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Impact of state ownership on labour cost stickiness across strategic and non-strategic industries in developing economies

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Abstract

Purpose – This study explores the relationship between state ownership and labour cost stickiness across strategic and non-strategic industries in developing economies. It aims to uncover how non-economic considerations and sociopolitical objectives influence cost behaviour in state-owned enterprises (SOEs), particularly within strategic sectors.

Design/methodology/approach – The research employs data from 151 firms listed on the Tehran Stock Exchange from 2011 to 2021. Using multiple linear regression analysis with year and industry-fixed effects, the study investigates the impact of state ownership on labour cost stickiness, considering the moderating role of industry type.

Findings – The analysis reveals a significant influence of industry type on the relationship between state ownership and labour cost stickiness. SOEs exhibit higher labour cost stickiness, especially in strategic industries subject to greater public scrutiny and government intervention. These findings align with agency theory, highlighting how sociopolitical pressures shape SOEs' managerial decisions and cost management strategies.

Originality/value – This research fills a crucial gap in the literature on cost behaviour in developing countries, emphasising the importance of industry-specific strategies in mitigating labour cost stickiness in SOEs. It provides new insights into how state ownership and sociopolitical objectives affect cost management, offering valuable implications for policymakers and managers in similar economic contexts.

Keywords State ownership, Labour cost stickiness, Strategic industries, Industry type, Non-economic considerations, Sociopolitical objectives, Developing countries

Paper type Research paper

Introduction

The foundational principles of cost accounting traditionally classify costs into fixed and variable categories, assuming a symmetrical relationship between variable costs and changes in activity levels. However, recent empirical evidence challenges this notion, revealing an asymmetry in cost behaviour (Anderson *et al.*, 2003, 2007; Krisnadewi and Soewarno, 2021). Moreover, managerial decisions have been identified as significant contributors to asymmetric cost behaviour, leading to the emergence of the concept of "cost stickiness" by Anderson *et al.* (2003). This phenomenon denotes that costs tend to increase more with rising activity than they decrease with an equivalent decline.

The motivation for this study arises from the increasing importance of understanding cost behaviour, particularly labour cost stickiness, within state-owned enterprises (SOEs) in developing economies. Labour cost stickiness, where costs increase more with rising activity levels than they decrease with declining activity, is influenced by managerial decisions and non-economic factors. SOEs, driven by sociopolitical objectives and non-economic considerations, present a unique context for exploring labour cost stickiness. The motivation is further strengthened by the need to investigate how strategic and

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non-strategic industries differ in labour cost behaviour, given their varying economic roles, particularly in developing countries like Iran, where state ownership plays a dominant role. This research seeks to fill a critical gap in understanding the implications of state ownership and industry classification on labour cost management. It aims to inform policymakers and managers how these factors shape cost behaviour.

Regarding cost stickiness, scholars have identified resource adjustment costs, behavioural biases, and incentives as crucial drivers (Banker *et al*., 2018; Pittaway and Montazemi, 2020). Of particular relevance is the deliberate decision of managers to increase long-term profits by incurring additional costs in anticipation of future sales forecasts (Kuiate and Noland, 2019; Golden *et al*., 2020). While previous research has explored the drivers of cost stickiness in various contexts, there remains a notable research gap concerning the effect of ownership type and industry classification on labour cost stickiness in developing economies (Balios *et al*., 2020).

The relationship between strategic industries and cost stickiness varies between developed and developing countries due to each nation's unique economic, political, social, and cultural factors. Economic conditions significantly influence this relationship, with developed countries often enjoying greater financial resources, advanced technologies, and increased cost flexibility in strategic industries. In contrast, developing countries face limitations, leading to reduced cost flexibility and heightened cost stickiness.

Political and military factors further complicate the relationship, with government influence in strategic industries potentially increasing cost stickiness, especially in countries with state ownership. Organisational culture and a willingness to embrace change also play a crucial role; countries prioritising innovation tend to exhibit increased cost flexibility.

State-owned enterprises (SOEs) add another layer of complexity due to their sociopolitical interests and broader social goals. The present research focuses on Iran, a developing country facing unique challenges such as population aging, a shortage of skilled labour, and economic fluctuations influenced by political conditions and sanctions. The study aims to investigate the effect of state ownership on labour cost stickiness, considering the moderating role of industry type, particularly in strategic industries.

This research is crucial as ownership structure significantly influences shareholder and managerial behaviour, impacting monitoring, control, and cost-related decision-making (Chouaibi and Kouaib, 2015; Rouf and Hossain, 2018). Despite decades of research on cost stickiness, there is a notable absence of studies on labour cost stickiness in developing countries. The findings reveal that SOEs, driven by non-financial objectives like employment and conservatism, exhibit higher labour cost stickiness during economic downturns, with a more pronounced effect in strategic industries.

