

# Are Sustainable Growth Indicators in Gas Market Companies Comparable? The Evidence from China and Russia

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## Are Sustainable Growth Indicators in Gas Market Companies Comparable? The Evidence from China and Russia

### Abstract

This study explores examples of sustainable growth in Chinese and Russian natural gas companies. The topic of sustainable growth has become a priority focus for studies in market development. Company growth encounters many obstacles, and any such study necessitates a multivariate analysis of interrelated financial and non-financial factors.

The authors aim to highlight two fundamental issues in this study. The first is the choice of those indicators which characterise company growth. The second is the identification of factors that have a sustainable impact on growth. Additionally, we try to answer the question: “Are the sustainable growth factors of Russian and Chinese gas market companies comparable?”

The primary purpose of this study is to analyse Chinese and Russian gas market companies’ financial growth strategies using the ‘Geniberg Z-matrix’, as well as enhanced Financial Sustainability Indicators System indices by identifying which indicators have a greater influence on the Sustainable Growth Rate. The scientific novelty of this study is related to the process of constructing financial reports with a focus on sustainable factors, and the implementation of a sustainable financial growth matrix to the appropriate information of Chinese and Russian oil and gas companies.

Through this approach, a relationship between sustainable growth and energy companies’ financial strategy was confirmed. Chinese and Russian gas companies’ financial growth strategy was analysed by employing the Geniberg-Z matrix as well as enhanced Financial Sustainability Indicators System indices. We found that ROCE, WACC, ROL, and CG-Dummy influence Chinese gas companies’ sustainable growth rate and recommended the implementation of an FSIS calculation. In the same way, ROCE, ROFA, CR, DOL, ROL influence Russian gas companies’ sustainable growth rate, and we recommend an FSIS calculation. Evaluation results also show that Chinese and Russian gas companies are financially attractive and have stable results, but could improve their financial strategies from a sustainable growth perspective.

**Keywords:** Chinese gas market companies, Russian gas market companies, Sustainable Growth Rate (SGR), Geniberg Z-matrix

**JEL classification:** G32, F30, M21, Q01, Q40

## Introduction

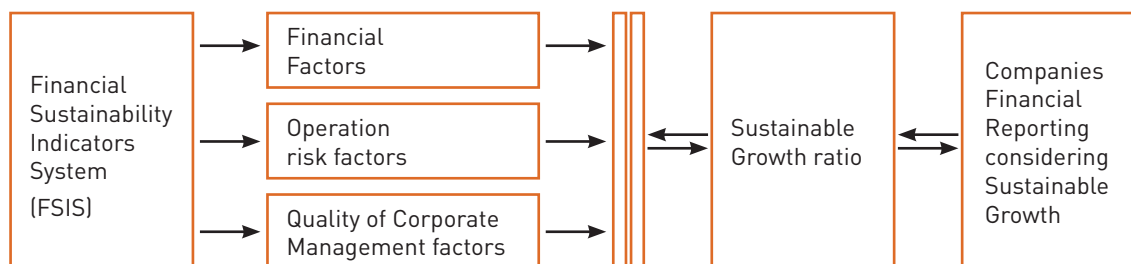
Nowadays, we pay much attention to the problems of justifying the choice of evaluation criteria and analysing the effectiveness of a company’s methods. An approach based on the concept of sustainable growth is becoming increasingly popular. However, the debate about the importance of this concept and its impact on company efficiency continues apace. This is justified, in our opinion, for the following reasons: (a) all companies and industries are unique and have their own individual set of sustainable growth factors, which does not allow us to single out a “standard” set of sustainable growth factors; (b) there is no generally accepted methodology for assessing the impact of sustainability factors on companies’ performance; and (c) many companies do not follow non-financial reporting according to GRI standards, which significantly complicates analysis and synthesis [1]. In this paper, we will try to fill this gap for the oil and gas industry.

The objective of the present study is to analyse the biggest Chinese and Russian gas market companies’ growth for ten years and try to assess the impact of other criteria on

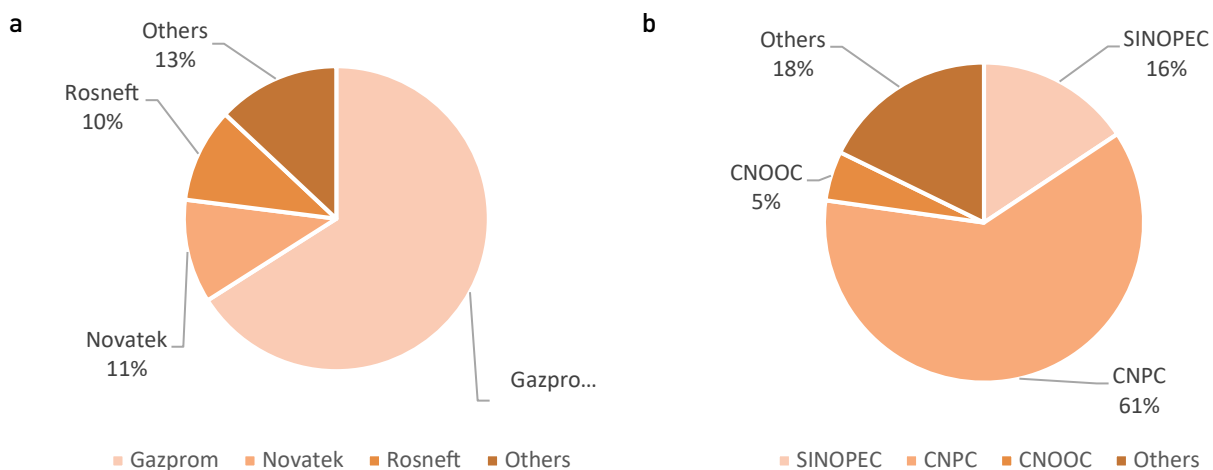
sustainable growth. The research innovation (see Fig.1) of this study consists of an enhancement of finance management methodical tools (FSIS) brought to bear on Chinese and Russian gas market companies, and applied according to appropriate sustainable growth patterns. As a rapid growth of investment leads to rapid company growth, the critical task for Chinese and Russian gas companies concerns the analysis of the companies’ sustainable growth. Different terms have been used by different authors to define companies’ growth stages, but the stages through which each company passes remain more or less the same ensuring planning and securing the future growth should match company’s financial capabilities [2].

‘Gibrat’s law’ (as referenced in many prior studies) was not confirmed, so there was still a necessity of seeking the factors influencing companies’ sustainable growth. The importance of that particular problem is that growth is a qualitative characteristic, but it must be measured somehow. We suggest a set of measures which have a greater effect on sustainable growth and a strong emphasis on a financially sustainable index system [1, 3, 4].

