Macroeconomic Impacts of Closure of Small and Medium Enterprises

FUKANUMA Hikaru*

Chief Research Fellow, Japan Finance Corporation Research Institute

YAMAZAKI Atsushi

Economist, Japan Finance Corporation Research Institute

YAMADA Yoshimi

Visiting Economist, Japan Finance Corporation Research Institute

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Abstract

Owners of small and medium enterprises (SMEs) are aging. An increase in aged owners means an increase in potential retirees among them. When an SME owner retires, its business will continue if there is a successor or if it is taken over by another concern, but otherwise is highly likely to be closed. However, even SMEs that are expected to go out of business in the future are still creating a certain number of jobs and earning income by providing goods and services. Added value created through such operations are a source of GDP. The Japanese economy will suffer a great loss if they cease to exist. In this report, we will estimate decreases in the number of workforces, the amount of added value and sales through the closure of SMEs, using findings by the "Survey on Business Succession of SMEs" newly conducted by the Japan Finance Corporation Research Institute in 2019.

When prospects for SME business succession are broken into four types based on results of the questionnaire survey, 12.5% of SMEs are found to have already decided on a successor with his/her consent (hereinafter, "companies with a definite successor"). The percentage of SMEs whose owners have yet to decide on a successor ("companies without a definite successor") is 22.0%, while 52.6% of owners are planning to close business ("companies planning for closure"). In addition, 12.9% responded that they are still young enough not to have to consider their successors ("companies yet to consider a successor").

We first made estimates for companies planning for closure, finding that 7,043,000 workforces, 25.1 trillion yen worth of added value, and 110.3 trillion yen in sales would be lost through 2,002,000 cases of closure. Furthermore, 7.2% of companies with a definite successor and 12.8% of companies without a definite successor suggested the possibility of eventually going out of business. Adding the impacts of their possible closure, we estimated that a total of 2,144,000 SMEs would close business, resulting in losses of 9,195,000 workforces, 44.2 trillion yen worth of added value and 195.1 trillion yen in sales.

Given the life cycle of SME owners, the closure of SMEs is unavoidable. However, the number of closures will decrease if there are people who take over companies planning for closure. If existing businesses take them over, the economic impacts of closures will be eased, though the total number of companies will decrease. It is an urgent task for Japan to work out a mechanism to minimize the expected impacts of business closures.

1. Introduction

Aging of SME owners is advancing. Looking at their age distribution in five-year increments, based on data compiled by Teikoku Databank Ltd., the age bracket having the largest number of owners was "65-69" in 2014, representing a rise of exactly 10 years from "55-59" in 2004 (Figure-1). Although "65-69" has remained the peak age bracket in 2019, the aging of owners advanced as a whole. The average age climbed from 57.97 in 2004 to 59.82 in 2014 and 60.99 in 2019. In addition, owners aged "60 and older" and "70 and older" accounted for 54.9% and 20.4% of all owners in 2014, respectively, up from 44.5% and 13.5% in 2004. In 2019, furthermore, the percentages of "60 and older" and "70 and older" rose to 55.8% and 26.9%.

Any business owner eventually retires. An increase in aged owners means an increase in potential retirees among them. When an SME owner retires, its business will continue if there is a successor or if it is taken over by another concern, but otherwise is highly likely to be closed.

However, businesses which are expected to go out of business in the future are still creating a certain number of jobs and earning income by providing goods and services, as long as they are operating. Added value created through such an operation is a source of gross domestic product. The closure of SMEs will cause extremely large economic impacts unless the replacement of closing SMEs with existing businesses that expand operations or the creation of new businesses goes smoothly.

Then, to what extent will the closure of SMEs cause impacts? Murakami, Kodama and Higuchi (2017) estimated the future numbers of companies and employees in each prefecture. Utilizing the Japan Finance Corporation Research Institute's "Survey on Business Succession of SMEs" (2015) in the process of calculation, they estimated that 2,735,000 out of the 4,025,000 businesses which existed in 2015 would go out of business by 2040, due to the aging of owners.[1] They also calculated that the number of workforces would decrease by 18,237,000 as a result of their closure.[2] But the calculation did not refer to added value and sales.[3]

