

# Examining the Trends in Bank Deposits through Internal and External Factors based on the Supply Chain Strategies: A Primary and Secondary Data Survey

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**Abstract-** The banking sector is the basis of the economy of any country which relies on the supply chain strategies. Funding plays a significant role in the activities of banks, in the structure of which deposits to this day remain the cheapest and most significant resources. Bank deposits are also a major part of the country's savings. The level of bank deposits allows us to judge the quality of funding of second-tier banks. The level of attracting deposits is influenced by many external and internal factors of an economic, political, social nature. An analysis of the studies available in the economic literature shows either a one-sided study of factors affecting bank deposits and the use of mainly linear regression, or a study of factors on deposits of the country's banking sector as a whole. However, this approach does not allow us to see the degree of dependence of the level of deposits on various factors for individual banks, which is much more important when evaluating funding. The author presents an attempt to analyze the influence of external and internal factors on the level of the deposit base of individual second-tier banks in Kazakhstan using ridge regression and ANOVA. In addition, our study has provided the primary data analyses, covering the impact of supply chain management and green supply chain adoption on the banking sector deposits. It is found that some factors of supply chain management and green supply chain adoption are positively impacting on bank's deposit while others are found to be non-significant determinants for predicting the deposits of the banks. However, supply chain management (6<sup>th</sup> item) is adversely impacting on the first and second measure of bank's deposit. Similar trend is observed by green supply chain adoption (5<sup>th</sup> item) on first and third measure of bank's deposits in Kazakhstan.

**Keywords;** *correlation, ANOVA method, supply chain strategy, ridge regression, bank deposits.*

## 1. Introduction

SCM encompasses the integrated planning and execution of processes required to optimize the flow of materials, information and capital in functions that broadly include demand planning, sourcing, production, inventory management and logistics -- or storage and transportation. Companies use both business strategy and specialized software in these endeavors to create a competitive advantage. In Kazakhstan, deposits remain the main and cheapest source of funding the activities of second-tier banks. The financial disasters of the last decade have significantly influenced the change in the structure of deposits in favor of tenge deposits. The outflow of deposits in foreign currency became noticeable in 2016-2017 and was associated with the conversion of deposits in tenge. Such a process of outflow of foreign currency and inflow of tenge deposits was characteristic of both the mass segment and the segment of large deposits. The reduction in foreign currency deposits was caused by three main factors: by 12% - exchange rate revaluation, by 42% - the conversion of foreign currency deposits in tenge, by 46% - the outflow of foreign currency deposits from the banking system.

Since the end of 2018, the overflow of foreign currency deposits in tenge has slowed, and the outflow of deposits in foreign currency from 50 million tenge from the banking system of the country becomes apparent. The reason for this is that certain owners of these capital prefer to invest in assets with higher returns.

Currently, in the banking sector of Kazakhstan, a stable growth of deposits in tenge is provided by the mass segment of deposits up to 20 million tenge. In general, in 2018 deposits in tenge in the mass segment grew by 16.4%.

The above data clearly demonstrate the fact that deposits remain the main sources of funding for banks. It should be noted that it is the state of the resource base of second-tier banks, the main share of which is depositary resources, that shows its specific functioning parameters and are expressed in the following:

- reflects the assessment of the stability and reliability of the bank by investors, depositors and other banks;
- is an indicator of the quality of customer service by the bank (the number of services provided to customers, the presence of a branch network, electronic banking services, courtesy of staff, etc.);
- characterizes the pricing policy of the bank, that is, the ability of the bank's management to adequately respond to changes in market prices for banking services and products [1-5].

The fact that deposits are the cheapest and most attractive source of funding for banks in Kazakhstan creates a need to study the degree of influence of various factors on the level of deposit resources in the country's banks. Moreover, the analysis includes an assessment and study of the state of the external environment of the functioning of the bank and the internal potential of the bank [6].

## 2. Literature review

In the economic literature, the application of various methods of econometrics to assess the effectiveness of banks is considered in many works. So, Aigbe Akhigbe, James E. Mc Nulty rated, that small banks are more profit efficient than large banks. Small banks in non-metropolitan statistical areas (non-MSA) areas are consistently more profit efficient than small banks in MSAs. Cross-sectional analysis of the correlates of the profit efficiency estimates suggests that structure–performance factors, relationship–development factors, and expense-preference behavior play an important role in explaining the profit efficiency of small US commercial banks [7].

[8] examines the effectiveness of banks in terms of issuing loans and attracting deposits. In modeling, he uses a stochastic production function and assesses the impact of administrative costs and net assets on attracting deposits by banks. As a result, it was found that, *ceteris paribus*, more efficient banks attract more deposits.