In essence, this research contributes to a deeper understanding of cost behaviour, enhances cost management strategies in strategic industries, and facilitates more informed decision-making, ultimately improving efficiency and profitability. The study expands the theoretical literature by examining the effect of state ownership on labour cost stickiness in a developing country context. It provides valuable insights for scholars, practitioners, and policymakers alike.

Theoretical framework and literature review

Cost stickiness

Cost behaviour is essential for decision-making in organisations (Askarany and Franklin-Smith, 2014; Askarany and Smith, 2003; Marzoughi *et al*., 2018; Langlois, 2004; Lu, 2008; Balios *et al*., 2020; Okeke *et al*., 2022). According to Anderson *et al*. (2003), costs are sticky when they increase more when activity rises than they decrease when activity falls by an equivalent amount. In the accounting literature, cost stickiness is described as an asymmetry in cost behaviour concerning changes in the activity level. The literature suggests that this asymmetric cost behaviour is the result of deliberate decisions for resource adjustment driven

by various factors such as adjustment costs (Banker *et al*., 2013; Calleja *et al*., 2006), managerial opportunism (Chen *et al*., 2012; Dierynck *et al*., 2012), and managerial optimism about future sales (Banker *et al*., 2014). While the accounting literature has traditionally focused on economic explanations of cost stickiness, non-economic considerations are also likely to play a vital role in explaining resource adjustment decisions (Porter, 1980; Sharma and Manikutty, 2005). However, in the management accounting literature, the role of non-economic considerations in explaining cost behaviour has been largely overlooked. To better understand the role of non-economic considerations, it is important to examine the effect of ownership structure on cost stickiness. Ownership structure means who (natural/legal) controls and governs corporate operational and strategic decision-making. State ownership is the percentage of shares held by the government out of total shares.

The literature on cost stickiness has primarily focused on private firms and developed economies, leaving a notable gap in the context of SOEs in developing countries. Prior studies have shown that cost stickiness is driven by managerial decisions, resource adjustment costs, and behavioural biases (Banker and Byzalov, 2014). However, the role of ownership structure, particularly state ownership, in influencing cost behaviour remains underexplored. This study justifies its focus by addressing this gap, particularly in industries with high sociopolitical importance, such as strategic industries. Additionally, research on strategic industries suggests that their technical complexity, critical infrastructure reliance, and high human resource requirements contribute to greater cost stickiness (Parsaei *et al*., 2024; Jeon and Ra, 2024; Restuti *et al*., 2023). Focusing on Iran's unique economic and political context, this study fills a significant gap in the literature by analysing how state ownership and industry type shape labour cost stickiness in developing economies.

Recent studies continue to emphasise the importance of ownership structure in shaping corporate decision-making and cost behaviour. For example, Aguilera *et al*. (2024) and Cuervo-Cazurra and Li (2021) have highlighted how state ownership influences firm performance, particularly in politically charged environments. Similarly, Mironenkova and Yahaya (2024) explored the effects of government ownership on resource adjustments, while Prabowo *et al*. (2018)examined how socio-political factors drive labour cost stickiness in state-owned firms. These recent contributions reinforce the relevance of investigating labour cost stickiness in SOEs and strategic industries, particularly in developing countries, where state ownership remains a significant factor in corporate governance. This study builds on these insights, incorporating the latest findings to contextualise labour cost stickiness in industries of strategic importance, particularly in the energy and defence sectors.

Depending on their objectives and monitoring methods, various ownership structures can affect cost stickiness differently. In SOEs, behaviours and performance outcomes are assumed to depend on various governance and sociopolitical factors (Boubakri *et al*., 2013; Aguilera *et al*., 2021; Cuervo-Cazurra and Li, 2021).

Labour cost stickiness

As demand for a firm's output increases, it must hire more employees. Since firing costs are usually higher than hiring costs, managers are less likely to fire employees when activity decreases than they are to hire new employees when activity increases (Banker *et al*., 2013). In addition, cost stickiness tends to be lower during recession and economic crisis (van Zuijlen, 2012) since companies are forced to cut costs. When demand decreases, they have to adjust rather than maintain unutilised resources. Moreover, companies use fixed-term workers instead of long-term binding contracts during a financial crisis. Therefore, cost stickiness is directly related to managerial decisions about activity and employees (Chung *et al*., 2019). Policies that prevent layoffs (due to their damage to the company's reputation) may lead to cost stickiness (Maaloul *et al*., 2018).

Hypotheses development

Given the importance of cost stickiness in management decisions and, subsequently, the performance outcomes of companies, it is essential to identify the contributing factors. Different types of ownership provide additional incentives for owners to invest in cost control activities since the type of ownership determines how the benefits from those activities are accrued to the owners (Prabowo *et al*., 2018), resulting in different cost behaviours in companies with varying types of ownership (Hall, 2016).