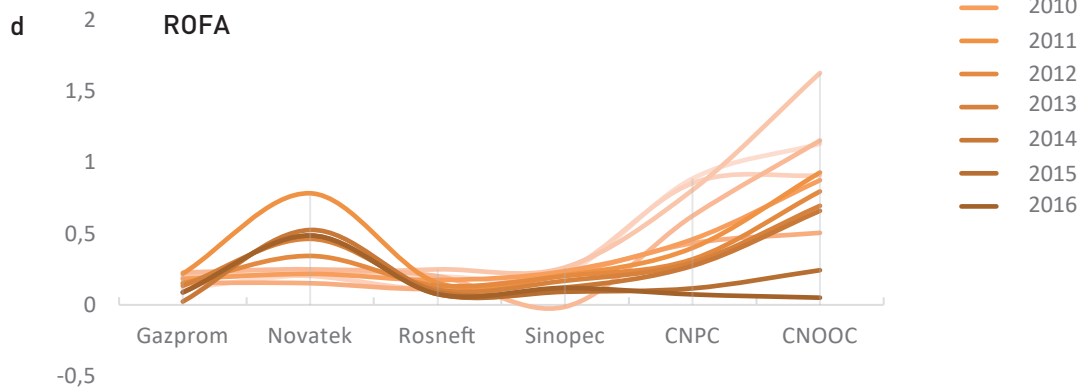
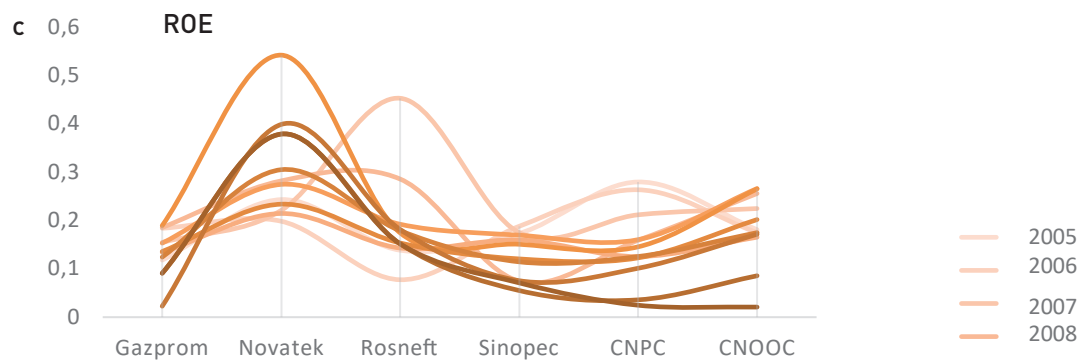
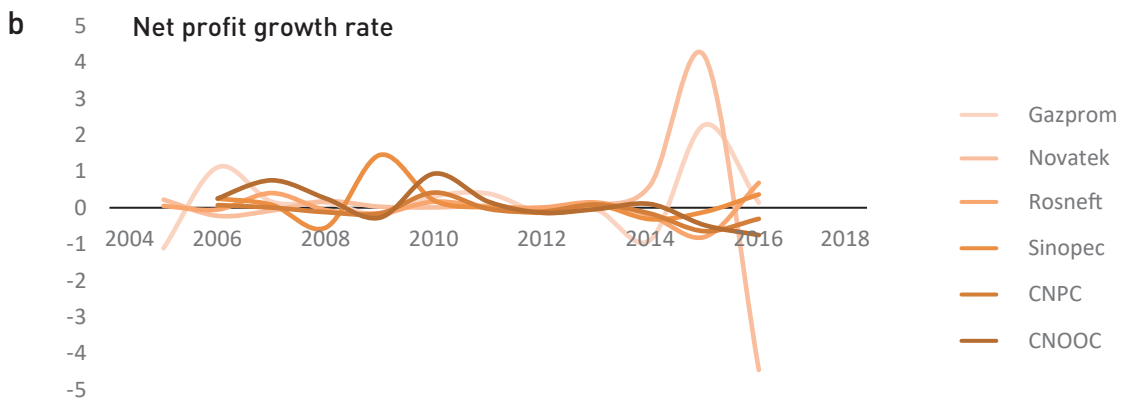
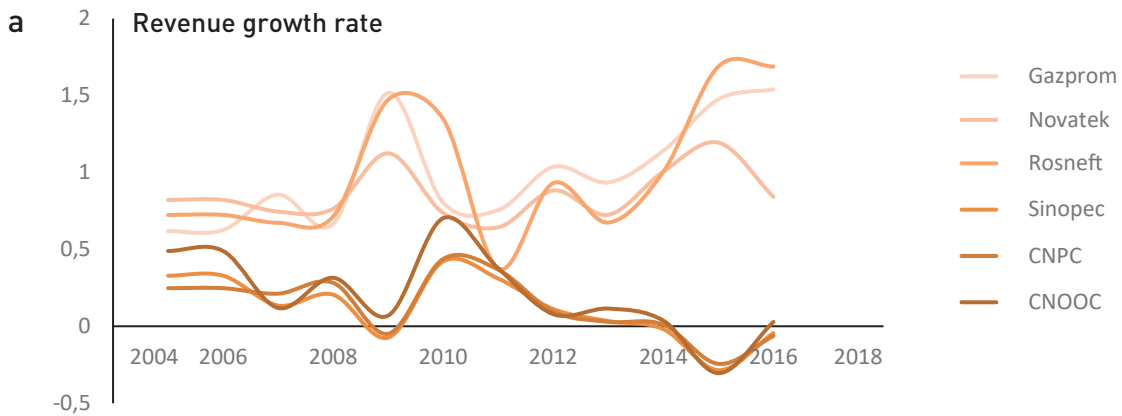
**Figure 1.** Research Scheme



**Figure 2.** A look at Russian (a) and Chinese (b) petroleum companies and their shares of the national gas market, 2016. Data sources: Annual report of Gazprom/Novatek/Rosneft (2016), BP China, Annual Report of Sinopec/CNPC/CNOOC (2016)



**Figure 3.** Chinese and Russian gas market companies' financial coefficients in dynamics: (a) Revenue growth rate, (b) Net profit growth rate, (c) ROE, (d) ROFA



For this purpose, we modified a Sustainable Growth Ratio (further referred to as SGR). According to the Financial Sustainability Indicators System (FSIS), inputted financial indices representing the present authors' point of view can help to improve a company's financial strategy very efficiently.