[9] identifies the categories of factors that influence the deposit base of banks, noting macro factors, mesofactors, microfactors. At the same time, the influence of factors is considered only at a theoretical level.

[10] analyzed ordinary and extraordinary (including force majeure) deviations of deposit resources of banks using the method of transformation of the variable part of current liabilities. [11] note the importance of assessing the influence of factors on the resource base of banks, which are based on deposits [10].

[12] conducts a correlation analysis of factors affecting the attraction of deposits of individuals, limited to only five factors of a general nature: the financial result of organizations; interest rate on deposits; unemployment rate; number of credit organizations; living wage.

[13] evaluated the sensitivity to changes in the maximum interest rate and sensitivity to the forward rate on deposits, which made it possible to determine that the low volume of attracting term deposits does not allow to evaluate market expectations from deposit interest rates. [14] conducted a study of factors affecting bank deposits in Albania using linear regression and 14 valuation factors, including the level of remittances, GDP, inflation, exchange rates, bank capitalization, etc.

[15] analyzed the influence of five macroeconomic factors on the growth of deposits in Western Balkan countries: Interest rate on deposit, Margin interest rate, GDP, Interest, Broad Money, using parameters random effect, regression Hausman Taylor and GMM model.

[16] used panel ARDL (Autoregressive Distributed Lag) method by using 23 non-Islamic and 23 Islamic countries data from 1999 to 2014 to analyze the effect of interest rates on the level of deposits. Results showed that in Islamic countries interest rate don't have any impact on bank deposits both in long run and short run. But in the case of non-Islamic countries interest rate have positive significant impact on bank deposits.

As can be seen from the literature review, many authors conducted research on the influence of various factors on changes in the level of deposits attracted by banks using various analysis methods. At the same time, the analysis carried out mainly concerned the level of deposits throughout the country, and not relative to individual banks, especially Kazakhstan.

## 3. Research methods

The linear regression used by many reflects a linear relationship between variables. It is useful in creating not very complex dependencies, as well as with a small amount of data. However, economic relationships are increasingly subject to non-linear relationships. In this sense, nonlinear regression can model complex relationships. [17] used non-linear regression models to analyze the degree of dependence, rightly arguing that they more accurately reflect the dependence of factors.

Meanwhile, in cases of high collinearity of variables, standard linear and nonlinear regressions become ineffective.

Ridge regression is a corrective measure to reduce collinearity among predictor variables in a regression model. She adds a small quadratic displacement factor to reduce dispersion. The main idea of ridge regression is to allow some bias in the estimates of the regression coefficients, but to reduce the variance of biased estimates. The assumptions of this regression are the same

as in the least squares method, except for the fact that a normal distribution is not assumed in ridge regression.

Ridge regression regularizes parameters and overcomes some of the disadvantages of the least squares method.

Regularization methods often make it possible to reduce the variance of the forecast due to a slight increase in its bias. As a result, the accuracy of the forecast increases and the interpretability of the model increases [18].

Ridge regression involves evaluating parameters using the following formula:

$$\alpha_\lambda = (X_\lambda^T X_\lambda + \lambda I)^{-1} X_\lambda^T Y_\lambda \quad (1)$$

Adding the parameter  $\lambda$  solves the problem of poor conditioning of the matrix  $X^T X$ . These estimates are biased, in contrast to LSM-estimates (least square method). However, it has been proved that there exists a  $\lambda$  at which these estimates are more effective than the least-squares estimates (the least-squares estimates are effective (have the smallest dispersion) among linear unbiased estimates) [14].

The value is recommended to be taken from 0.1 to 0.4. N. Draper, G. Smith in their work cite one of the methods of "automatic" selection of the quantity  $\lambda$ , proposed by [5]:

$$\lambda = \frac{m \cdot SSe}{n-m-1} * \frac{1}{a^T \tau a} \quad (2)$$

where  $\tau$  – number of parameters (excluding the free term) in the original regression model;

$SSe$  – residual sum of squares obtained from the original regression model without adjustment for multicollinearity;

$a$  – column vector of regression coefficients converted by the formula:

$$a_j^* = a_j \sqrt{\sum (x_j - \bar{x}_j)^2} \quad (3)$$

where  $c_{ij}$  – parameter with variable  $y$ , in the original regression model.

To assess the significance of the factors, the Ferrara-Glouber algorithm was used, in which the Fisher criterion and ANOVA analysis of variance were evaluated (Analysis Of Variance) [17].

