Quantitative Analysis of Consultation and Support Functions by Financial Institutions

(Summary)

This paper attempts to conduct a quantitative analysis of business consultation and support functions provided by financial institutions to their client firms, using a questionnaire asking how firms evaluate financial institutions' practices as well as firms' financial data. It is suggested that there are certain correlations between the consultation and support functions provided by financial institutions and changes in firms' financial performance, although data and analytical methods need to be improved to further examine the effects of policies related to consultation and support functions by financial institutions.

I. Scope of analysis

The concept of "relationship banking," in which financial institutions provide loans to firms based on information about the qualities of the managers and business potential of the firm under a long-term business relationship, has been widely recognized since the Financial Services Agency (FSA) and its expert committee published reports titled "Toward Strengthening the Function of Relationship Banking" (2003) and the following "Action Program for Strengthening the Function of Relationship Banking" (2003).[1] The program proposed the need to strengthen the function of relationship banking, and since then many narrative-based case studies of relationship banking have been accumulated. However, quantitative verification of the effects of relationship banking has not been conducted so widely compared to the accumulation of qualitative cases. Therefore, in this paper, an analysis using a quantitative method is conducted to examine how financial institutions provide business consultation and support services to their client firms (hereinafter, "consultation and support functions"). In the analysis, individual responses to the FSA's questionnaire on financial institutions' practices collected from SMEs (hereafter, "corporate questionnaire") are utilized as a part of the dataset.

This paper conducts analyses from the following three perspectives by using data, such as a corporate questionnaire conducted in March 2020, corporate financial data (FY2019 data) obtained

[1] https://www.fsa.go.jp/news/newsj/14/ginkou/f-20030328-2.html (Japanese only)

from a third-party vendor, and the FSA's internal data on financial institutions' loans and capital as of the end of March 2020:

(1) Analysis of trends in consultation and support functions

(2) Analysis of the impact of the support functions on firms' willingness to continue their relationship with a financial institution

(3) Analysis of the impact of consultation and support functions on firms' financial performance

This paper analyzes the performance of consultation and support functions by main banks (the banks with the top financing share to certain firms among other peers) based on responses to the corporate questionnaire; the trends of non-main banks are not in the scope of the analysis.

II. Analysis (1): Analysis of trends in consultation and support functions

As pointed out in the progress report on enhancing the financial intermediary function published by the FSA in June 2023,[2] regional financial institutions are, by their nature, required to develop business models that enable them to achieve their own sustainable management based on their regional business bases. Therefore, providing consultation and support to their regional clients could be an effective measure for ensuring both the stability of their own business bases and the sustainability of the regional economies.

On the other hand, how to perform consultation and support functions depends on the business model and the management strategy of each financial institution. Therefore, an analysis using the data mentioned above is conducted in order to grasp the characteristics of what types of banks and clients are more involved in consultation and support functions.

1. Analytical method

A corporate questionnaire conducted by the FSA asks SMEs about how their main banks are performing and whether they make use of various services provided by their main banks. Questions cover banks' consultation activities, such as "attentive interview on business and management concerns," and support services, such as "support on business plan development," as shown in Table

[2] https://www.fsa.go.jp/news/r4/ginkou/20230628/20230628.html (Japanese only)

1 below (hereafter, activities and services related to consultations and support functions by banks are collectively referred to as "services"). SMEs answer the questionnaire by selecting “yes” or “no” to the applicability of each service. Based on this, the following logit model is built to estimate the relationship between the probability of a firm i answering "yes" to each service s ($p_{i,s}$) and variables related to individual firms’ financial status and financial institutions’ characteristics.[3]

$$log\frac{p_{i,s}}{1-p_{i,s}} = \beta_{0,j,s} + \sum_{m=1}^{5} \beta_{m,j,s} \cdot Company_{m,i} + \sum_{m=6}^{8} \beta_{m,l,s} \cdot Financial\_institution_{m,k} + \varepsilon_{i,s}$$

Three services related to consultation and five services related to support are used for dependent variables. In addition, the question about whether the firms are "receiving visits from the main bank about once a month” is also included as a dependent variable for comparison. In total, nine regression analyses are performed. Explanatory variable $Company_{m,i}$ denotes firms’ financial status and $Financial\_institution_{m,k}$ denotes the characteristics of the financial institutions providing services. $\beta_{0-5,j,s}$ and $\beta_{6-8,l,s}$ are parameters to be estimated and $\varepsilon_{i,s}$ represents the error term.