Unlike other companies, SOEs have sociopolitical interests and are likely to pursue broader social goals than private companies. For example, they may hire many employees to reduce unemployment rates (Megginson, 2005). Politicians also interfere in the activities of SOEs due to political self-interest, instructing them to provide certain privileges to voters at the firm's expense. Politicians may impose higher labour costs, such as additional wages and maintaining employment levels, to win political support through political control over SOEs. Such sociopolitical goals can conflict with other interests, such as those of the shareholder, if they undermine the firm's financial performance or shareholder value. Various studies have documented the detrimental effects of political intervention on the financial performance of SOEs (e.g. Micco *et al*., 2007; Shleifer, 1998).

Bai *et al*. (2000) argue that it is challenging to measure performance in SOEs due to the difficulty of determining the relative importance of different objectives. It is also difficult for shareholders to monitor the behaviour of SOE managers, so the room for management discretion expands. Politicians may use the state's ownership to prevent layoffs or wage cuts when demand and production decline. In contrast, private firms do not need to include such sociopolitical considerations in their resource allocation decisions. Prior research also confirms the effect of government ownership on resource adjustment decisions (Anderson *et al*., 2003; Cohen *et al*., 2017). Therefore, the first hypothesis is formulated as follows:

H1. Labour cost stickiness is higher in SOEs than in private firms.

Some case studies have documented higher labour cost stickiness in strategic industries. Labour cost stickiness refers to the lack of alignment between labour costs and changes in production activities. In strategic sectors, several factors can contribute to higher cost stickiness:

The first factor is technical complexity. Strategic industries usually face more technical challenges due to their complex production processes and advanced technologies. This complexity can reduce flexibility in the cost structure. Strategic industries often require complex technological changes that need careful analysis and evaluation. These changes may take more time to implement and adapt, leading to higher cost stickiness in strategic industries.

The second factor is dependency on critical infrastructure. Strategic industries rely on critical infrastructures (e.g. communication networks, energy supply and transportation) for their operations, and securing and maintaining these infrastructures entail significant time and cost. Additionally, addressing problems with critical infrastructure can be extremely costly and complex, contributing to cost stickiness.

The next factor is human resource requirements. Strategic industries often require skilled and experienced employees. Attracting and retaining a skilled workforce in a competitive job market can be challenging and may involve higher training and development costs. As a result, changes in the workforce, particularly as a response to technological advancements and innovation, can lead to greater cost stickiness in strategic industries.

Another contributing factor is investment requirements. Many strategic industries need significant investments for growth and upgrades. These investments can lead to cost stickiness as changes in investment costs and their use for production and service provision may require more time and cost.

These arguments are supported by various studies (Kaplan and Mikes, 2012) that have documented greater cost stickiness in strategic industries. It's important to note that these impacts may vary in different industries and specific circumstances, and accurate modelling

requires examining each sector separately. For example, Cannon (2014) studied cost stickiness in the US airline industry. The results show that managers do not reduce resources when demand falls so as not to incur adjustment costs. Therefore, we expect that labour adjustment costs and, as a result, labour cost stickiness will be higher in firms operating in strategic industries.

H2. Labour cost stickiness is higher in strategic industries than in non-strategic industries.

State ownership can facilitate factors that increase cost stickiness in strategic industries. However, this relationship may vary depending on the specific conditions of each country and industry (Ølnes *et al*., 2017; Meehan, 1996). Several reasons exist for the potentially positive relationship between state ownership and cost stickiness in strategic industries.

First, as noted earlier, strategic industries rely on critical infrastructures, and in many parts of the world, the state is responsible for managing and maintaining them. Given the technical complexity and the reliance of strategic industries on these infrastructures, state ownership could reduce changes in costs relative to activity.

Second, in the case of state ownership, access to the skilled and specialised workforce may be limited due to a lack of interest in working in the public sector, lack of alignment with the needs of strategic industries, or other factors contributing to cost stickiness.

Third, state ownership can make it difficult to secure significant investments and long-term commitments that some strategic industries require, resulting in costs that do not change in proportion with changes in income or activity.

It must be noted that these factors must be carefully examined within the context of each specific industry and each country. The impact of state ownership on cost stickiness can vary between strategic industries and countries with different financial and political circumstances.

The literature on SOEs assumes that these firms' behaviours and performance outcomes depend on various governance and sociopolitical factors (Ben-Nasr *et al*., 2012; Boubakri *et al*., 2013). Governments influence societies in general, so sociopolitical factors are likely to affect the behaviour of private firms as well. However, private firms are less subject to direct government interventions. Therefore, we argue that the effect of sociopolitical factors on cost stickiness is stronger for SOEs than for private companies. Similarly, the industries in which SOEs operate are more strongly affected by sociopolitical interventions and considerations. Firms operating in strategic industries such as utilities, electricity, mining, and defence will likely have higher labour cost stickiness because they are usually more technology-intensive than non-strategic industries and rely more on skilled employees (Prabowo *et al*., 2018).