According to ANOVA, the average variability in the model is estimated as follows:

$$MST = \frac{S^2}{df} = \frac{SST}{n-1} \text{ - total average variability}$$

$$MSA = \frac{S^2 A}{df A} = \frac{SSA}{v-1} \text{ - intergroup average variability}$$

$$MSW = \frac{S^2 R}{dfw} = \frac{SSW}{n-v} \text{ - intragroup average variability}$$

where  $SST$  – full variability in the model, in which  $SST = SSA + SSW$

$SSA$  – intergroup variation;

$SSW$  – intragroup variation;

$df$  – degrees of freedom;

$SS$  – sum of squared deviations;

$MS$  – mean squares [4].

For each model are also calculated MSE – mean squared error:

$$MSE = \frac{1}{n} \sum_{t=1}^n Y_t - Y_t^{\wedge} = \frac{\sigma^2}{n} \quad (4)$$

where  $Y_t$  – actual factor values;

$Y_t^{\wedge}$  – predicted values of factors;

$n$  – number of periods considered.

To study the multicollinearity of the regression model, we used the coefficients of variance increase  $VIF_i$ ,  $i = 1, \dots, n$ :

$$VIF_i = \frac{1}{1-R_i^2} \quad (5)$$

where  $R_i^2$  – coefficient of determination.

If  $VIF_i > 5$ , for at least one  $i$ , it is believed that the multicollinearity of the regression matrix  $X$  is large. For  $VIF_i > 10$ , multicollinearity is considered critical.

The use of ridge regression will allow for regularization of parameters and increase model interpretability.

The second part of our study has applied the survey questionnaire to observe the trends in supply chain management of the banks, adoption of green supply chain with their influence on the bank's deposits. For this purpose, questionnaire was developed and data was collected from 263 respondents as working in different banking firms of Kazakhstan's economy. The results are provided in the section below (Table 8 to Table 11) respectively. For analyzing the impact of supply chain management and adoption of green supply chain, items from the existing literature were identified and added in the questionnaire. In the final stage, collected data was analyzed through SPSS-24 version for the correlation matrix, VIF of the items, descriptive measures and regression results.

#### 4. Results and Discussion

The growth rates of both external for the bank and internal indicators were taken as factors influencing the change in the volume of deposits in banks in Kazakhstan (Table 1).

**Table 1.** Correlation factors for assessing the impact on the volume of deposits in second-tier banks

External to the bank		Internal for the bank	
Designation	Indicator, growth rate in %	Designation	Indicator, growth rate in %
EX <sub>1</sub>	Population income level	IN <sub>1</sub>	Bank net assets
EX <sub>2</sub>	Refinancing rate	IN <sub>2</sub>	Capital
EX <sub>3</sub>	Inflation	IN <sub>3</sub>	Problem Credit Level
EX <sub>4</sub>	External loans of the country	IN <sub>4</sub>	Liquidity
EX <sub>5</sub>	Able-bodied population	IN <sub>5</sub>	Bond issue volume
EX <sub>6</sub>	GDP	IN <sub>6</sub>	Interbank loan rate
EX <sub>7</sub>	Unemployment	IN <sub>7</sub>	Interest rate on deposits
EX <sub>8</sub>	Dollar / tenge rate	IN <sub>8</sub>	Return on assets
EX <sub>9</sub>	Euro / Tenge rate	IN <sub>9</sub>	Return on equity
EX <sub>10</sub>	Ruble / tenge exchange rate		
EX <sub>11</sub>	Level of economic activity		
EX <sub>12</sub>	Average monthly wage		

Note: compiled by the author

Thus, in total, we used 21 factors for analysis, the degree of influence of which on the level of deposits in individual banks should be assessed.

For analysis, we used the data of the National Bank of the Republic of Kazakhstan, the Committee on Statistics of the Republic of Kazakhstan, as well as performance indicators based on data from the Bloomberg information system for «Halyk Bank» JSC, «Bank CenterCredit» JSC, «Kaspi Bank» JSC. The factors presented in table 1 were

used to assess the impact on the volume of attracted deposits by Kazakhstan banks «Halyk Bank» JSC, «Bank CenterCredit JSC, «Kaspi Bank» JSC separately.

In order to correct the correlation model in ridge regression, in the case of assessing the impact of indicators on the deposits of «Halyk Bank» JSC, an indicator was chosen as  $\lambda$  at which  $MSE\lambda$  turned out to be minimal  $\lambda = 0.0236$ . The final results of the correlation assessment for JSC «Halyk Bank» are presented in table 2.

**Table 2.** Indicators of the correlation assessment of the influence of factors on the level of deposits of JSC «Halyk Bank» for the period 2008-2018.