[3]The items related to the implementation status of consultation services, such as "attentive interview on business and management concerns," are items that are evaluated subjectively by client firms. Therefore, when a high rating is observed for these items, there are two possibilities: financial institutions are focusing on providing consultation services, or a client gives a high rating simply because it has a favorable impression of financial institutions. Analyses in this paper use consultation-related services as a proxy variable for the former and thus do not consider the latter possibility. Therefore, various possibilities need to be considered when interpreting the results presented in this paper.

Table 1: List of Variables

[Service (dependent variables)]

Consultation

(1) Attentive interview on business and management concerns

(2) Frequent communication on issues and concerns related to business and management

(3) Issues raised and evaluations conveyed by the main bank are convincing

Support

(4) Business plan development

(5) Improvement of financial conditions

(6) Introduction of business partners and distributors

(7) Fixed cost reduction

(8) Introduction of management personnel

Other

(9) Receiving visits approximately once a month

Corporate financial variables (Company)

(1) ROA (operating income / total assets)

(2) Debt ratio (long-term and short-term debt / total assets)

Control variable

(3) Industry dummy

(4) Number of employees dummy

(5) Management age dummy

[Financial institution characteristic variables]

(6) Share of loans in the prefecture where the head office is located

(7) Lending competition in the prefecture where the head office is located (loan amount HHI*)

(8) Equity capital (logarithm)

(*) HHI (Herfindahl-Hirschman Index) is an index measuring the competitiveness in the market. Here, HHI is calculated by aggregating the squares of the loan amount shares of all financial institutions in the certain prefecture. The value range from 0 to 1, with closer to 0 being more competitive and closer to 1 being more monopolistic.

2. Estimation results

Table 2 shows the logit model's estimation results for each service, from which the following three trends can be observed. First, the coefficients for firms' ROA are significantly positive for 2 out of the 3 consultation services and 4 out of the 5 support services, and the coefficients for the debt ratio are significantly positive for all services. This indicates that firms with better profitability (ROA) and more borrowing (higher debt ratio) are more likely to receive consultation and support from financial institutions. Second, the coefficients for the size of financial institutions (equity capital) are significantly negative for all 5 support services, indicating that smaller financial institutions are more likely to provide support services. Third, the coefficients for the loan amount HHI are significantly positive for the 3 consultation services and negative for 2 support services, indicating that financial institutions headquartered in regions where competition among financial institutions is not intense (i.e., where the

loan amount HHI is high) are relatively more likely to provide consultation, but in contrast, for some support services, financial institutions in regions where competition is intense (i.e., where the loan amount HHI is low) are more likely to provide support services.

It should be noted that this analysis confirmed only the correlation between questionnaire responses and various variables related to firms' financial status and characteristics of financial institutions. For example, the first observation that "firms with higher profitability (ROA) receive more consultation and support from financial institutions" suggests that there are both possibilities that financial institutions may be actively providing services to firms with higher profitability (ROA), and that firms with higher profitability (ROA) may have more need for such services from financial institutions. Thus, it is necessary to consider these various possibilities when interpreting this analysis.

Table 2: Estimation results (Regression against each service)

Consultation services

dependent variables	Attentive interview on bussiness and management concerns	Frequent communication on issues and concerns related to bussiness and management	Issues raised and evaluations conveyed by main bank are convinsing
ROA (oprerating income / total assets)	1.2034**	0.9433*	0.4523
	(0.008)	(0.024)	(0.395)
Debt ratio (long-term and short-term debt / total assets)	0.6521***	0.5656***	0.5143***
	(0.000)	(0.000)	(0.001)
Share of loans in the prefecture where the head office is located	0.0126	-0.3236	-0.0002
	(0.971)	(0.303)	(0.999)
Lending competition in the prefecture where the head office is located (loan amount HHI)	1.1860 †	1.1988*	1.0001 †
	(0.076)	(0.048)	(0.094)
Equity capital (logarithm)	0.0147 †	0.0003	-0.0043
	(0.068)	(0.964)	(0.554)
pseudo-R2	0.04198	0.0307	0.02359