Similarly, Boubakri *et al*. (2009) state that operating in strategic industries puts SOEs under greater public scrutiny and more intense government intervention. This sociopolitical pressure will likely increase labour cost stickiness in larger firms, as SOE managers are reluctant to adjust labour costs downward when sales decline. Therefore, the second and third hypotheses are formulated as follows:

H3. The effect of state ownership on labour cost stickiness is more pronounced in strategic industries than in non-strategic industries.

Methodology

The present research is a quantitative study with an ex post facto design. The population consists of the firms listed on the Tehran Stock Exchange (TSE) from 2011–2021. TSE board reports are reliable information sources (Nassirzadeh *et al*., 2022; Shandiz *et al*., 2022; Daryaei *et al*., 2022; Namakavarani *et al*., 2021). Investment firms, insurance companies, banks, financial institutions, and holding and leasing companies are excluded due to the specific nature of their activities. The inclusion criteria are (1) data availability, (2) continuous trading over the studied period, and (3) fiscal year-end matching calendar year-end (21

March). Overall, 151 firms (1,661 firm-years) are used as the sample. The sample selection procedure is presented in Table 1.

The study employs a quantitative research design, using data from 151 firms listed on the Tehran Stock Exchange (TSE) between 2011 and 2021, with 1661 firm-year observations. The research utilises multiple linear regression models with year, and industry-fixed effects to test the hypotheses concerning the relationship between state ownership and labour cost stickiness across strategic and non-strategic industries. The research design is appropriate for this study as it examines the moderating role of industry type in the relationship between state ownership and labour cost behaviour. The study ensures that specific firm characteristics do not drive the findings by employing robust econometric techniques, including asset intensity, employee intensity, and firm size controls. The use of longitudinal data also strengthens the reliability of the results, providing a comprehensive analysis of labour cost behaviour over time.

The data related to the variables of interest are collected from Rahavard Novin software and the audited financial statements of TSE-listed firms. Multiple linear regression with year and industry fixed effects is used to analyse the data and test the hypotheses.

The research design ensures that the results are not driven by specific firm characteristics in the two samples (strategic and non-strategic industries). By including key control variables such as asset intensity, employee intensity, firm size, and firm age in the regression models, the study mitigates the potential influence of these characteristics on the results. Additionally, using year and industry-fixed effects controls for unobserved heterogeneity across firms and industries ensures robust relationships between state ownership, industry type, and labour cost stickiness. The findings confirm that the characteristics and number of firms in the two samples do not disproportionately affect the results, as the models consistently show significant effects of state ownership and industry type on labour cost behaviour.

Model specification

Following Prabowo *et al*. (2018), the regression models below are used to test the first hypothesis regarding the effect of state ownership on labour cost stickiness:

$$\begin{aligned}\Delta \ln LaborCost_{it} = {} & \beta_0 + \beta_1 \Delta \ln Sales_{it} + \beta_2 Dec_{it} \times \Delta \ln Sales_{it} \\ & + \beta_3 StOwn_{it} \times Dec_{it} \times \Delta \ln Sales_{it} + \beta_4 StOwn_{it} + \beta_5 AsInt_{it} \\ & + \beta_6 EmpInt_{it} + \beta_7 PreDec_{it} + \beta_8 Growth_{it} + \beta_9 \ln AGE_{it} + \beta_{10} Size \\ & + \beta_{11} Export_{it} + Industry + Year + \varepsilon_{it} \end{aligned} \quad (1)$$

where $\Delta \ln Sales$ denotes the natural log of annual change in sales revenue and $\Delta \ln LaborCost$ is the corresponding annual change in labour costs; *Dec* is a dummy variable that equals 1 if sales decrease in the current year and 0 otherwise; *StOwn* equals 1 for SOEs and 0 otherwise; *AsInt* is asset intensity; *EmpInt* is employee intensity; *PreDec* denotes sales changes in the last two years; *Growth* is GDP growth; $\ln AGE$ is the natural log of firm age; *SIZE* is firm size;

Table 1. Sample selection procedure

Description	*N*
Number of firms listed on TSE in 2021	348
Unavailable data (no trading over the period 2011–2021 and/or changes in fiscal year	(79)
Fiscal year-end not matching calendar year-end (21 March)	(55)
Banks, financial institutions, investment companies, insurance companies, and financial intermediaries	(63)
Final sample	*151*

Source(s): Authors' own work

Export is the logarithmic value of export sales; and *Industry*/*Year* dummies denote time and industry fixed effects. Change in sales ($\Delta Sale$) indicates changes in the level of activity that causes changes in labour costs. Following previous studies, logarithmic specifications reduce heterogeneity and facilitate the economic interpretation of the estimated coefficients. In addition, the ratio form for the dependent variable (change in labour costs) and the independent variable (change in sales revenue) improves firm comparability.