Indicators	<i>Corr</i>	<i>R</i> <sup>2</sup>	<i>VIF</i>	<i>MSE</i>
External factors				
EX <sub>1</sub>	0,500033	0,25003	1,333392	0,258064
EX <sub>2</sub>	0,731119	0,5345	2,148389	0,160167
EX <sub>3</sub>	(0,187721)	0,0035	1,036526	0,331974
EX <sub>4</sub>	(0,093403)	0,0087	1,008801	0,341098
EX <sub>5</sub>	0,513302	0,2635	1,357734	0,253437
EX <sub>6</sub>	0,411327	0,1691899	1,203644	0,285882
EX <sub>7</sub>	(0,390023)	0,1521	1,179409	0,291756
EX <sub>8</sub>	0,785531	0,6171	2,611368	0,13177
EX <sub>9</sub>	0,302041	0,0912	1,100387	0,312708
EX <sub>10</sub>	0,40052	0,1604	1,191066	0,288901
EX <sub>11</sub>	0,601247	0,3615	1,566166	0,219709
EX <sub>12</sub>	0,352101	0,1239	1,14152	0,30144
Internal factors				
IN <sub>1</sub>	0,210437	0,0443	1,046336	0,328862
IN <sub>2</sub>	0,631766	0,3991	1,664249	0,20676
IN <sub>3</sub>	0,08344	0,00696	1,007011	0,341704
IN <sub>4</sub>	0,503211	0,2532	1,339085	0,256967
IN <sub>5</sub>	(0,478203)	0,2287	1,296476	0,265412
IN <sub>6</sub>	(0,36608)	0,1340	1,154754	0,297986
IN <sub>7</sub>	0,703226	0,4945	1,978344	0,173933
IN <sub>8</sub>	0,31178	0,0972	1,107673	0,310651
IN <sub>9</sub>	0,293374	0,0861	1,094174	0,314484

Note: compiled on the basis of calculations based on data of Halyk Bank (Bloomberg)

The data obtained show that the most significant influence of external factors on the level of bank deposits is influenced by the refinancing rate (0.73), the dollar / tenge rate (0.79), the level of economic activity (0.6), the working population (0.51) and the level of population income (0.5). Among internal factors, the strongest dependence is observed for such factors as: interest rate on deposits (0.7), capital growth of the bank (0.63), liquidity of the bank (0.5).

These indicators can be explained from the following point of view. The refinancing rate affects the change in the rate on bank deposits, which has a direct impact on

attracting deposits. A strong influence is noticeable at the exchange rate of the US dollar. Socio-economic factors affecting the decisions of the population about investments and opportunities for savings also affect the growth of deposits. This may indicate a significant rating and confidence in the bank, since an increase in savings opportunities contributes to the growth of deposits in «Halyk Bank» JSC.

To assess significance, the probability of error ( $p$ ) was taken in the amount of not more than 0.05. Assessment of the significance of factors by JSC «Halyk Bank» according to the ANOVA method is presented in table 3.

**Table 3.** Analysis of the significance of factors by ANOVA

Group	Variability	<i>SS</i>	<i>df</i>	<i>MS</i>	F- ratio
External factors	MSA	4087606,2322	66	2043803,1162	F =9,06744 p<0,004 significant
	MSW	4875368,81	1881	85562,011	
	MST	8966231,3333	1947		
Internal factors	MSA	2431166,423	36	607791,6057	F =5,14336 P=0,013256 significant
	MSW	9267731,333	810	102974,7926	
	MST	12797663,7224	846		

Note: compiled on the basis of calculations based on data of Halyk Bank (Bloomberg)

Thus, ANOVA showed the significance of factors within the groups, despite the fact that some of the indicated factors have practically no effect on the level of

JSC are presented in table 4. At the same time, an indicator was chosen as  $\lambda$  at which  $MSE\lambda$  was the minimum  $\lambda = 0.0311$ .

deposits of «Halyk Bank» JSC. The results of the analysis of the influence of factors for «Bank CenterCredit»

**Table 4.** Indicators of the correlation assessment of the influence of factors on the level of deposits of «Bank CenterCredit» JSC for the period 2008-2018.