Supporting services

dependent variables	Bussiness plan development	Improvement of financial conditions	Introduction of bussiness partners and distributors	Fixed cost reductions	Introduction of management personnel	Receiving visits approximately once a month
ROA (oprerating income / total assets)	1.7485**	2.5295**	0.6723	1.8225 †	2.2673 †	1.0185*
	(0.009)	(0.007)	(0.288)	(0.087)	(0.076)	(0.027)
Debt ratio (long-term and short-term debt / total assets)	1.6045***	1.3095***	0.3688*	0.7203*	0.6771*	0.4649**
	(0.000)	(0.000)	(0.039)	(0.012)	(0.014)	(0.006)
Share of loans in the prefecture where the head office is located	0.4874	0.5228	0.2642	-0.6970	0.8567	-0.6464 †
	(0.300)	(0.219)	(0.509)	(0.306)	(0.187)	(0.068)
Lending competition in the prefecture where the head office is located (loan amount HHI)	-1.7069 †	-0.212	-0.7641	-0.8453	-3.5722**	0.4145
	(0.062)	(0.800)	(0.324)	(0.517)	(0.004)	(0.547)
Equity capital (logarithm)	-0.1117***	-0.1109***	-0.0790***	-0.1366***	-0.1192***	0.0406***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pseudo-R2	0.03629	0.02929	0.02504	0.01300	0.01384	0.04661

※ upper row : Estimated coefficients、lower row : (p-value)

※ Constant terms and dummy variables are omitted.

※ “†”, “*”, “**”, and “***” indicate that the significance level is met at 10%, 5%, 1%, and 0.1%.

III. Analysis (2): Analysis of the impact of the support functions on firms' willingness to continue their relationship with a financial institution

In order for financial institutions to realize the business model of relationship banking, it is ideal to create a virtuous cycle between the services provided by financial institutions and their clients' willingness to continue business transactions. In other words, relationship banking requires financial institutions to build good relationships with their client firms by providing support and other services. In turn, these firms are expected to become willing to maintain a relationship with the financial institutions, which leads to sustainable profitability of the financial insitutions.

In this section, the impact of the support functions on the clients' willingness to continue transactions with financial institutions is examined by using the aforementioned data.

1. Analytical method

The following logit model is built, where $p_{i,s}$ denotes the probability that firm i answers, "Yes, I definitely want to continue doing business with the current main bank," to the question, "Do you want to continue doing business with your current main bank?" $Service_{i,s}$ denotes whether a firm received each support service from a financial institution (binary variable: applicable: 1, not applicable: 0).

$$log\frac{p_{i,s}}{1-p_{i,s}} = \beta_{0,j,s}+\beta_{1,j,s}\cdot Service_{i,s} + \sum_{m=2}^{6}\beta_{m,j,s}\cdot Company_{m,i}$$

$$+\sum_{m=7}^{9}\beta_{m,l,s}\cdot Financial\_institution_{m,k}+\varepsilon_{i,s}$$

The list of variables is shown in Table 3. $\beta_{0-6,j,s}, \beta_{7-9,l,s}$ are the parameters to be estimated and $\varepsilon_{i,s}$ is the error term. Services provided by financial institutions to clients are used as explanatory variables. A total of ten services are chosen as explanatory variables, of which five are related to business support, such as "business plan development," and four are related to financing, such as "loans for equipment funds." Another service, “Receiving visits approximately once a month," is included as a comparison. Ten separate regressions were run to evaluate the impact of each service

on willingness to continue the relationship. In addition, firms' financial status $Company_{m,i}$ and the characteristics of financial institutions $Financial\_institution_{m,k}$ are included in the logit formula as control variables similar to Analysis (1).