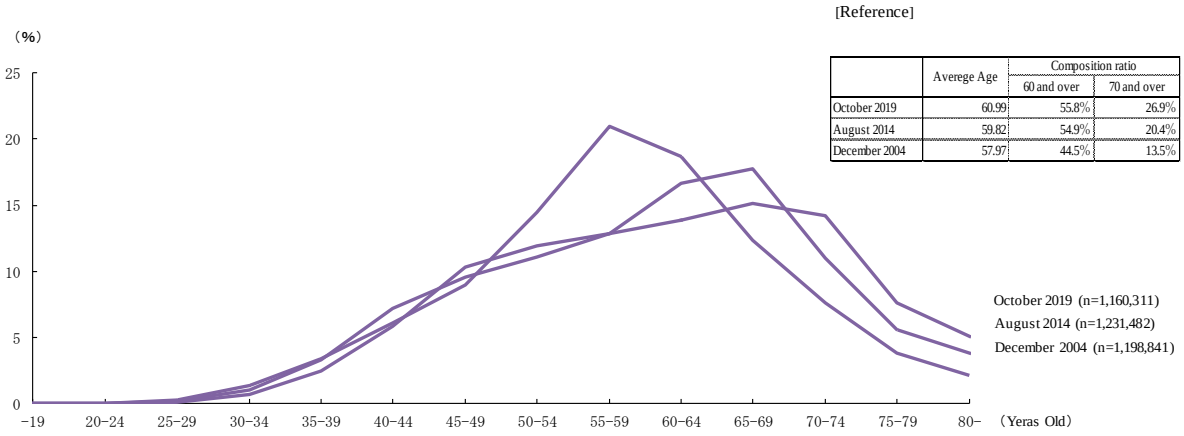
The Ministry of Economy, Trade and Industry (2017) calculated the impacts of SMEs' closure from 2016 to 2025 and estimated that some 1,270,000 SMEs would go out of business, causing some 6,500,000 people, excluding owners, to lose their jobs. A loss of about 22 trillion yen in added value was also forecast. Assuming that there is one owner, a total of 7,770,000 people would lose jobs, according to a hypothetical

[1] The number at the end of 2015 consists of the number in the Ministry of Internal Affairs and Communications' "Economic Census for Business Frame" (2014) and the numbers of establishments and closures from the date of the survey till the end of 2015. The number of closures is a total of figures for every five years from the end of 2015 till the end of 2040 as mentioned in the table drawn by Murakami, Kodama and Higuchi (2017), in the text of this paper.

[2] The number of workforces at the end of 2015 consists of the number in the Ministry of Internal Affairs and Communications' "Economic Census for Business Frame" (2014) and changes in the number resulting from establishments and closures from the date of the survey till the end of 2015. The number of workforces to be lost is a total of losses in every five years from the end of 2015 till the end of 2040 as mentioned in the table, drawn by Murakami, Kodama and Higuchi (2017), in the text of this paper.

[3] In the text of this paper, the number of companies is shown in units of 10,000, the number of people in units of 10,000 and the amount of money in units of trillions of yen after rounding off to one decimal place in principle.

Figure-1 Changes in Age Distribution of Business



	Averege Age	Composition ratio	
		60 and over	70 and over
October 2019	60.99	55.8%	26.9%
August 2014	59.82	54.9%	20.4%
December 2004	57.97	44.5%	13.5%

Source: Teikoku Databank Ltd.'s corporate information database

Notes: 1. Tally of data based on corporate information held by Teikoku Databank Ltd. at each point in time. Large companies are included.
2. Companies whose owners' ages are unknown are excluded.

assumption that SMEs, managed by 70-year-old owners, would go out of business at a certain rate. Though separating incorporated companies from individual proprietorships, the calculation took into account neither the scale of companies nor the closure of businesses managed by owners aged 69 and younger.

In this paper, therefore, we will attempt to make more elaborated estimates by using data obtained through the "Survey on Business Succession of SMEs" (2019) (hereinafter, the "SME Business Succession Survey") newly conducted by this research institute. While calculating impacts on sales in addition to those on employment and added value, we will show several results of estimation based on some assumptions.

It should be noted that the estimation will be made on the assumption that companies with no more than 299 workforces are SMEs, irrespective of business type and legal organization.[4]

2. Outline of the Questionnaire Results

(1) Implementation Procedures

This Section introduces the outline of the SME Business Succession Survey to be used for analyses. The Implementation Procedures are as shown in Table-1. Survey targets are SMEs nationwide. We defined SMEs as companies with no more than 299 workforces, and first conducted a preliminary survey targeting monitors aged 20 and older who are registered with an internet research company, and then conducted a detailed survey targeting extracted samples from the former. We adopted the same method for sampling as in the survey in 2015 (hereinafter, the "2015 Survey"), which was used for the analyses by Murakami (2017). The entire questionnaire was conducted via the internet and the number of valid responses to the detailed survey was 4,759.