For this Study we considered the financial data from the biggest Chinese and Russian companies in the natural gas market. The study focuses on a ten-year period between the years 2005 and 2016. The leader in gas production among Russian companies is Gazprom, which holds the world's largest natural gas reserves, and holds shares in the global and Russian reserves amounting to 17 percent and 72 percent respectively. As of December 31, 2016, the group's domestic A+B1+C1 hydrocarbon reserves (according to the Russian Energy Ministry's standards) amounted to 36,443.9 billion m<sup>3</sup> of gas and 1,534.9 million tons of gas condensate. In 2016 Gazprom extracted 419.1 billion m<sup>3</sup> of gas, which represented a share of total global and Russian gas production amounting to 11 percent and 66 percent respectively [5]. The second largest Russian gas company is Novatek, with 67.8 billion m<sup>3</sup> of gas extracted in 2016, which constituted 10.5% of total Russian production [6]. Rosneft and Lukoil take the third and fourth places by market share, respectively.

The top three leaders in gas production among Chinese companies are CNPC, Sinopec and CNOOC, which hold the most substantial part of natural gas reserves in China, with total reserves amounting more than 80 percent of the national gas industry [7]. CNPC takes first place in terms of gas production, which accounts for more than 60% of gas production in China. In 2016, it was responsible for 541.9 billion m<sup>3</sup> of proven gas reserves in China. Its annual gas production totaled 98.1 billion m<sup>3</sup>, an increase of 2.6 billion m<sup>3</sup> year-on-year. By the end of 2016, CNPC operated 51,734 kilometers of pipelines for natural gas, accounting for 75.8% of China's total.

Fig. 3 shows the financial condition of these Chinese and Russian companies' revenue growth rate, net profit growth rate, ROE, ROFA in dynamics.

The second-largest Chinese gas company is Sinopec. In 2016, the newly-increased natural gas controlled reserves in Sinopec were measured at 288.1 billion m<sup>3</sup>, and predicted reserves were 399.7 billion m<sup>3</sup>. In the whole year, they produced 21.59 billion m<sup>3</sup> of gas, increasing by 894 million tons (a rise of 4.3%). Annual newly established capacity for natural gas was 3.64 billion m<sup>3</sup>. CNOOC took third place by market share having produced 245 million m<sup>3</sup> of gas.

## Literature review and hypothesis

There are three questions concerning financial strategy which influence decision making. These are, (1): which long-term investments should be executed (capital budgeting), (2): how the company will earn funds to finance (capital structure), and (3): how does the company man-

age its cash flow in carrying out operations day by day (working capital management) [8]. All of these questions directly reference the company's sphere of sustainable growth [9].

Usually sustainable growth is defined as the percentage of annual growth of sales that is in agreement with the company's established financial policies [10]. However, this definition has gone through many transformations over the last few decades, from revenue-oriented definitions to 'cost of company' definitions [9], as well as definitions involving social and environmental factors and similar implications [11-13]. According to the HBS1 study "The Impact of Corporate Sustainability on Organizational Processes and Performance", companies with a well-developed management culture focusing on sustainable growth achieve better results according to the following criteria: increase of share price (+2.7 percent); return on equity (+3,5%); and return on assets (+1.6 percent) [14]. In their studies, Hall (1987), Geroski (1997) have used the change of number of employees as an indicator to measure the growth of a company [15, 16].

Also, many researchers have paid attention to analysis of the corporate governance factor influence on sustainable growth [17-19]. However, the majority of authors reference the company's financial statements when examining growth criteria. For example, Singh Whittington (1975) examined the carrying value of net assets as a criterion of growth, Berry (1971) examined the book value of total assets, while Varaiya, Kerin, and Weeks (1987) looked at net profit. C. Joseph and George Miller, exploring the factors of growth pertaining to small business, pointed to steady annual increases in profits [20, 21]. Brush, Bromiley, and Hendricks (2000), Stuart (2000), and Geroski, Machin, and Walters (1997) (and many others scientists) looked at the growth of the company's increased revenues, both through organic development and through acquisitions in the core business of the company and beyond [3].

When considering financial growth, we consider increases in revenue from product sales, total assets, profit, equity, etc. [1, 22, 23]. But is financial growth sustainable or not? Nowadays, it is considered the most important question for every company [24, 25]. In order to describe a system of Financial Sustainability Indicators it is necessary to summarize the ideas of the research: main subject of study is the company' operation; a key characteristic of the functioning of the company is financial sustainability. Financial sustainability is widely interpreted as a condition of dialectical equilibrium in which the company is able to retain its quality in terms of dynamic environment and internal transformations and at the same time to ensure growth and the achievement of corporate goals. A key feature of a company's potential is the performance quality, which can be the basis of a sustainable growth strategy. The system of financial sustainability indicators (FSIS) includes organisational, market, operational and financial sustainability indicators. The system of indicators characterises the present condition of the company and prospects for improving the quality of its operating.

The system of financial sustainability indicators includes the following characteristics: quality of products/ services; quality of the company management; financial condition of the company (asset quality, resource potential, profit and profitability); and operating indicator (economic) risks. The core block of the represented system is a system of financial indicators. 'Financial condition' is not only a concept in classical financial analysis but also an instrument of sustainable growth in social and environmental spheres. In this indicator system, two components - product/service quality and management quality - are universal. Other operational risk factors, which take into account specific features of business, are considered in the block of indicators named "Operational risk". Among operating risks we suggest to consider a few types of risks: personnel risk, reputation risks, transportation risks, natural and environmental risks, political risks. Factors of managerial risks are included in a system of indicators named "Management quality" [26, 27].

This paper systematises the results of theoretical and empirical research devoted to the study of companies' sustainable growth and financial and non-financial indicators, which can influence sustainable growth. Previous research does not account for the interrelations between key corporate structures, each of which is related to energy return on investments, return on labor or environmental ratings concerning Russian and Chinese gas companies. But the main goal of this study is to examine the financial strategy of the six biggest Chinese and Russian natural gas market companies with an emphasis on analysing interrelations between financial and non-financial factors, in order to better understand how to improve sustainability. Therefore, we focus on the identification of how financial architecture patterns relate to energy, social and environmental factors among the examined companies and have formulated the following hypotheses:

*Hypothesis 1.* The Chinese and Russian companies operate in different countries, but a similar market share correlates with similar financial growth strategy results.

*Hypothesis 2.* The Sustainability Growth Rates will provide similar results and have a positive relationship with the supposed coefficients for the FSIS in Russian Companies: ROFA, CR, NPG, DER, WACC, RER, RDS, EROI, ER, and Corporate Government Dummy.