Table 3: List of Variables

Questionnaire item (dependent variables)

- Whether the client firm is willing to continue transactions with the main bank

Service

Support

(1-1) Business plan development

(1-2) Improvement of financial conditions

(1-3) Introduction of business partners and distributors

(1-4) Fixed cost reduction

(1-5) Introduction of management personnel

Loan

(1-6) Loans for equipment funds

(1-7) Loans for working capital for purchases of commodities and raw materials

(1-8) Loans for funds related to the payment of expenses, such as employees' salaries

(1-9) Loans for funds related to the repayment of existing loans

Other

(1-10) Receiving visits approximately once a month

Corporate financial variables (Company)

Control variable

(2) ROA (operating income / total assets)

(3) Debt ratio (long-term and short-term loans / total assets)

(4) Industry dummy

(5) Number of employees dummy

(6) Management age dummy

Financial Institution characteristic variables

(7) Share of loans in the prefecture where the head office is located

(8) Lending competition in the prefecture where the head office is located (loan amount HHI*)

(9) Equity capital (logarithm)

(*) HHI (Herfindahl-Hirschman Index) is an index measuring the competitiveness in the market. Here, HHI is calculated by aggregating the squares of the loan amount shares of all financial institutions in the certain prefecture. The value range is from 0 to 1, with closer to 0 being more competitive and closer to 1 being more monopolistic.

2. Estimation results

Table 4 shows the estimated results of the logit model for each service provided by financial institutions. For 9 of the 10 items, significantly positive coefficients were observed, indicating that there is a certain correlation between the willingness of firms to continue transactions with their current

main bank and the provisioning of support services by the main bank.

However, similar to the previous Analysis (1), this analysis also confirmed just the correlation and did not evaluate the causal relationship, i.e., causality between the proposal or provision of services by the financial institution, and clients' willingness to continue transactions with the financial institution is uncertain. Thus, it is necessary to recognize such possibilities in interpreting the results.

Table 4: Estimation results (Regression using each service as explanatory variable)

Supporting services

dependent variables	Whether the client firm is willing to continue transactions with the main bank				
Bussiness plan development	0.3331*				
	(0.018)				
Improvement of financial conditions		0.3356**			
		(0.009)			
Introduction of bussiness partners and distributors			0.5671***		
			(0.000)		
Fixed cost reductions				0.2078	
				(0.311)	
Introduction of management personnel					0.6208**
					(0.002)
pseudo-R2	0.02882	0.02928	0.03501	0.02702	0.03059

Loans, other services

dependent variables	Whether the client firm is willing to continue transactions with the main bank				
Loans for equipment funds	0.3762***				
	(0.000)				
Loans for working capital for purchases of commidities and raw materials		0.5975***			
		(0.000)			
Loans for funds related to the payment of expenses, such as employees' salaries			0.5398**		
			(0.002)		
Loans for funds related to the repayment of existing loans				0.2301 †	
				(0.082)	
Receiving visits approximately once a month					0.9379***
					(0.000)
pseudo-R2	0.03138	0.03954	0.03047	0.02779	0.06047

※ upper row : Estimated coefficients、lower row : (p-value)

※ Constant terms and dummy variables are omitted.

※ " † ", "*", "**", and "***" indicate that the significance level is met at 10%, 5%, 1%, and 0.1%.

IV. Analysis (3) Analysis of impact of consultation and support functions on firms' financial performance

As previously noted, the need for financial institutions to provide consultation and support to their clients has been widely recognized since the publication of the "Action Program" by the FSA in 2003. Many case studies of relationship banking have been accumulated in narrative forms since then, however, a quantitative examination of its effects seems to still be underway due to limitations in

available data and methods.

Against this backdrop, this section attempts to conduct a quantitative analysis, using the aforementioned data, to examine the causality question, that is, whether the consultation and support functions by financial institutions contribute to the financial performance of their clients.

1. Analytical method

First, the relationship between the changes in financial indicators of clients between FY2019 and FY2022 and services related to consultation and support functions are estimated by using regression formula 1 below.

(Regression formula 1)

$$Financial\_indicator\_diff_{i,f} = \beta_{0,j,f,s} + \beta_{1,j,f,s} \cdot Service_{i,s} + \beta_{2,j,f,s} \cdot Industry_i + \beta_{3,j,f,s} \cdot Number\_of\_employees_i + \varepsilon_{i,f,s}$$

The dependent variable $Financial\_indicator\_diff_{i,f}$[4] denotes the differences in three financial indicators between FY2019 and FY2022, i.e., EBITDA, liquidity ratio, and expenses (excluding interest expenses and other extraordinary expenses). Since it is considered that it takes a certain period for consultation and support functions to have an actual impact on clients' financial performances, the three-year differences in financial indicators are used.