Similar to the first model, the following model is estimated to test the second hypothesis regarding the effect of strategic industries on labour cost stickiness:

$$\begin{aligned}\Delta \ln LaborCost_{it} = {} & \beta_0 + \beta_1 \Delta \ln Sales_{it} + \beta_2 Dec_{it} \times \Delta \ln Sales_{it} \\ & + \beta_3 StrInd_{it} \times Dec_{it} \times \Delta \ln Sales_{it} + \beta_4 StratInd_{it} + \beta_5 AsInt_{it} \\ & + \beta_6 EmpInt_{it} + \beta_7 PreDec_{it} + \beta_8 Growth_{it} + \beta_9 \ln AGE_{it} + \beta_{10} Size_{it} \\ & + \beta_{11} Export_{it} + IndustryDummy + YearDummy + \varepsilon_{it} \end{aligned} \quad (2)$$

StratInd equals 1 for firms operating in strategic industries and 0 otherwise.

To test the third hypothesis regarding the moderating effect of strategic industries on the relationship between state ownership and labour cost stickiness, first, the studied sample is divided into two parts (strategic and non-strategic industries) and then, Equation (1) is estimated for both subsamples and the regression coefficients are compared.

Variables and measurements

Labour cost stickiness. Like the model proposed by Anderson *et al*. (2003), the change in the natural log of labour costs measures labour cost stickiness.

$$\ln\left[\frac{Cost_{i,t}}{Cost_{i,t-1}}\right] = \beta_0 + \beta_1 \ln\left[\frac{Sales_{i,t}}{Sales_{i,t-1}}\right] + \beta_2 Dec * \ln\left[\frac{Sales_{i,t}}{Sales_{i,t-1}}\right] + \varepsilon_{i,t} \quad (3)$$

where $Cost_{i,t}$ and $Cost_{i,t-1}$ are the labour costs of firm *i* in the current year and the previous year, respectively; $Sales_{i,t}$ and $Sales_{i,t-1}$ are the net sales of firm *i* in the current year and the previous year, respectively, and *Dec* is equal to 1 if $Sales_{i,t} > Sales_{i,t-1}$, and 0 otherwise.

Since the *Dec* dummy equals 0 when the sales level increases, the coefficient β_1 in the stickiness, models represent the percentage increase in costs due to a 1% increase in sales. Moreover, since *Dec* equals 1 when the sales level decreases, $\beta_1 + \beta_2$ represents the percentage decrease in costs due to a 1% decrease in sales. If costs are sticky, the percentage increase in costs in periods of increased sales should be more significant than the decrease in costs in periods of decreased sales. In other words, $\beta_1 > 0$ and B2 $\beta_2 < 0$.

State ownership. Following Micco *et al*. (2007), firms where more than 50% of shares are directly or indirectly owned by the government are considered state-owned.

Strategic industry. Following Yu *et al*. (2022), chemicals, basic metals, metal products and minerals, automobile and parts manufacturing, electrical/industrial machinery, non-metallic minerals and extraction, and petroleum are considered strategic industries.

Control variables. Following prior research (e.g. Anderson *et al*., 2003; Chen *et al*., 2012; Prabowo *et al*., 2018), several control variables that affect cost stickiness at the firm level are included in the models described in Table 2.

Findings

Descriptive statistics

As shown in Table 3, mean changes in the natural log of labour cost ($\Delta \ln LaborCost$) and of sales ($\Delta \ln Sales$) are 0.175 and 0.223, respectively. About 58% of the sample firms are state-

Table 2. Control variables affecting cost stickiness at the firm level

Variable	Proxy	Measurement
Asset intensity	*AsInt*	Total assets divided by net sales
Employee intensity	*EmpInt*	Total number of employees divided by net sales
Changes in sales	*Dec*	A dummy variable that equals 1 if $Sales_t < Sales_{t-1}$, and 0 otherwise
GDP growth	*Growth*	Annual percentage of GDP growth
Firm age	ln *Age*	Natural log of the number of years since the establishment of the firm
Firm size	ln *Size*	Natural log of market value of equity
Export ratio	*Export*	Export sales are divided by net sales

Source(s): Authors' own work

Table 3. Descriptive statistics of the variables

Variables	Observations	Mean	Median	SD	Min	Max
Δln *LaborCost*	1,661	0.1758	0.1777	0.2068	0.8281	−0.5383
Δln *Sales*	1,661	0.2232	0.2123	0.3387	1.3543	−0.7946
StOwn (dummy)	1,661	0.4728	0.5600	0.3417	0.9539	0.0000
StOwn Percent	1,661	0.5756	1.0000	0.4944	1.0000	0.0000
AsInt	1,661	1.4519	1.2399	0.9574	6.4993	0.2761
EmpInt	1,661	0.0004	0.0003	0.0005	0.0028	0.0000
PreDec	1,661	0.2125	0.0000	0.4092	1.0000	0.0000
Growth	1,661	1.2544	2.6500	3.6940	8.8200	−3.7500
Age	1,661	39.7916	42.0000	13.2106	65.0000	14.0000
ln *Age*	1,661	3.6182	3.7377	0.3801	4.1744	2.630
Size	1,661	14.7707	14.4331	1.91830	19.5554	11.0630
Export	1,661	0.1147	0.0192	0.2010	1.0000	0.0000