Indicators	<i>Corr</i>	<i>R</i> <sup>2</sup>	<i>VIF</i>	<i>MSE</i>
External factors				
EX <sub>1</sub>	0,328732	0,10806473	1,121158	0,306915
EX <sub>2</sub>	0,534491	0,28568063	1,399934	0,245797
EX <sub>3</sub>	(0,093453)	0,00873346	1,00881	0,341095
EX <sub>4</sub>	(0,075664)	0,00572504	1,005758	0,34213
EX <sub>5</sub>	0,47537	0,22597664	1,291951	0,266341
EX <sub>6</sub>	0,211883	0,04489441	1,047005	0,328652
EX <sub>7</sub>	(0,093426)	0,00872842	1,008805	0,341097
EX <sub>8</sub>	0,66459	0,44167987	1,791087	0,192118
EX <sub>9</sub>	0,332762	0,11073055	1,124519	0,305998
EX <sub>10</sub>	0,413478	0,17096406	1,20622	0,285271
EX <sub>11</sub>	0,58453	0,34167532	1,519007	0,22653
EX <sub>12</sub>	0,299663	0,08979791	1,098657	0,313201
Internal factors				
IN <sub>1</sub>	0,563492	0,31752323	1,465251	0,23484
IN <sub>2</sub>	0,661123	0,43708362	1,776463	0,1937
IN <sub>3</sub>	0,320077	0,10244929	1,114143	0,308847
IN <sub>4</sub>	0,39844	0,15875443	1,188714	0,289473
IN <sub>5</sub>	(0,510056)	0,26015712	1,351638	0,25458
IN <sub>6</sub>	(0,13447)	0,01808218	1,018415	0,337878
IN <sub>7</sub>	0,622721	0,38778144	1,633404	0,210664
IN <sub>8</sub>	0,400239	0,16019126	1,190747	0,288978
IN <sub>9</sub>	0,310877	0,09664451	1,106984	0,310845

Note: compiled on the basis of calculations based on data of CenterCredit Bank (Bloomberg)

The data obtained show that the strongest influence of external factors on the level of bank deposits is influenced by the dollar / tenge rate (0.66), refinancing rate (0.53), and the level of economic activity (0.58). Among internal factors, the strongest dependence is observed for such factors as: bank capital (0.66), deposit rate (0.62), asset growth (0.56), bond growth (-0.51).

The influence of the level of economic activity on the volume of deposits of «Bank CenterCredit» JSC proves

the importance of the bank for the population. Similarly, the dependence on the financial indicators of the bank itself indicates that its stability is becoming an attractive aspect for attracting deposits.

To assess significance, the probability of error ( $p$ ) was taken in the amount of not more than 0.05. Assessment of the significance of factors for «Bank CenterCredit» JSC by the ANOVA method is presented in table 5.

**Table 5.** Analysis of the significance of factors by ANOVA

Group	Variability	SS	df	MS	F- ratio
External factors	MSA	3842711,487	66	1962788,0934	F =11,0723
	MSW	2689121,6843	1881	78095,6631	P=0,02134
	MST	7677544,3211	1947		significant
Internal factors	MSA	3625690,33	36	720933,7122	F =4,2361
	MSW	9815266,7214	810	201788,3322	P<0,00783
	MST	22100054,1109	846		significant
Note: compiled on the basis of calculations based on data of CenterCredit Bank (Bloomberg)					

Thus, ANOVA showed the significance of factors within the groups, despite the fact that some of the identified factors have practically no effect on the level of deposits of «Bank CenterCredit» JSC.

The results of the analysis of the influence of factors for AO «Kaspi Bank» are presented in table 6. At the same time, an indicator was chosen as  $\lambda$  at which MSE $\lambda$  turned out to be minimal  $\lambda = 0.05631$ .

**Table 6.** Correlation assessment indicators of the influence of factors on the level of deposits of «Kaspi Bank» JSC for the period 2008-2018

Indicators	Corr	R <sup>2</sup>	VIF	MSE
External factors				
EX <sub>1</sub>	0,723109	0,52288663	2,095938	0,164175
EX <sub>2</sub>	0,587311	0,34493421	1,526564	0,225408
EX <sub>3</sub>	(0,100763)	0,01015318	1,010257	0,340606
EX <sub>4</sub>	(0,009345)	8,7329E-05	1,000087	0,34407
EX <sub>5</sub>	0,523391	0,27393814	1,377293	0,249838
EX <sub>6</sub>	0,19934	0,03973644	1,041381	0,330427
EX <sub>7</sub>	(0,083456)	0,0069649	1,007014	0,341703
EX <sub>8</sub>	0,702316	0,49324776	1,973351	0,174373
EX <sub>9</sub>	0,440021	0,19361848	1,240108	0,277476
EX <sub>10</sub>	0,420765	0,17704319	1,215131	0,283179
EX <sub>11</sub>	0,72309	0,52285915	2,095817	0,164184
EX <sub>12</sub>	0,711139	0,50571868	2,023139	0,170082
Internal factors				
IN <sub>1</sub>	0,478123	0,2286016	1,296347	0,265438
IN <sub>2</sub>	0,456083	0,2080117	1,262645	0,272523
IN <sub>3</sub>	0,192303	0,03698044	1,038401	0,331375
IN <sub>4</sub>	0,33761	0,11398051	1,128643	0,304879
IN <sub>5</sub>	(0,302562)	0,09154376	1,100768	0,3126
IN <sub>6</sub>	(0,100845)	0,01016971	1,010274	0,340601
IN <sub>7</sub>	0,7023	0,49322529	1,973263	0,174381
IN <sub>8</sub>	0,380234	0,14457789	1,169014	0,294351
IN <sub>9</sub>	0,332109	0,11029639	1,12397	0,306147
Note: compiled on the basis of calculations based on data of Kaspi Bank (Bloomberg)				