The explanatory variable $Service_{i,s}$ denotes services related to consultation and support functions provided by financial institutions. $Industry_i$ and $Number\_of\_employees_i$ are control variables representing industry and the number of employees dummy respectively. $\beta_{0-3,j,f,s}$ are the parameter to be estimated and $\varepsilon_{i,f,s}$ is the error term.

However, even if a significant coefficient is found in the assumed direction in regression formula 1, the possibility of an inverse causal relationship cannot be ruled out. That is, financial institutions may actively provide consultation and support to financially sound firms. Therefore, as shown in regression formula 2 below, the instrumental variables method, which is a common method in causal inference, was conducted in the following analysis.

[4]The definition of subscript f represents the letter that identifies the difference between the 2019 and 2022 financial measures of the explained variable.

Specifically, first, the dependent variable $Service_{i,s}$, which denotes consultation and support services provided by financial institutions, is estimated by the instrumental variable $Bank\_Equity_k$, which denotes financial institutions' equity capital. In addition, $Bank\_Share_k$, which denotes financial institutions' share of loans in the prefecture in which their head offices are located, is used as a control variable (regression formula 2-1). Next, $fitted\_Service_{i,s}$ is estimated as shown in regression formula 2-2 below to identify a causal relationship.

(Regression formula 2)

(Regression formula 2-1)

$$Service_{i,s} = \beta_{0,j,s} + \beta_{1,l,s} \cdot Bank\_Equity_k + \beta_{2,l,s} \cdot Bank\_Share_k + \varepsilon_{i,s}$$

(Regression formula 2-2)

$$Financial\_indicator\_diff_{i,f} = \beta_{0,j,f,s} + \beta_{1,j,f,s} \cdot fitted\_Service_{i,s} + \beta_{2,l,f,s} \cdot Bank\_Share_k + \varepsilon_{i,f,s}$$

Box 1: Instrumental variable method

In the instrumental variable method, a certain variable that is not correlated with the dependent variable but is correlated with the explanatory variable (instrumental variable) is used to specify a causal relationship by excluding the impact of covariates that affect both the dependent variable and the explanatory variable.

On the premise that the size of financial institutions is correlated with the extent to which they provide consultation and support functions to their clients but is unrelated to the financial performance of the clients to some extent, "the amount of financial institutions' equity capital (logarithm)," which is a proxy variable for the size of financial institutions, is introduced as an instrumental variable.

However, the selected instrumental variable may directly affect the dependent variable, i.e., there may be a tendency for firms with good financial conditions to have a relationship with a large-sized financial institution in the region. Therefore, the share of loans in the prefecture where the financial institution's head office is located is used as a control variable, as a proxy variable for "the relative size of the financial institution in its region." By controlling this, the aforementioned tendency is expected to be controlled and thus the exogeneity of the instrumental variable on the dependent variable is expected to be strengthened.[5]

[5]It should be noted that the control may not be perfect because the business area of financial institutions is actually subdivided at the level of municipalities or even smaller, not at the level of prefectures.

2. Estimation results

Table 5 shows the estimated results of regression formula 1. A significantly positive coefficient is observed for "Fixed cost reduction" against "ΔEBITDA," while significantly negative coefficients are observed for "Improvement of financial conditions" and "Referrals of business partners and distributors" against "Δexpenses (excluding interest expenses, etc. and extraordinary expenses)."[6]

Table 5: Estimation results

Consultation services

dependent variables	Δ EBITDA			Δ liquidity ratio			Δ expenses (excluding interest expenses, etc. and extraordinary		
Attentive interview on bussiness and management concerns	0.3881			-0.3402			1.0414 †		
	(0.427)			(0.157)			(0.069)		
Frequent communication on issues and concerns related to bussiness and management		0.6519			-0.3603			0.5083	
		(0.244)			(0.191)			(0.439)	
Issues raised and evaluations conveyed by main bank are convinsing			0.279			-0.2992			0.8770
			(0.694)			(0.391)			(0.291)
R2	0.023	0.023	0.022	0.005	0.005	0.004	0.013	0.012	0.012