## Data and Methodology

After considering all methodological instruments for financial sustainable growth evaluation, the research methodology we selected was the financial evaluation coefficient suggested by Higgins, as well as Ivashkovskaya's modified coefficients. Methods of research were used as general scientific methods of research (the analysis, synthesis, comparison, graphics), and special methods (statistical methods of the analysis, coefficient method).

## Population and sample

This study considers the biggest Chinese and Russian natural gas companies' financial data. The study examines a ten years period between the years 2005 and 2016. Data was collected from the annual reports of the three biggest Russian gas market companies (Gazprom, Novatek) [5, 6, 28] and (Rosneft) [29], for the year 2016. The market share for these companies is 88.6% [31] of the total Russian natural gas market [31-32] (see Fig 2 (a)). Similarly, data was collected from the annual reports of the three biggest Chinese gas market companies Sinopec, CNPC, CNOOC [33-35] (see Fig 2 (b)).

## Suggested set of Financial Sustainability Index System (FSIS) coefficients

In this research, we want to utilise the Financial Sustainability Indicators System (FSIS) and test which indicators have the most significant influence on sustainable growth. After previously analysing financial coefficients like ROA, NWCT, NWC, DOL, FL, CL, RG, ROE, ROCE, EBIT, ROL, and others, we decided to choose those few coefficients that we considered to be most suitable for testing in this case (see Tab 1, Appendixes 1-4).

**Table 1.** Russian Gas Companies' "sustainable financial and non-financial indicators" for testing influences on the Sustainable Growth Rate

System Dynamic Model Sustainable Growth areas	Financial Sustainability Indicators System (FSIS)	Financial Sustainability Indicators System (FSIS)- financial factors	Proxy	Calculation method
		Sustainable Growth Rate	SGR	$RM * AT * FL * R$
Economy	Financial factors	Return On Capital Employed	ROCE	$EBIT / (Total Assets - Current Liabilities)$
		Return on Fixed Assets	ROFA	$EBIT / Fixed Assets$
		Current Ratio	CR	Current assets/current liabilities

System Dynamic Model Sustainable Growth areas	Financial Sustainability Indicators System (FSIS)	Financial Sustainability Indicators System (FSIS)- financial factors	Proxy	Calculation method
Economy	Financial factors	Net profit growth	NPG	An increase of a company s net profit when compared to a previous quarter s net profit performance
		Net assets growth	NAG	An increase of a company s net assets when compared to a previous quarter s net assets performance. Net assets=Total assets-Total Current liabilities
		Operation leverage degree	DOL	% change in EBIT/% change in Revenue
		Weighted Average Cost Of Capital	WACC	$WACC = rE \times kE + rD \times kD \times (1 - T)$
Environmental	Operational risks	ROL	ROL	Net profit/ number of employees× 100%
Corporate	Quality of the Company Management	Corporate Governance Variables	CGDummy	Increase/reduction in the membership of the Board of Directors

To calculate the SGR, we have chosen Higgins’ sustainable growth index calculations [10]. The SGR formula is a valuable planning tool because it emphasises the relationship between the four factors described above and the SGR. It is also clear that if a company does not want to issue shares or change either its profitability, asset turnover, financial gearing or dividend policy, it shall have only one SGR [36]. An actual growth rate in sales different from the sustainable growth rate is inconsistent with a fixed financial policy and, like it or not, companies will be unable to maintain financial targets under these circumstances. An actual growth rate below the sustainable growth rate implies that the company has more than enough capital to meet its investment needs and calls for an increase in liquid assets, a reduction in leverage, or an increase in dividends [10].

Sustainable Growth Rate (SGR) Formula:

$$SDR = RM \times AT \times FL \times R, \quad (1)$$

where *RM* – Return on Sales,

*AT* – Asset Turnover

*FL* – Financial Leverage

*R* – Savings norm (1 – (Dividends/ Net profit))

### For Financial Strategy Growth evaluation

We consider the most comprehensive method for Russian gas companies’ Financial Sustainable Growth Strategy analysis is the methodology referenced at [22, 32]. The main aspect of the theory of Ivanova, Geniberg, and Polyakova is the emphasis on a distinction between financial policy and funding [1], using the interrelation scheme of assets’ profitability, products’ profitability and the “Du

Pont” model. Russian scientists developed the Z-matrix for financial strategy growth formation based on the BCG SGR. The Z-matrix consists of four parts and is based on an assessment of the revenue growth rate and financing growth rate (Fig.3). The matrix is divided into four squares by an average SGR growth and G (revenue growth). The average tempo is calculated according to the geometric average tempo:

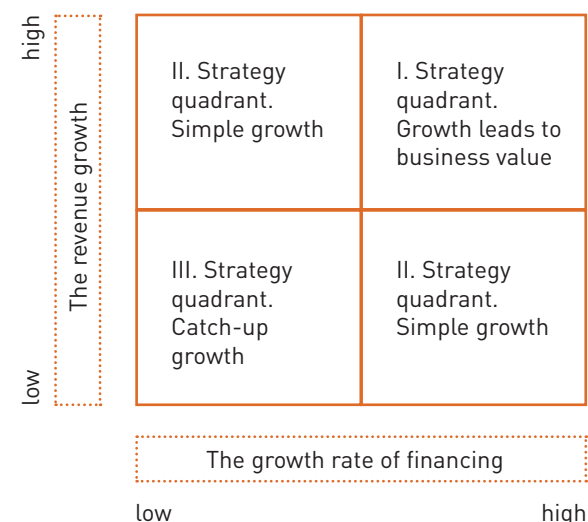
$$1 + r_{gm} = \sqrt[n]{G(1 + r_i)}, \quad (2)$$

where *r<sub>gm</sub>* – average geometric growth,

*r* – growth rate per year,

*n* – number of years.

Figure 4. Z-matrix Financial Sustainable Growth Model



To build the Z- matrix (Fig.3.) we address 4 calculations:

$$1) \text{ Revenue growth} = AT \times PM$$

(vertical axis of the Z matrix).

$$2) \text{ Financial growth} = FL \times \text{Rate of savings}$$

(horizontal axis of the Z matrix). The product of these indices reflects the growth rate of the financing of the company (profit).

3) The average values plotted on the axes are the result of the average meanings of the RR and FR of 4 Russian gas companies.

The results may show the following [32]:

I. Strategy Quadrant. This implies growth, leading to increased business value. In this case, the company has excess capital. A typical financial strategy is growth through internal funding sources. The company's level of retained earnings grows more rapidly than the Equity Growth Rate. In this case, the company (through internal funding sources), can increase sales growth and assets, but at the same time there may be a risk that a rise in sales could lead to gross profit increase. However, according to financial theory this growth will require increases in assets for increasing production volume. The company typically has to increase inventory, receivables, and other assets.