The data obtained show that the most significant influence of external factors on the level of bank deposits is influenced by the level of household income (0.72), level of economic activity (0.72), average monthly salary (0.71), refinancing rate (0.58). Among internal factors, the strongest dependence is observed only at the deposit rate (0.7), other internal factors do not have the proper impact on the level of the bank's main funding source.

The influence of the population's income level, economic activity, average monthly wage on the volume of deposits of «Kaspi Bank» JSC testifies to the popularity

of the bank, which offers an extensive range of "pleasant" bonuses and services to its customers. At the same time, the bank's financial indicators have practically no effect on attracting deposits. Mostly the population, which is the main clientele of the bank, is not interested in indicators of assets, profitability and capital of the bank.

To assess significance, the probability of error ( $p$ ) was taken in the amount of not more than 0.05. Assessment of the significance of factors for «Bank CenterCredit» JSC by the ANOVA method are presented in table 7.

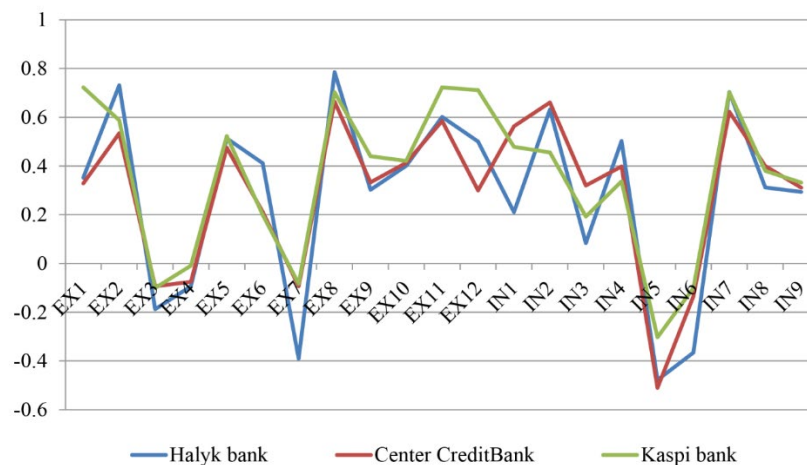
**Table 7.** Analysis of the significance of factors by ANOVA

Group	Variability	<i>SS</i>	<i>df</i>	<i>MS</i>	F- ratio
External factors	MSA	5371678,3042	66	2177904,0053	F =14,0064
	MSW	2833077,3511	1881	83710,2137	p<0,007311
	MST	8765331,0859	1947		significant
Internal factors	MSA	2674441,6703	36	578404,3375	F =3,66301
	MSW	7409928,3442	810	189961,7182	P<0,08037
	MST	21890136,4893	846		significant

Note: compiled on the basis of calculations based on data of Kaspi Bank (Bloomberg)

Thus, ANOVA showed the significance of factors within the groups, despite the fact that some of the identified factors have practically no effect on the level of deposits of Caspi Bank. The analysis showed that the

Kazakhstan banks under consideration are not closely dependent on external factors in attracting deposits (Figure 1).



**Figure 1.** Correlation indicators of banks

To a greater extent, external dependence is observed in relation to «Kaspi Bank» JSC, which pursues an active policy among the population to attract deposits. The least dependent is «Bank CenterCredit» JSC. At the same time, the level of deposits of «Halyk Bank» JSC and «Bank CenterCredit» JSC is dependent on some indicators of the banks themselves. Therefore, when choosing these two banks, great importance is given to their financial position and rating.

In general, dependency models adjusted for bias in estimates of regression coefficients for Kazakhstan banks examined have some similarities. In particular, this applies

to dependency factors. Many factors, such as external government loans, inflation, unemployment, show a practically zero correlation for all three banks, similarly to bank liquidity and the rate of interbank lending. «Bank CenterCredit» JSC has an average level of dependence on bond issue volumes, which becomes an alternative to bank deposits, especially when the bank experienced some difficulties in attracting funds.