Supporting services

dependent variables	Δ EBITDA					Δ liquidity ratio					Δ expenses (excluding interest expenses, etc. and extraordinary expenses)				
Bussiness plan development	-0.5019					-0.1474					-0.2224				
	(0.488)					(0.679)					(0.794)				
Improvement of financial conditions		0.4911					-0.2198					-1.3265 †			
		(0.462)					(0.503)					(0.090)			
Introduction of bussiness partners and distributors			0.7509					0.0174					-1.3562 †		
			(0.229)					(0.955)					(0.064)		
Fixed cost reductions				2.3353*					0.2184					-1.3702	
				(0.033)					(0.685)					(0.285)	
Introduction of management personnel					0.0313					0.0432					-0.4788
					(0.974)					(0.927)					(0.672)
R2	0.023	0.023	0.023	0.025	0.022	0.004	0.004	0.004	0.004	0.004	0.011	0.013	0.013	0.012	0.011

※ upper row : Estimated coefficients、lower row : (p-value)

※ Constant terms and dummy variables are omitted.

※ "†", "*", "**", and "***" indicate that the significance level is met at 10%, 5%, 1%, and 0.1%.

※ For EBITDA and expenses, NEG-LOG transformation (Yn = sng(Xn) x ln(|Xn| + 1), if Xn > 0, sgn = +1 else sgn = -1) was applied.

Table 6 shows the results of the first step estimation (regression formula 2-1) of the two step least-squares method of the instrumental variable method. Given the significant coefficient for the consultation service "Attentive interview on business and management concerns" against the instrumental variable $Bank\_Equity_k$, the second step estimation (regression formula 2-2) is conducted for "Attentive interview on business and management concerns" as shown in Table 7.

[6]"Attentive interview on business and management concerns" is significant for "Δexpenses (excluding interest expenses, etc. and extraordinary expenses)" in the opposite direction to the assumed sign, but there is a possibility of an inverse causal relationship. The point is the same that it cannot be evaluated based on this analysis alone.

Table 6: Estimation results

	consultation services				support services			
dependent variables	Attentive interview on bussiness and management concerns	Frequent communication on issues and concerns related to bussiness and management	Issues raised and evaluations conveyed by main bank are convinsing	Bussiness plan development	Improvement of financial conditions	Introduction of bussiness partners and distributors	Fixed cost reductions	Introduction of management personnel
Bank Equity (logarithm)	-0.0183 †	-0.0070	-0.0045	-0.0077	-0.0100	0.0014	-0.0045	0.0018
	(0.087)	(0.451)	(0.541)	(0.286)	(0.202)	(0.872)	(0.342)	(0.740)
Share of loans in the prefecture where the head office is located	0.0293	-0.0002	-0.0727	-0.0366	0.0459	-0.0007	-0.0524	-0.0264
	(0.698)	(0.998)	(0.159)	(0.469)	(0.404)	(0.990)	(0.118)	(0.489)
R2	0.002	0.000	0.002	0.001	0.001	0.000	0.003	0.000
F-value	1.49	0.3243	1.677	1.249	0.9023	1.40E-02	2.485	0.2441

※ upper row : Estimated coefficients、lower row : (p-value)

※ Constant terms and dummy variables are omitted.

※ " † ", "*", "**", and "***" indicate that the significance level is met at 10%, 5%, 1%, and 0.1%.

Table 7: Estimation results

dependent variables	Δ EBITDA	Δ liquidity ratio	Δ expenses (excluding interest expenses, etc. and extraordinary expenses)
Attentive interview on bussiness and management concerns	2.0312	-1.5615	24.942
	(0.8718)	(0.7633)	(0.2191)
R2	-0.0057	-0.0126	-0.9874

※ upper row : Estimated coefficients、lower row : (p-value)

※ Constant terms and dummy variables are omitted.

※ " † ", "*", "**", and "***" indicate that the significance level is met at 10%, 5%, 1%, and 0.1%.

※ for EBITDA and expenses, NEG-LOG transformation (Yn = sng(Xn) x ln(|Xn| + 1), if Xn > 0, sgn = +1 else sgn = -1) was applied.