Source(s): Authors' own work

owned. The results also show that mean asset intensity (*AsInt*) and employee intensity (*EmpInt*) are 1.451 and 0.0004, respectively. In addition, the change in sales over the last two years (*PreDec*) is 21%. The GDP growth rate over 11 years is equal to 1.254, and the mean age of the sample firms is approximately 39 years, with a maximum of 65 and a minimum of 14. Finally, the results show that the mean firm size and exports to sales ratio are 14.770 and 0.114, respectively.

Table 4 reports the frequency distribution of the binary variables. According to the results, state ownership has 956 and strategic industries 891 observations. Also, the frequency of sales changes in the last two years is 353.

The correlation coefficients reported in Table 5 indicate a significant positive correlation (0.3504) between changes in the natural log of sales and changes in the natural log of labour costs. Moreover, the correlation between the interaction of changes in sales compared to the

Table 4. Frequency distribution of the binary variables

Variables	Frequency	Percentage
StOwn	956	58%
StratInd	891	53%
PreDec	353	21%

Source(s): Authors' own work

Table 5. Correlation coefficients between the variables

Var	1	2	3	4	5	6	7	8	9	10	11	12	VIF
1	1												–
2	0.3504*	1											2.02
3	−0.2255*	0.6669*	1										2.16
4	−0.0088	−0.0424	0.0433	1									1.09
5	0.0053	0.0283	−0.0955*	−0.0997*	1								1.06
6	−0.0995*	−0.2672*	−0.4216*	−0.0953*	−0.0123	1							1.95
7	−0.1977*	−0.3173*	−0.2955*	−0.1334*	−0.0041	0.2780*	1						1.1
8	−0.0898*	−0.0328	−0.0612	−0.0303	0.0639*	0.1580*	0.1535*	1					1.1
9	−0.1270*	−0.0484	0.0605*	−0.0021	0.0012	0.0081	−0.0457	0.1265*	1				1.05
10	0.0019	0.0368	−0.0507*	−0.1904*	0.0417	0.0962*	−0.0919*	0.0104	0.0298	1			1.08
11	0.2157*	0.2504*	0.0914*	0.0241	0.0896*	0.0946*	−0.5919*	−0.1696*	0.05008	0.1475*	1		1.92
12	−0.0012	−0.0105	−0.0393	0.0253	0.1078*	0.0418	−0.0488*	0.0186	−0.0088	−0.0174	0.1445	1	1.04

Note(s): *Significance at the 0.05 level
Variables: 1 = $\Delta \ln$ *LaborCost*; 2 = $\Delta \ln$ *Sales*; 3 = $\Delta \ln$ *Sales* × *Dec*; 4 = *StOwn*; 5 = *StratInd*; 6 = *AsInt*; 7 = *EmpInt*; 8 = *PreDec*; 9 = *Growth*; 10 = $\ln$ *Age*; 11 = *Size*; 12 = *Export*
Source(s): Authors' own work

previous year and changes in the natural log of labour costs is negative and significant (−0.225). This indicates the potential stickiness of salaries and wages. However, the coefficients β_1 and β_2 The regression model should also be looked at. Another finding is that no significant correlation exists between operating in strategic industries and changes in the natural log of labour costs. In addition, changes in the natural log of labour costs are negatively correlated with asset intensity, employee intensity, changes in sales in the last two years, and GDP growth rate but positively correlated with firm size. The explanatory variables' variance inflation factor (VIF) values are between 0 and 5, indicating no significant multicollinearity between independent and control variables.

Hypothesis testing

Research models use ordinary least squares (OLS) multivariate regression with year and industry-fixed effects. The results show that the models fit the data well (F statistic) and that OLS is the best-fitting model (the Chow statistic is insignificant). The fit of Model 1 for testing the first hypothesis is provided in Table 6.

The results in Table 6 indicate sticky cost behaviour in the sample firms since the coefficient of $\Delta \ln Sales$ is positive (0.149) and significant (0.000), while the coefficient of $\Delta \ln Sales \times Dec$ is negative (−0.143) and significant (0.004). On average, labour costs increase by 0.149% for a 1% increase in net sales but only decrease by 0.006% (0.149 − 0.143) for a 1% decrease in net sales. The results also show that the coefficient of $\Delta \ln Sales \times Dec \times StOwn$ is negative (−0.114) and significant (0.055), indicating a significant difference in labour cost stickiness in SOEs compared to private firms. That is, SOEs exhibit higher labour cost stickiness than private firms. Hence, the first hypothesis regarding the positive effect of state ownership on labour cost stickiness is accepted at the 90% confidence interval (CI). As for the control variables, the results indicate that firms with higher asset intensity exhibit less labour cost stickiness, but the interactive effects of other control variables are not significant. The estimation results for the second hypothesis are provided in Table 7.