Thus, the above analysis of factors affecting the main source of funding for Kazakhstan banks individually for each bank allows us to assess in a certain way the position of the bank in the country's market, to identify aspects that

require the primary attention of banks in the policy of raising funds. In the future, the author intends to conduct a study on all Kazakhstan banks and to rank depending on the parent bank.

In the second part of the analyses, initially, present study has observed the level of association between the factors of supply chain management in the banking firm and green supply chain by the banks. For answering this query, pairwise correlation coefficients are presented in Table 8 where level of significance is also presented below each of the correlation coefficients. For SCM1 to SCM3, association is positive, significant at 10 percent but at low level. The rest of the indicators are found to be insignificantly associated to each other under second column of Table 1. Meanwhile, correlation between

SCM5 and green supply chain adoption or GSADOP1 is -0.139, showing a negative, significant and weak association between the both. Additionally, correlation coefficient between GSADOP2 and GSADOP4 is .171 which is positive and significant at 10 percent. Similar positive and weak but significant association is found between GSADOP2 and GSADOP4; .137, significant at 10 percent. For exploring either this correlation among the items of supply chain management and adoption of green supply chain is creating an issue or not, variance inflation factor VIF is calculated and presented in the Table 9 where individual value of VIF for all the items is below 5. Similar situation is found for the Mean VIF which is 1.031, hence no issue of higher interdependency between the variables.

**Table 8.** Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) scm1	1.000										
(2) scm2	-0.054	1.000									
	0.383										
(3) scm3	0.144*	-0.044	1.000								
	0.020	0.478									
(4) scm4	0.012	0.091	-0.076	1.000							
	0.845	0.141	0.216								
(5) scm5	-0.111	0.006	0.026	-0.030	1.000						
	0.073	0.919	0.670	0.632							
(6) scm6	-0.096	0.068	-0.028	-0.013	0.074	1.000					
	0.120	0.269	0.650	0.840	0.230						
(7) gsadop1	-0.027	-0.028	-0.019	-0.010	-0.139*	0.032	1.000				
	0.666	0.650	0.758	0.872	0.024	0.605					
(8) gsadop2	0.090	-0.074	0.010	-0.024	0.002	-0.012	0.038	1.000			
	0.144	0.234	0.875	0.704	0.980	0.841	0.540				
(9) gsadop3	0.044	-0.014	0.093	-0.073	0.044	0.010	0.117	0.096	1.000		
	0.476	0.823	0.132	0.237	0.482	0.876	0.058	0.119			
(10) gsadop4	0.054	0.004	0.042	0.054	0.023	-0.080	-0.048	0.171*	-0.001	1.000	
	0.380	0.945	0.495	0.382	0.715	0.196	0.439	0.005	0.993		
(11) gsadop5	0.091	-0.030	0.059	-0.090	0.086	-0.006	0.026	0.137*	-0.006	0.058	1.000
	0.141	0.627	0.338	0.145	0.164	0.917	0.675	0.026	0.928	0.352	

\* shows significance at the .05 level

**Table 9.** Variance Inflation with Individual Score, Mean Score and Tolerance Level (1/VIF)

Items	GSADOP2	GSADOP4	GSADOP3	GSADOP5	GSADOP1	MEAN VIF
VIF	1.059	1.035	1.023	1.021	1.018	1.031
1/VIF	0.944	0.966	0.977	0.979	0.982	

**Table 10.** Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max
SCM1: Quality of supply chain	263	2.932	1.423	1	5
SCM2: implication of IT in supply Chain	263	2.935	1.449	1	5
SCM3: Integrated facilities in supply chain	263	2.958	1.423	1	5
SCM4: Relationship Development	263	2.909	1.403	1	5
SCM5: Improving the operational practices	263	2.958	1.377	1	5



SCM6: creating friendly environment for the relationship	263	2.992	1.342	1	5
GSADOP1: working on environment friendly policies	263	2.992	1.417	1	5
GSADOP2: reduction of fuel consumption	263	3.156	1.363	1	5
GSADOP3: working with lean suppliers	263	3.015	1.475	1	5
GSADOP4: motivating employees to work under green practices	263	3.308	1.453	1	5
GSADOP5: motivating customers to adopt green products	263	2.977	1.345	1	5
BNKD1: Advertising for Deposits	263	3.023	1.488	1	5
BNKD2: Retention of Deposits	263	2.943	1.376	1	5
BNKD3: Exploring new Deposits	263	2.989	1.455	1	5

Descriptive results are showing the fact that most of the items for supply chain management, adoption of green supply chain and bank deposits have their moderate level of responses from the respondents. Similarly, the trends in the standard deviation is also between 1 and 2 where highest value is represented by 1.48 for BNKD1 and lowest by SCM6;1.363. For the scaling of all these items, minimum and maximum range is 1 and 5.