A causal relationship between the consultation item "Attentive interview on business and management concerns" and three-year differences between financial indicators could not be confirmed under this instrumental variable method. However, for the following reasons, it would not be appropriate to conclude from this analysis alone that the consultation and support functions do not improve firms' financial performance. First, there is room for further consideration in the selection of instrumental variables[7] as the causal inference was unstable and also performed partially since no effective instrumental variables were found for the three services for which significant coefficients were confirmed in the aforementioned regression formula 1, i.e., "Improvement of financial conditions," "Fixed cost reduction," and "Introduction of business partners and distributors", within the data used in this analysis. Second, a significant sample reduction occurred in the process of combining a corporate questionnaire and corporate financial data, so there might be some sample bias in the dataset. Third, the time horizon covered in this analysis needs to be discussed as some consultation and support services may take more than three years to improve firms' financial

[7]For the selection of instrumental variable, in addition to the analysis using regression formula 2, a separate analysis using another instrumental variable, a dummy variable indicating how a firm answered to the corporate questionnaire (whether by online or by post), has also been tested. The result was same, i.e., significant causality was not observed. This alternative instrumental variable was selected based on the hypothesis that the attitude of understanding the questionnaire instructions and responding via online form is correlated with the extent to which the firm receives consultation and support functions from financial institutions. Industry and number of employees are controlled in the analysis, assuming that larger firms may tend to respond by online and that ICT literacy by industry may correlate with the way of answering the questionnaire.

performance, depending on the nature of the services.

V. Conclusion

In this paper, a quantitative analysis of financial institutions' consultation and support functions was conducted using corporate questionnaires and corporate financial data.

Analysis (1) and (2) identified the trends and characteristics of consultation and support by financial institutions, which is expected to help deepen the understanding of financial institutions' business models and behavior. Analysis (3) found a certain correlation between the provision of consultation and support functions by financial institutions and firms' financial performance, although causal relationship was not observed.

Although the models and analytical results presented in this paper provide some clues to understanding the current situation, the analytical framework of utilizing qualitative information, such as a corporate questionnaire and individual firms' financial data and other granular data, is still at the experimental phase. Furthermore, since it is not possible to directly observe the performance of consultation and support functions provided by financial institutions to their clients, the analysis utilized the responses of corporate questionnaires, which may be affected by factors other than the performance of consultation and support functions, such as firms' subjective favorable impression of financial institutions and firms' need for services. Moreover, the process of sampling and submitting corporate questionnaires, and the sample reduction that occurred when combining corporate questionnaires with corporate financial data, may generate sample bias. For these reasons, it is important to interpret the results taking these points into consideration.

Enhancing policy making and policy assessment based on data and quantitative analysis is a medium- to long-term agenda. Even in cases where it is difficult to identify causality due to the existence of various confounding factors and simultaneous determinism as in the analysis in this paper, it may be possible to assess policy effects through the construction of appropriate datasets and models. The FSA will continue to improve its data infrastructure including collection of granular data, such as transaction-level data on bank loans[8] and corporate financial data. The FSA will also continue to enhance analytical methods to better understand the environment surrounding the financial system and the economy, and to have effective dialogues with financial institutions.

[8]https://www.fsa.go.jp/news/r4/sonota/20230623/20230623.html

Box 2: Another method of modeling analysis (3) by focusing on changes in questionnaire responses

Analysis (3) analyzed the relationship between three-year changes in financial indicators and the "level" of questionnaire responses (i.e., whether or not client firms are receiving consultation or support services at a certain point in time), under the assumption that ongoing commitment by financial institutions improves the financial performance of the clients.

However, given that changes in the provision of consultation/support functions trigger improvements in the financial performance of the clients, there may be another way of designing the analysis focusing on "changes" in the responses of the same firm to the corporate questionnaire (i.e., changes over time from the status of not receiving consultation/support services to the response of receiving consultation/support services). Therefore, an additional analysis was conducted using the following fixed effects model[9] with a focus on the relationship between "changes" in the responses of the same company to the corporate questionnaire and changes in its financial indicators.