II. Strategy Quadrant. This reflects simple growth. The company is focused on an aggressive sales policy, as there is a high rate of revenue growth in conjunction with a less strict financial policy. The company is profitable because of increasing assets. The company may carry out financing of various investment projects. If none of the investment options is acceptable, the company need not provide additional funding, The company can use all the accumulated profit for dividends.

III. Strategy Quadrant. This quadrant reflects catch-up growth. This implies deficient performance. A typical strategic focus in this case would be a company reinvention strategy or a withdrawal from the market (or market segment). The company may invest in order to improve their position in the market, to invest for recovering lost position, or to reduce the level of investments. As stated, the company may require reinvention and leave the market (or market segment) if it cannot subsequently achieve significant competitive momentum.

IV. Strategy Quadrant. This implies that growth is leading to increased profits. The strategy in this instance is aimed at attracting funds from external sources, either through various kinds of loans or by increasing share capital (issued stocks or bonds). Besides, the bond issue is the highest priority, as it promotes credit rating formation.

To build the matrix it is necessary to perform the following steps [32]:

1) Evaluate the Revenue Growth Rate. This is calculated using the index AT and PM. A product of these indicators reflects the Sustainable Growth Rate (Revenue). The results of this calculation delay value on the vertical axis of the Z- matrix.

- 2) Evaluate the Financing Growth Rate. This is calculated using the FL and R indicators. A product of these indices reflects the company's Financing Growth Rate (Profit). Calculation results delay value on the horizontal axis of the matrix.
- 3) Industry average values plotted on the axes of the matrix are set according to the Russian Federal State Statistics Service.
- 4) Determine Quadrant 1-4, and identify how the company needs to work with the appropriate financial strategy to develop more specific recommendations for the its financial management.

This approach allows us to estimate the value of the business terms using growth in revenue and funding. Depending on Z-matrix results, the company must invest in those areas that are most competitive. This analysis is an effective mechanism for the consideration of opportunities for further investment expansion or reduction. The Z-matrix results can help a company's leaders evaluate their business to compare the attractiveness of different areas of financial activities and to determine the direction of cash flow.

## Hypothesis calculation

This study tests a number of variables.

Fundamental variables:

Fundamental variables refer to the basic independent variables in the analysis which are introduced as indicators of the company's growth. We have divided the fundamental variables into two further categories, those of financial and non-financial variables.

Financial factor variables: ROCE, ROFA, CR, WACC, NPG, NAG, DOL.

Operational risk factor variables (social, energy, environmental, etc.): ROL.

Non- fundamental variables:

Corporate governance was chosen as a variable to reflect the change in the total number of members of the Board of Directors for the first year:

$$CGdummy = \begin{cases} 1, & \text{if } (a) \\ 0, & \text{if } (b) \end{cases}, \quad (3)$$

where a – Board of Directors' members increase, b – other

To test this hypothesis, dummy variables were used according to the following regression model:

$$Y_i = a_1 + a_2 D_{2i} + a_3 D_{3i} + \beta X_i + u_i . \quad (4)$$

To test hypothesis 2, we constructed a regression model:

$$\ln y = b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + c , \quad (5)$$

where  $y$  – SGR

$\ln$  – natural logarithm;

$b_1, b_2, b_3, etc$  – coefficients



$x_1, x_2, x_3$  – dependence variable

(ROFA, CR, NPG, DERT, WACC, RER)

C – Dummy variable

The basic regression model is Russian scientist Irina Ivashkovskaya’s model. For this research, the regression model was modified.

$$SGR = aROCE + bCR + cNPG + dNAG + eWACC + fROFA + gDOL + gCGDummy \quad (6)$$

where SGR – Sustainable Growth Rate, ROCE- Return on Capital Assets; ROFA – Return on Fixed assets, CR – Current ratio, NPG – Net profit growth, NAG – Net Assets growth; WACC – Average cost of capital, ROL – Return on Labour; CG Dummy – corporate Dummy

## Results

### Hypothesis 1 results

We built a Financial Strategy Sustainable Growth Z-matrix for analysing financial strategy based on the concept of the sustainable growth model. The Z-matrix consisted of four parts, and was based on an assessment of the revenue growth rate and the financial growth rate. We can see that Russian gas companies’ actual revenue growth is higher than SGR growth. In other words, companies ignored financial limitations and prefer to operate in high risk situations.

The results of the analysis of Russian gas companies via the Z-matrix confirmed Ivashkovskaya’s research findings [9] that achieving sustainable growth was not only associated with profit growth. Fig. 5 shows that Gazprom’s performance between 2005 and 2013 was mostly founded in the Q1 range. This means Gazprom’s growth lead to a high business value. The company has a significant volume of capital. A typical financial strategy for Gazprom, in this case, is growth via internal funding sources. The company’s level of retained earnings grows more rapidly than the growth rate of equity. In this way, the company can increase the growth of sales and assets. However, at the same time, there may be a risk, for example in the event that a rise in sales could lead to profit increase, while the growth also requires increases in assets for increasing production volume. For sustainable growth, Gazprom must increase assets, because additional sales requires more labour and other investments [32]. If companies are not able to increase their growth, it may be because they do not have a material base for this (limited production capacity, limited financial resources or limited qualified labour resources). An increase in assets is accompanied by the growth of funding sources, either internally (R indicator in the calculation of the SGR) or externally (by borrowing). We can see that Gazprom’s 2014-2015 transfer to Q3 was characterized by a relatively deficient performance. However, from 2016, Gazprom again tries to move to the Q1 quadrant.

