2/0	0/04
DD_{it-1}	-0/03	-3/1	0/00	-0/03	-2/8	0/01	-0/03	-1/8	0/07	-0/03	-3/3	0/00
$Debt_{it}$	-0/03	-1/5	0/1	-0/03	-1/8	0/07	0/06	3/1	0/00	-0/02	-1/0	0/2
EMP_{it}	-0/02	-2/7	0/01	-0/02	-3/4	0/00	-0/02	-1/7	0/08	-0/02	-1/7	0/07
FCF_{it}	-0/04	-1/5	0/1	-0/04	-1/6	0/1	0/03	0/8	0/4	-0/04	-1/7	0/09
QT_{it}	0/003	2/5	0/01	0/003	2/6	0/01	0/004	1/5	0/1	0/003	3/1	0/00
Ret_{it}	-0/03	-2/6	0/01	-0/03	-2/8	0/01	-0/04	-2/2	0/03	-0/03	-1/2	0/2
F-statistic	19/4			20			8/5			18		
F-statistic probability	0/00			0/00			0/00			0/00		
Adjusted determination coefficient	20%			21%			11%			20%		
Durbin–Watson statistic	2/3			2/3			2/3			2/3		

$ASINT_{it}$ was eliminated in model 2 due to high insignificance

5. Discussion and conclusion

The conventional process used by financial analyzers comprises administrative, general, and sales expenses components, as a percentage out of the total net sales of companies, comparison with another company in different periods. This analysis can be wrong if expenses' behavior in relation with sales raise reduction is not considered. An analysis within this framework, in order to help analyzers with scrutinizing how expenses change based on the revenues, can be corrected. With expense behavior determination, company owners can analyze whether the managers are imposing extra expenses on the firm. Understanding expense behavior is also appropriate for external users (as analyzers) who want to evaluate the company's performance. On the other hand, efficiency or inefficiency of expenses raise and its impact on the company's future profitability, is one of the topics in management accounting and has drawn researchers' attention lately. The latter number increase can be of positive influence on the company's future profitability if it is controlled by the manager and it is set out to create intangible asset (Khani and Shafie, 1392).

This study was aimed to investigate intellectual capital's effect on operation expenses asymmetrical behavior. As the title shows, companies use general, administrative, and sales expenses as long-term investments in order to grow and develop the company, relying on intangible assets. Moreover, considering this kind of expenses as an investment would increase the company's intangible assets and cause optimistic expectations in the managers toward future sales (Venieris, 2015). In other words, companies' managers, through optimistic expectations and possessing intangible assets during sales reduction period, will not decrease the organization's resources which this refers to expenses stickiness definition. Based on this and regarding the management measured decisions and also the company's intangible assets (within corporate governance definition), it is expected that one of the contributing factors on asymmetric behavior of companies, is intellectual capital amount. Despite the theoretical backbone of the determined hypotheses in this study, none of the hypotheses were confirmed at 5% significance threshold which this is in contrast with Venieris et al. (2015) and also national researches (Ahmadi and SoroushYar, 1394; Ramezani

and Taheri, 1395). Considering the study's findings, intellectual, organization, financial, and physical capital are not influential on expenses' asymmetrical behavior and even in case of organization, financial, and physical capital, anti-stickiness effect was demonstrated. Nevertheless, regarding intellectual and human capitals' interactive coefficient negativity, these independent variables are effective on operation expenses stickiness, but it is statistically insignificant. Among reasons of this study's findings contradiction with the theoretical backbone and national and international researches in the time and palace territory of the study, negligence and inconsideration of intangible assets by the managers and also their mistrust toward the future conditions of the market in the study's place territory, can be named. In this respect, standard limitations of intangible assets accounting and "reliability" and "quantifiably measurable" definitions in the theoretical framework have led to a practical ignorance of these intangible investments by the companies' managers and the level of these intangible assets are not considered in the management's decision making process. Human capital's effect on expenses stickiness can be interpreted differently from other intellectual capital components (including organization, financial and physical capital) on the account that some of the measurement indexes of this capital, such as salary and wages, merit pay, productivity, and education are measurable and quantifiable. In this respect, companies' managers, by mentioning these expenses in the financial statement, would have little future optimistic expectations about the company's performance. What the study results determine regarding statistical findings, is inconsideration of intellectual capital and its components by the managers of accepted companies in Tehran stock exchange due to lack of recognition of these intangible assets in the financial statements of the companies. This matter is only solvable by intangible assets' accounting standards change and determination in order to recognize and measure intellectual capital, as they are profitable resources in the future.

5.1. Practical suggestions & Scientific and new findings

Modulating the conservative approach of accounting standards in order to identify intangible assets in the form of economic resources that have future benefits (instead of current expense) could be one the most important of the suggestion research. If the latter issue becomes operational, the financial statements will have higher transparency in a competitive and free economy and will provide a fair illustration of the companies' situation.

In this regard, justifying the managers of companies in order to continue and reduce resources (the concept of stickiness), is a prudent decision to continue the process of participation in the operational activities, which (despite reducing the level of activity) causes: Company staff would be trained properly, post-recession advertisement would be done, organizational structures would be reviewed, and all measures to compensate for unrealized profits in the post-recession period would be taken. It is noteworthy that in addition to interpreting the issue of sticking to operating expense from the perspective of prudent decisions of managers, concluding personnel contracts, and the existence of labor protection laws would cause a raise in the ratio of expenses to sales in the period of demand decline; another justification and interpretation of stickiness behavior presence in the operating expenses of companies.

5.2. Suggestions for future research:

- Investigating the relationship between intellectual capital and the stickiness of sales, general and administrative expenses according to the rate of change in economic activities and taking inflation index into consideration.
- Provide a model to predict companies' profit based on asymmetric expense behavior and compare the performance of the proposed model with other models based on profit forecasting.

5.3. Research limitations

Among the limitations of the present study, the special feature of quasi-experimental research which is the lack of control over some factors affecting the research results such as the impact of macro variables like economic factors, political conditions, global economic situation, especially the specific conditions of companies in the current sanctions, and such like are out of reach for the researcher.

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