In this analysis, firm-fixed effect $Firm_i$ and time-fixed effect $Year(2020,2021)_t$ are introduced (due to the introduction of a time-fixed effect, the dependent variable, a financial indicator, is changed from its difference to its level at a certain time). Estimation for $t = 2020$ $(t = 2021)$ uses the corporate questionnaires conducted in March 2020 (April 2021) and TDB's corporate financial data for FY2019 (FY2020)[10]. The number of samples used in this analysis is N = 1834, where $\beta_{0-1,j,f,s}$, $\beta_{2,i,f,s}$ and $\beta_{3,f,s,t}$ are the parameters to be estimated and $\varepsilon_{i,f,s,t}$ represents the error term.

(Regression formula 3)

$$Financial\_indicator_{i,f,t} = \beta_{0,j,f,s} + \beta_{1,j,f,s} \cdot Service_{i,s,t} + \beta_{2,i,f,s} \cdot Firm_i + \beta_{3,f,s,t} \cdot Year(2020,2021)_t + \varepsilon_{i,f,s,t}$$

The results of the estimation are shown in Table 8. As with regression formula 1 in Analysis (3), significant coefficients were found among some services but no causal relationship could be observed by applying the instrumental variable method using "the amount of equity capital of financial institutions," which was controlled by the share of loans in the prefecture where the financial

[9] In this section, dummy variables are set for observed individuals and time, respectively, and the problem of missing variables is solved by controlling elements that are different for observed individuals but constant over time, and elements that are constant for observed individuals but different over time. Therefore, the effect of trends common to all individuals against time and fluctuating over time is removed from the estimation.

[10] Fiscal period ends between April 2019 (2020) and March 2020 (2021) are defined as FY2019 (FY2020).

institution's head office is located, as an instrumental variable.[11]

However, as in analysis (3), it is not possible to conclude from this analysis alone that the provision of consultation and support function to clients has no impact on their financial performances given that it may take considerable time for financial institutions' services to take effect on firms' financial performance and so on.

Table 8: Results of model estimates (regression results for each service against financial indicators)

Consultation services

dependent variables	EBITDA			liquidity ratio			expenses (excluding interest expenses, etc. and extraordinary expenses)		
Attentive interview on bussiness and management concerns	0.0225			0.0314			-0.0059		
	(0.615)			(0.757)			(0.969)		
Frequent communication on issues and concerns related to bussiness and management		0.0127			0.2259*			-0.0004	
		(0.791)			(0.037)			(0.982)	
Issues raised and evaluations conveyed by main bank are convinsing			-0.0458			0.0900			0.0007
			(0.432)			(0.496)			(0.973)
R2	0.946	0.946	0.946	0.936	0.937	0.936	0.969	0.969	0.969

Supporting services

dependent variables	EBITDA					liquidity ratio					expenses (excluding interest expenses, etc. and extraordinary expenses)				
Bussiness plan development	-0.0872					0.0798					-0.0424 †				
	(0.240)					(0.635)					(0.090)				
Improvement of financial conditions		-0.0660					-0.0443					0.0232			
		(0.281)					(0.750)					(0.262)			
Introduction of bussiness partners and distributors			-0.0129					0.0202					-0.0007		
			(0.816)					(0.872)					(0.969)		
Fixed cost reductions				0.0107					-0.1324					-0.0092	
				(0.910)					(0.536)					(0.772)	
Introduction of management personnel					-0.1786*					-0.1491					0.0096
					(0.046)					(0.463)					(0.750)
R2	0.946	0.946	0.946	0.946	0.946	0.936	0.936	0.936	0.936	0.936	0.969	0.969	0.969	0.969	0.969

※ upper row : Estimated coefficients、lower row : (p-value)

※ Constant terms and dummy variables are omitted.

※ "†", "*", "**", and "***" indicate that the significance level is met at 10%, 5%, 1%, and 0.1%.

※ for EBITDA and expenses, NEG-LOG transformation (Yn = sng(Xn) x ln(|Xn| + 1), if Xn > 0, sgn = +1 else sgn = -1) was applied.

[11]A significant relationship is observed between EBITDA and "Introduction of management personnel" in the opposite direction from the expectation. It is possible to interpret this as meaning that a company with low profitability (EBITDA) is more likely to use the "Introduction of management personnel" service (reverse causality) and that the "Introduction of management personnel" service does not immediately lead to an improvement in profitability (EBITDA). In any case, it is difficult to make a convincing interpretation without addressing the issue of simultaneous determinism of the dependent and explanatory variables.