Table 10 is providing the regression output for Model-1 as BANKD1; the main dependent variable, Model-2 as BANKD2; main dependent variable, and Model-3 as BANKD3; the key outcome variable. It is observed that SCM1 is highly significant and positively related to BANKD1 and BANKD3 where the coefficients are .5020 and .1298. significant at 1 percent with lower standard error as provided in the parenthesis below the relative coefficients. It means that higher the focus on SCM1 and

related practices, positive the impact on the first and third dimension of bank deposits. For SCM4, impact on BANKD1 and BANKD2 is .2852 and .4220 which means that there is a positive and significant impact on first and second measure of bank deposit as measured through five point likert scale. Additionally, SCM6 is showing totally a contrary effect on first and second measure of the bank deposit where coefficients are -.928 and -.434. This reflect that SCM6 is negatively affecting the bank deposit. For explanatory power of the model, highest R2 is presented by Model-1 which is .218 which means that overall 21 percent change in bank deposit is directly defined by the supply chain management. In addition, BANKD2 is found to have a change of 11.3 percent by supply chain management but lowest by Model-3 which is 5.1 percent as provided under Table 10.

**Table 10.** Supply Chain Management and Bank Deposits

	(M1)	(M2)	(M3)
Supply Chain Management	BANKD1	BANKD2	BANKD3
SCM1	0.5020***	0.0807	0.1298***
	(0.0662)	(0.0614)	(0.0650)
SCM2	0.0188	-0.0563	0.0748
	(0.0641)	(0.0595)	(0.0629)
SCM3	0.0385	-0.00185	-0.00493
	(0.0657)	(0.0609)	(0.0645)
SCM4	0.2852***	0.4220**	0.0161
	(0.0662)	(0.0614)	(0.0650)
SCM5	0.0932	0.0185	-0.00869
	(0.0676)	(0.0626)	(0.0663)
SCM6	-0.928***	-0.434***	0.0701
	(0.0693)	(0.0642)	(0.0680)
Constant	2.626***	3.302***	2.591***
	(0.487)	(0.451)	(0.478)
Observations	263	263	263
R-squared	0.218	0.113	0.051

Notes: Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 11 is providing the results for the green supply chain adoption and bank deposits where GSADOP2 is positive and significant where coefficient is 0.120. It means that there is a positive and significant impact of green supply chain adoption. For Model-2 the influence of GSADOP2 on the 2<sup>nd</sup> measure of bank deposit is 0.398

which provides the argument that there is a direct and positive relationship between the GSADOP2 and bank deposit as measured through second indicator. However, rest of the items for the green supply chain adoption is insignificant, except for GSADOP5 which is -0.165 which is negative and significant at 1 percent chance of error and

for BANKD3 which is -.119, significant at 1 percent. For the model explanation, Model 1 is showing the variation

in main dependent variable of 13.3 percent, Model 2 is 12.0 percent and 15.3 percent by Model 3 of the study.

**Table 11.** Supply Chain Adoption and Bank Deposits

VARIABLES	(1) BANKD1	(2) BANKD2	(3) BANKD3
gsadop1	-0.0172 (0.0650)	0.0243 (0.0605)	0.00117 (0.0645)
gsadop2	0.120* (0.0722)	0.3980*** (0.0673)	-0.0454 (0.0718)
gsadop3	-0.0689 (0.0626)	0.0799 (0.0583)	-0.0119 (0.0622)
gsadop4	0.0212 (0.0639)	0.0697 (0.0595)	-0.0312 (0.0634)
gsadop5	-0.165** (0.0686)	-0.0717 (0.0639)	-0.119*** (0.0681)
Constant	3.327*** (0.411)	2.502*** (0.383)	3.225*** (0.409)
Observations	263	263	263
R-squared	0.133	0.120	0.153

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Conclusion

By using the global forces framework presented here, managers can clearly analyze the various important factors that shape global operations decisions and understand the implications of recent global events and trends on their supply chain strategies. We clearly illustrate the application of our framework in shaping supply chain strategy via a real case study from our consulting practice. Supply chain management is an expansive and complex undertaking that relies on each partner -- from suppliers to manufacturers and beyond -- to run well. Because of this, effective supply chain management also requires change management, collaboration and risk management to create alignment and communication between all the participants.

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