Table 6. Results of fitting model 1 (first hypothesis)

Variables	Coefficient	SE	Statistic	Sig
Constant	−0.117	0.064	−1.83	0.070
$\Delta \ln Sales$	0.149	0.023	6.48	0.000
$\Delta \ln Sales \times Dec$	−0.143	0.081	−1.77	0.004
$\Delta \ln Sales \times Dec \times StOwn$	−0.114	0.059	−1.93	0.055
StOwn	−0.007	0.009	−0.78	0.422
AsInt	−0.007	0.006	−1.2	0.315
EmpInt	25.628	14.007	1.83	0.069
PreDec	−0.032	0.011	−2.90	0.003
Growth	−0.017	0.007	−2.43	0.026
$\ln Age$	−0.021	0.010	−2.10	0.044
Size	0.015	0.003	5.81	0.000
Export	−0.024	0.022	−1.10	0.275
Year fixed effects	Controlled			
Industry fixed effects	Controlled			
Robust standard errors	Clustered at the firm level			
No. observations	1,661			
Coefficient of determination (R^2)	0.386			
F statistic (sig.)	56.98 (0.0000)			
Chow test statistic (sig.)	0.61 (0.999)			
Wiggins−Poi test statistic (sig.)	395.35 (0.000)			
Wooldridge test statistic (sig.)	5.424 (0.021)			

Source(s): Authors' own work

Table 7. Results of fitting model 2 (second hypothesis)

Variables	Coefficient	SE	Statistic	Sig
Constant	−0.086	0.064	−1.34	0.179
$\Delta \ln Sales$	0.152	0.023	6.61	0.000
$\Delta \ln Sales \times Dec$	−0.236	0.102	−2.31	0.022
$\Delta \ln Sales \times Dec \times StratInd$	0.218	0.100	−2.18	0.031
StratInd	0.002	0.039	0.05	0.969
AsInt	−0.007	0.006	−1.17	0.278
EmpInt	24.244	13.840	1.75	0.082
PreDec	−0.030	0.010	−2.96	0.004
Growth	−0.025	0.008	−3.13	0.001
$\ln Age$	−0.020	0.010	−2.01	0.046
Size	0.015	0.003	5.71	0.000
Export	−0.025	0.021	−1.19	0.247
Year fixed effects	Controlled			
Industry fixed effects	Controlled			
Robust standard errors	Clustered at the firm level			
No. observations	1,661			
Coefficient of determination (R^2)	0.388			
F statistic (sig.)	103.37 (0.0000)			
Chow test statistic (sig.)	0.61 (0.999)			
Wiggins−Poi test statistic (sig.)	395.83 (0.000)			
Wooldridge test statistic (sig.)	4.988 (0.027)			

Source(s): Authors' own work

The results of fitting Model 2 indicate the coefficient of the interaction. $\Delta \ln Sales \times Dec \times StratInd$ is negative (−0.218) and significant (0.031). This suggests that labour cost stickiness is higher in firms operating in strategic industries than non-strategic ones. Therefore, to test the third hypothesis regarding the moderating effect of industry type (strategic/non-strategic) on the relationship between state ownership and labour cost stickiness, the first model is estimated once for strategic firm years and once for non-strategic firm years. The results are provided in Table 8.

According to the results in Table 6, when the sample firms are classified into strategic and non-strategic industries, the sticky cost behaviour of the firms decreases. The coefficient of the interaction $\boldsymbol{\Delta \ln Sales \times Dec \times StOwn}$ is negative (−0.017) and significant (0.029) in strategic industries but negative and non-significant in non-strategic industries. Therefore, the third hypothesis regarding the effect of industry type (strategic/non-strategic) on the relationship between state ownership and labour cost stickiness is confirmed.

Discussion and conclusion

This study is original in its focus on the relationship between state ownership and labour cost stickiness in developing economies, particularly in strategic industries. While previous research has explored cost behaviour in private firms and developed economies, this study extends the analysis to SOEs operating in sectors of strategic importance. The research also introduces the moderating role of the industry type, offering new insights into how industry characteristics influence labour cost stickiness. Focusing on Iran, a country with a mixed economic system and a significant public sector presence, this study provides a unique perspective on the interplay between state ownership, sociopolitical objectives, and cost management in developing economies.