Figure 5. Company’s Z-matrix trajectory results, 2005-2016; (a) Gazprom, (b) Novatek, and (c) Rosneft

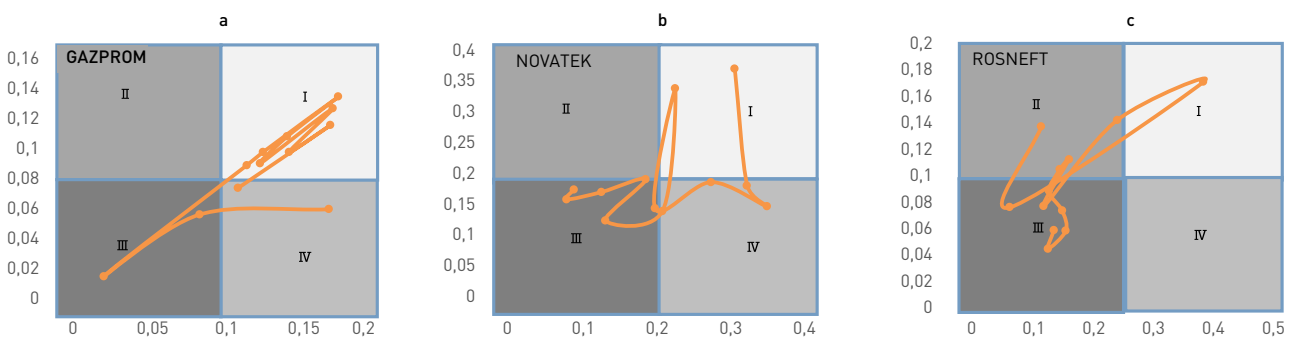


Figure 6. Company’s Z-matrix trajectory results, 2005-2016; (a) CNPC, (b) Sinopec, and (c) CNOOC

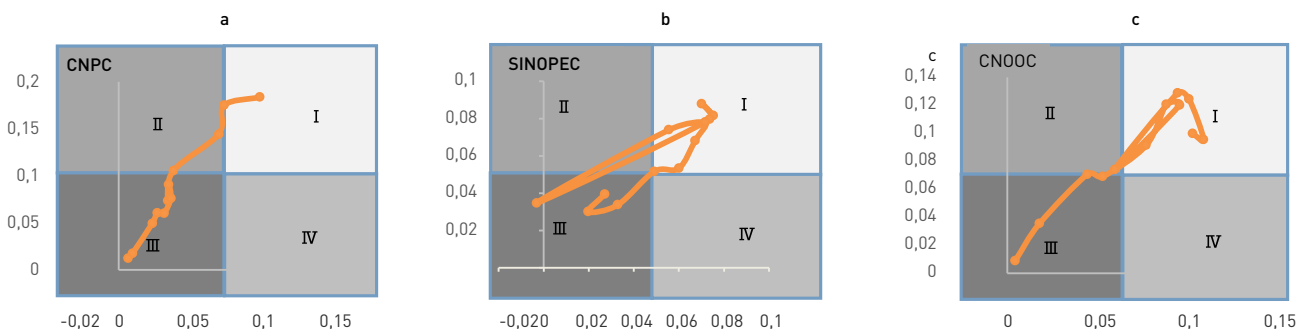


Fig. 5 shows that Novatek's growth was mostly founded in Q4. But from 2014, they were seen to be operating within the Q1 quadrant range. Lukoil, from 2005 till 2011 was at Q1, but from 2011 this changed to Q3 with a very low rate of performance. In 2015 the focus was at Q2 and the "simple growth" strategy, but from 2016 the company returned to Q1. As a result, currently, financial growth strategy recommendations for Novatek are the same as those for Gazprom. Rosneft was focused on Q3 for several years, but from 2016 Gazprom moved to another financial strategy point. Rosneft stays in Q2 "Simple growth". So, Rosneft focused on an aggressive sales policy with a high rate of revenue growth but with less focus on developing its financial policy. Rosneft has subsequently carried out financing for various strategic investment projects. If none of the investment options is acceptable, the company need not provide additional funding.

Analysis of the Z-matrix shows that the companies' financial strategies change from period to period, and in some periods (for example until 2011, see Tab.2) they have approximately the same strategy, and then start strong fluctuations within one company affect the whole sample. However, for the most part, they have passed in linear fashion from Q1 to Q2 or Q3, from Q2 to Q3. Notably, it is necessary to pay attention to Novatek, which since 2012 has moved initially to the second quadrant, and then to the third, but in 2014 returned to Q1. Consequently, we demonstrated that the SGR does not fully reflect the company's growth. So, maybe there are other financial and non-financial criteria (for example, environmental criteria [37] or energy efficiency criteria [38, 39]) that also have an impact on a company's sustainable growth.

The situation concerning Chinese natural gas companies does not appear to be quite the same. Analysis of the Z-matrix (Fig. 6) shows that companies' financial strategies are changing from period to period and in some periods (for example 2005-2008 and 2010-2012) they have approximately the same strategy as the Q1 model, meaning growth which leads to increased business value. In this case, the company has excess capital. A typical financial strategy would be to aim for growth through the use of internal funding sources. In this situation the company's level of retained earnings grows more rapidly than the Equity Growth Rate. Such a company can increase sales growth and assets through internal funding, but as previously described, there may be a risk in this situation, such as where a rise in sales can lead to a gross profit increase, which would require increases in assets to accommodate increasing production volume. The company would then typically have to increase inventory, receivables, and other assets. Indeed, that was a period of rising prices on energy resources. As the 2011-2012 year starts, one can observe strong fluctuations within one company which affects the whole sample. From 2014, all companies gravitate into Q3. A period of catch-up growth is then entered, which results in deficient company performance. Companies may invest in order to improve their positions in the market, to invest in recovering lost positions, and

to reduce the level of investments. On the one hand, the companies are in a more stable position, which means external actions and internal shifts leave them less prone to unanticipated changes as they were in the previous state. On the other hand, Chinese companies must improve their financial strategies according to a sustainable growth point of view by moving to another financial growth strategy - either Q2 or Q1. For example, CNOOC during the period 2013-2015 was at Q2, which means the company was focused on an aggressive sales policy, resulting in a high rate of revenue growth and less focus on diversifying the financial policy. The company is profitable at this stage because of increasing assets, and may carry out financing of various investment projects.

During the crisis of 2008, Chinese companies were actively developing oil and gas assets around the world in order to preserve their capital by transferring them into another form (this involved increasing reserves, resources and production capacity). These reserves and resources changed the financial structure indicators in a certain way, but had not yet reached proper sustainable growth levels of development. For example, when Chinese companies faced a relative crisis due to slow economic growth in 2014, certain companies suffered due to a particular exposure to non-tangible asset development.