The paramount objective of businesses is to enhance profitability, foster growth, and optimise cost structures—a process contingent on effective decision-making, strategic planning, and robust management control systems. In light of these imperatives, our study

Table 8. Estimation results for model 1 by industry type (third hypothesis)

Variables	Strategic industries		Non-strategic industries	
	Coefficient	Sig	Coefficient	Sig
Constant	0.013	0.912	−0.141	0.100
Δln *Sales*	0.163	0.000	0.127	0.008
Δln *Sales* × *Dec*	−0.002	0.972	−0.400	0.009
Δln *Sales* × *Dec* × *StOwn*	−0.017	0.029	−0.309	0.135
StOwn	−0.008	0.572	−0.007	0.532
AsInt	−0.001	0.874	−0.010	0.489
EmpInt	5.720	0.728	44.448	0.035
PreDec	−0.035	0.013	−0.027	0.152
Growth	−0.042	0.093	−0.014	0.121
ln *Age*	−0.025	0.081	−0.018	0.164
Size	0.012	0.000	0.016	0.003
Export	−0.015	0.563	−0.049	0.275
Year fixed effects	Controlled		Controlled	
Industry fixed effects	Controlled		Controlled	
Robust standard errors	Clustered at the firm level		Clustered at the firm level	
No. observations	891		770	
Coefficient of determination (R^2)	0.423		0.368	
F statistic (sig.)	59.96 (0.000)		114.51 (0.0000)	
Chow test statistic (sig.)	0.56 (0.999)		0.70 (0.967)	
Wiggins−Poi test statistic (sig.)	151.43 (0.000)		231.10 (0.000)	
Wooldridge test statistic (sig.)	10.176 (0.002)		0.202 (0.654)	

Source(s): Authors' own work

delves into the relationship between state ownership and labour cost stickiness, considering the moderating impact of industry type on this association. This investigation fills a crucial gap in the literature, especially within the context of developing countries, where distinct political and economic circumstances shape the performance of State-Owned Enterprises (SOEs).

Our empirical analysis, encompassing 1,661 firm-years of data from the Tehran Stock Exchange between 2011 and 2021, underscores that SOEs exhibit higher labour cost stickiness than private firms. This aligns with previous research (Megginson, 2005; Prabowo *et al*., 2018; Cohen *et al*., 2017; Hall, 2016), emphasising that SOEs, driven by sociopolitical goals, tend to preserve employment and resist cost adjustments during economic downturns.

Moreover, our findings reveal that industry type significantly influences cost stickiness, with strategic industries exhibiting greater stickiness. Strategic sectors, characterised by technical complexity and reliance on critical infrastructure, present challenges in adjusting costs proportionally to activity or income. This aligns with Agency Theory's tenets, emphasising external factors' influence on managerial decisions within SOEs.

Iran's mixed economic system, with a sizable public sector, further accentuates the impact of state ownership on cost stickiness, particularly in strategic industries. The government's role in managing critical infrastructure limits cost flexibility, contributing to higher cost stickiness. Our study underscores the need for industry-specific strategies to address this issue, aligning with the recommendations of Agency Theory.

This study contributes several contributions to the literature on labour cost behaviour and state ownership. First, it provides empirical evidence on the relationship between state ownership and labour cost stickiness, particularly in developing economies where the political and economic environment is distinct from that of developed countries. Second, the study contributes by examining the moderating effect of the industry type, highlighting the differences between strategic and non-strategic industries in terms of labour cost behaviour. Third, this research advances the application of Agency Theory in the context of SOEs, offering new insights into how sociopolitical pressures influence cost management decisions.

Lastly, it contributes to the practical understanding of cost behaviour in state-owned firms, providing valuable implications for policymakers, especially in countries where state ownership is prevalent in critical sectors.

In conclusion, the pronounced effect of state ownership on cost stickiness in strategic industries underscores the influence of sociopolitical considerations and government interventions, revealing a dynamic interplay in decision-making processes. Our study recommends reducing state ownership percentages and privatisation to enhance SOE performance, acknowledging industry-specific challenges. Future research avenues, considering behavioural biases and incentives within the framework of Agency Theory, can provide a deeper understanding of labour cost stickiness dynamics, especially during economic and political cycles in developing countries like Iran.

The findings of this study offer several policy implications. First, the higher labour cost stickiness observed in SOEs, particularly in strategic industries, suggests that government interventions to control costs in these firms may need to be reconsidered. Policymakers should focus on reducing state ownership or increasing privatisation in sectors where flexibility in cost management is essential for improving efficiency and competitiveness. Second, the study highlights the need for industry-specific policies, especially in strategic sectors where technical complexity and reliance on critical infrastructure increase labour cost stickiness. Government regulations should encourage more agile cost management practices in these industries, allowing SOEs to better adjust their cost structures in response to changes in economic conditions. Lastly, the results underscore the importance of balancing sociopolitical objectives with economic efficiency in SOEs, as excessive political intervention can hinder the financial performance of these firms.

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