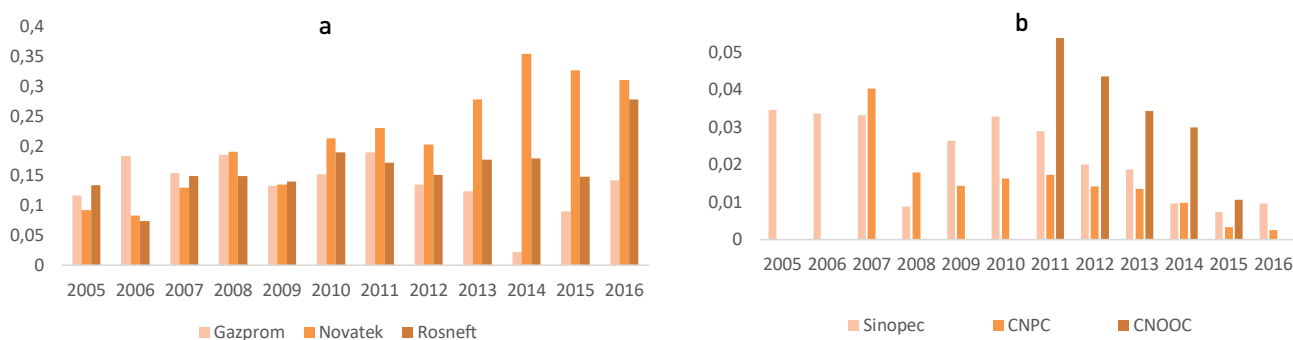
Indeed, the international oil and gas business has seen the rise of national petroleum companies that have dramatically restricted access to hydrocarbon reserves for major international oil companies such as Exxon Mobil, Chevron, Shell and BP over the last ten years. Intense competition from national petroleum companies is apparent in global capital markets. For example, in the first half of 2012, PetroChina, Rosneft and Petrobras attracted more than \$27 billion to the financial markets, while Exxon Mobil, Chevron, Shell and BP attracted about \$10 billion. The Chinese national oil company (CNPC), since 2011, has invested in oil and gas assets around the world in the amount of approximately \$100 billion. If we compare "supermajors" Exxon Mobil and PetroChina's oil reserves, Exxon Mobil is above the Chinese corporation. However, from the "total capital" point of view, PetroChina started 2014 with 1.2 trillion yuan (or \$204.8 billion), whereas ExxonMobil held \$180.4 billion. CNPC had the most liquid assets in cash for a total amount of \$8.2 billion (or 51.4 billion yuan), which is almost twice as high as the free cash levels of the American competitor. By the results of 2014, even some top twenty petroleum companies completed the fiscal year with a loss: the net loss of Petroleo Brasileiro SA (Brazil) amounted to \$7503.0 million. Petroleos Mexicanos (Mexico) - \$36071.0 million, "Gazprom" - \$3561.7 million. With regard to companies of average and small size, we can see the net loss based on the activities shown by Santos Ltd. (Australia) - \$844.0 million; Lundin Petroleum AB (Sweden) - \$252.2 million; Tullow Oil PLC (Ireland) - \$276.7 million. Four Canadian mining companies augment this list. In the U.S. a net loss was recorded in twenty oil companies, among which are the

famous Anadarko Petroleum Corp. – \$156.3 million, and Apache Corp. – \$5060.0 million. CNPC confirmed that was the lowest level of the company's profits during the previous five years, after which CNPC announced its intention to reduce the operating costs by 9% to 266 million yuan in 2015.

With Chinese gas market companies' profitability at a low level, therefore, it is necessary to increase it by a more effective use of the available resources and reduction of expenses [31]. In turn, when faced with a decrease in net profit, Chinese companies nevertheless count on

dividends. Concerning our financial analysis, companies can use the self-financing technique (i.e. internal funding), but that doesn't necessarily allow them to access the necessary expanded reproduction process and accretion of assets to accommodate sustainable growth. It may be stated that Chinese companies lag relatively behind in terms of financing, which is confirmed by the fact that the actual gain of sales volume is lower than the calculated SGR, as observable since 2014. Concerning the financing issue, the companies in question have not yet recovered from the 2014 crisis (see Fig. 7).

**Figure 7.** Sustainable Growth Rate calculation results (a) for Russian gas companies; (b) for Chinese gas companies



Financing could be carried out due to the attraction of the loan capital, but companies often do not opt for this approach, and conduct instead a deliberate strategy of financing. It is not necessarily a bad approach, because companies want to be stable and employ their resources deliberately. Since 2012, all examined Chinese companies maintained a stable structure of financing (ratio loan to own the capital), and Sinopec, despite insignificant profitability and other difficulties, could reduce external financial dependence by more than 35% (relative to 2012), if loan financing was reduced.

Now that there are difficulties with profitability for various reasons (prices, the markets, production costs) financing sources are limited. On the one hand, the level of dividend payments is the same as in the "good times", and some companies, on the contrary, do not decrease but increase dividends, but credits and other sources of loan are reduced. The level of financial dependence on loan sources in Russian companies is far higher, despite sanctions, as the companies find suitable means for the attraction of financial resources to ensure growth.

Russian and Chinese gas market companies' evaluation results show that companies are financially attractive, but companies outline conservative policies and sustainable growth outlooks in their annual financial reports. On the other hand, companies' financial performance suggest another situation because of an insufficient application of relevant indices. This situation reflects the inconsistency of existing sustainable growth approaches. Chinese and Russian gas market companies must improve their financial strategies according to a sustainable growth point of view by implementation of the FSIS during financial reporting, including FSIS KPIs that have influence on companies' sustainable growth.

## Hypothesis 2 results

Unbalanced financial growth leads to resource deterioration and debt burden risks. That is why it is essential to know which financial indicators concerning sustainability have a more significant influence on the company's sustainable growth as a whole. We calculated a set of financial indicators through which Russia and China's three largest gas market companies' sustainable growth rates for the period 2005-2016 were determined.

Financial sustainable growth has been identified as the growth of a company's strategic and financial results with some key determinants. Evaluation of the regressions was carried out by using pooled regression models, with deterministic and random effects. The following evaluations were applied to gauge their influence on the SGR calculation: ROCE, ROFA, CR, NPG, NAG, DOL, WACC, ROL and CGDummy. A panel regression analysis result shows that SGR provides similar results and has a positive relationship with Russian gas market companies' supposed coefficients for FSIS: ROCE, ROFA, CR, DOL, ROL (see Appendix 1,3) and a panel regression analysis result shows that the SGR calculation provides similar results and has a positive relationship with Chinese gas market companies' supposed coefficients for FSIS: ROCE, WACC, ROL, and CGDummy (see Appendix 2,4).

The challenge for Russian gas companies is the undervaluation of assets. Thus, results of our study show that Russian gas companies should choose a strategy which leads to an increase in the value of assets. Russian gas companies tend to pay particular attention to social benefits for staff. An employee could ostensibly feel that the company's management takes care of personal needs and thus be motivated to work more efficiently [32].

Thus, a socially-oriented strategy for Russian companies should be continued because social responsibility leads to a sustainable financial growth increase. The same could be the strategy based on the discussions of the Chinese gas market companies' results. The best option, also, is to focus on a strategy which leads to an increase in the value of assets. As we see, at the Chinese companies, payments to staff have an impact on the company's steady growth, and, what is essential and very inherent for China, is that the corporate component has significant influence on China gas market companies' financial sustainable growth. China is a country with strong traditional management, and a corporate component is very essential in that country. Research results are important for the adequate design, formulation and application of financial policies for Chinese oil and gas companies as well as Russian companies that encourage social responsibility and conscientious corporate governance to improve company financial growth.

## Discussion and Conclusion

It is obvious that the relationship between sustainable growth and gas companies' financial strategies must be closer and more interrelated. Non-financial factors and their influence on the Sustainable Growth Rate should become an essential part of financial system sustainability analysis. As a research result, recommendations about capital structure formation and development of a financial strategy which acknowledges companies' sustainable growth were defined. It was also illustrated that sustainable growth factors for Russian gas companies and Chinese gas companies are not identical. Chinese and Russian gas companies' financial growth strategy were analysed using the Geniberg Z-matrix, as well as enhanced Financial Sustainability Indicators System indices by identifying which indicators have a greater influence on the Sustainable Growth Rate. It was found that ROCE and WACC have a strong influence on Chinese gas companies' sustainable growth rate and are recommended for consideration as part of an FSIS calculation. It was discovered that ROL and CGDdummy also have an influence on the Sustainable Growth Rate. ROCE, ROFA, CR, DOL also have an influence on Russian gas companies' sustainable growth rate and are also recommended for FSIS calculations. Additionally, ROL also has an influence on the Sustainable Growth Rate. Evaluation results show that Chinese and Russian gas companies are financially attractive and have stable results, but must improve financial strategies according to a sustainable growth perspective. As a result of this analysis, we identified the relevance of the Return on Labour ratio for both Chinese and Russian companies and the impact of a corporate governance factor on Chinese companies' SGR, which confirmed our assumptions. Consequently, the authors demonstrated that SGR does not fully reflect a company's growth. So, maybe there are other financial and non-financial criteria (for example, criteria concerning personnel [15, 16], environmental protection [40], social responsibility, energy

efficiency or corporate governance issues which will have an impact on companies' sustainable growth. The authors believe that Chinese and Russian gas market companies should pay more attention to the social, environmental and economic determinants that will contribute to sustainable company growth.

## Future Research

Sustainable financial growth is a potential area for future research projects and scientific investigative potential. It is debatable which factors have more influence on the SGR. However, companies must try to find a way to implement relevant indices that will influence such growth, and set them as companies KPI. The authors emphasise that a mere financial analysis of sustainable growth will not fully reflect the financial capabilities of such companies. That is why in this research we take into account non-financial indicators as a possible direction for further development of the financial sustainable growth theory. Concepts such as environmental protection, energy savings, and social factors may represent some significant non-financial factors which can influence the sustainable growth rate. Also, the central question that the authors would focus on in future related research is whether sustainable growth is optimal or balanced. That is, whether it is better that financial sustainable growth should be balanced - where all parts of the model must be equal - or if this "equal" model is not practically useful in our society because it is premised upon an unrealistic ideal of a corporations presence in the real world.

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**Appendix 1**

Hypothesis 2 regression results (Russia)

	(1)
VARIABLES	sgr
roce	-0.414*** (0.120)
rofa	0.441*** (0.0623)
cr	-0.0242* (0.0137)
wacc	0.00116 (0.00292)
nag	0.0791 (0.0491)
npg	0.00219 (0.00589)
dol	0.0214* (0.0115)
rol	0.0113** (0.00469)
cgdummy	-0.00410 (0.0161)
Constant	0.157*** (0.0445)
Observations	36
Number of id	3

**Appendix 2**

Hypothesis 2 regression results (China)

	(1)
VARIABLES	sgr
roce	0.0766* (0.0446)
rofa	0.000208 (0.0115)
cr	-0.00895 (0.00553)
wacc	0.00991*** (0.00370)
nag	0.0264 (0.0279)
npg	-0.00858 (0.00772)
dol	5.71e-05 (6.04e-05)
rol	-0.000468* (0.000263)
cgdummy	0.00970** (0.00413)
Constant	-0.0264 (0.0167)
Observations	36
Number of id	3

**Appendix 3**

## Hypothesis 2 correlation results (Russia)

sgr sgr	roce 1	rofa	cr	wacc	nag	npg		
roce 0.388	0.148	1						
rofa 0	0.6842*	0.6266*	1					
cr 0.0429	-0.3393*	-0.262	-0.274	1				
wacc 0.0317	0.3588*	-0.0701	0.277	0.00320	1			
nag 0.204	0.217	0.111	0.0247	-0.00860	0.0654	1		
npg 0.555	0.102	0.0238	0.0295	0.0234	-0.0431	0.224	1	
dol 0.280	0.185	0.3025*	0.151	0.0703	-0.125	0.246	0.136	
rol 0.259	0.193	-0.3650*	-0.251	-0.152	0.121	0.00960	-0.0644	
cgdummy 0.954	-0.00990	-0.218	-0.00120	0.0827	-0.0689	-0.4352*	-0.222	
dol dol	rol 1	cgdummy						
rol 0.440	-0.133	1						
cgdummy 0.739	0.0574	0.00990	1					



**Appendix 4**

## Hypothesis 2 correlation results (China)

sgr sgr	roce 1	rofa	cr	wacc	nag	npg		
roce 0.169	0.234	1						
rofa 0.579	-0.0956 0.000200	0.5756*	1					
cr 0.0440	-0.3377* 0.254	0.195 0	0.7556*	1				
wacc 0.000800	0.5339* 0.111	0.270 0.705	0.0652 0.278	-0.186	1			
nag 0.336	0.165 0.0671	0.3086* 0.000400	0.5609* 0.0309	0.3602* 0.149	0.245	1		
npg 0.306	0.175 0.00160	0.5062* 0.0177	0.3930* 0.338	0.164 0.181	0.228 0.0167	0.3965*	1	
dol 0.286	0.183 0.522	0.110 0.592	-0.0924 0.475	-0.123 0.946	0.0117 0.732	0.0592 0.000100	0.6106*	
rol 0.389	0.148 0.0181	0.3917* 0.168	-0.235 0.000600	-0.5443* 0.295	0.179 0.432	-0.135 0.696	0.0674	
cgdummy 0.00920	0.4283* 0.982	0.00380 0.0800	-0.2957* 0.0414	-0.3416* 0.641	0.0805 0.626	-0.0841 0.403	0.144	
dol dol	rol 1	cgdummy						
rol 0.641	0.0803	1						
cgdummy 0.196	0.221 0.203	0.217	1					