For the issue of business succession, the influence of company sizes and owners' ages is significant as

[4] Workforce includes the entrepreneur/CEO (the same applies hereinafter).

Table-1 Implementation Procedures for the "Survey on Business Succession of SMEs"

Survey time	October 2019
Survey method	A questionnaire survey via the internet (We conducted a preliminary survey targeting monitors aged 20 and older who are registered with an internet research company, and then conducted a detailed survey for extracted samples falling under the survey targets.)
Survey targets	SMEs in Japan (companies with no more than 299 workforces; excluding those engaging in agriculture, forestry and fisheries, real estate rental and leasing services, and photovoltaic business)
Number of valid responses	4,759 (13,193 valid responses for the preliminary survey)

Note: Workforce includes the entrepreneur/CEO (the same applies hereinafter).

pointed out by Murakami (2017). However, not many owners of relatively large-sized companies and aged owners were included in those registered monitors. Therefore, we first divided all samples into 40 cells depending on legal organizations, workforce sizes, and owners' ages, and proceeded with the survey while paying attention so that the number of valid responses does not become extremely small for any of those cells.[5]

Furthermore, in order to make the sample distribution closer to the actual distribution of companies, we conducted weighting in data processing. First, we estimated the actual number of companies falling under each cell by multiplying the number of companies by legal organization and workforce size shown in the "Economic Census for Business Activity" (2016) by the Ministry of Internal Affairs and Communications and the Ministry of Economy, Trade and Industry (hereinafter, the "Economic Census") by the distribution ratio by owners' age bracket registered in the database of Teikoku Databank, Ltd.[6] Then, we calculated weights by dividing those estimated numbers by the number of valid responses for respective cells. The details are shown in the reference tables at the end of this paper. Hereinafter, we proceed with the analyses using weighted numbers of responses to respective questions.

(2) Status Whether SMEs' Successors are Decided

First of all, regarding the status of SMEs' successors, we categorized companies into four types depending on prospects for their business succession based on responses to questions regarding whether a successor has already been decided, and if not, the reasons therefor.

Looking at the percentages of these four types, companies that have already decided on a successor with his/her consent ("companies with a definite successor") accounted for only 12.5% of the total (Table-2). Companies that are seeking a successor or cannot obtain consent from an expected successor and have yet to decide on a successor ("companies without a definite successor") accounted for 22.0%, a higher percentage than companies with a definite successor. On the other hand, companies whose owners are planning to close business upon retirement ("companies planning for closure") accounted for 52.6%, and companies whose owners responded that they are still young enough and do not have to consider their successors ("companies

[5] For more accurate calculations, workforce sizes were classified more finely than in the 2015 Survey.
[6] We adopted this method because business owners' ages are not surveyed in the Economic Census.

Table-2 Types and Their Composition Ratios Based on the Questionnaire Survey

(%)

Types	Definitions based on responses		2019 (n=4,759)		2015 (n=4,104)	
Companies with a definite successor	Have already decided a successor (with consent from the successor)		12.5		12.4	
Companies without a definite successor (companies that intend to continue business but have yet to decide on a successor)	Have yet to decide on a successor	Have a candidate successor in mind but have yet to obtain his/her consent	22.0	5.1	21.8	3.4
		Have a candidate successor in mind but that person is still too young		4.6		6.0
		Have yet to decide a successor from multiple candidates		2.7		3.5
		Currently seeking a successor		7.6		7.7
		Other		2.0		1.2
Companies planning for closure		Planning to close business upon retirement	52.6		50.0	
Companies yet to consider a successor		Being still young and finding no need to decide on a successor	12.9		15.9	

Source: Japan Finance Corporation Research Institute "Survey on Business Succession of SMEs" (2015 and 2019)

Notes: 1. Results of tabulation after weighting (the same applies hereinafter)
2. "n" shows the number of companies that responded to each question (the same applies hereinafter).
3. Figures are rounded off to one decimal place. Accordingly, the total does not necessarily become 100% (the same applies hereinafter).

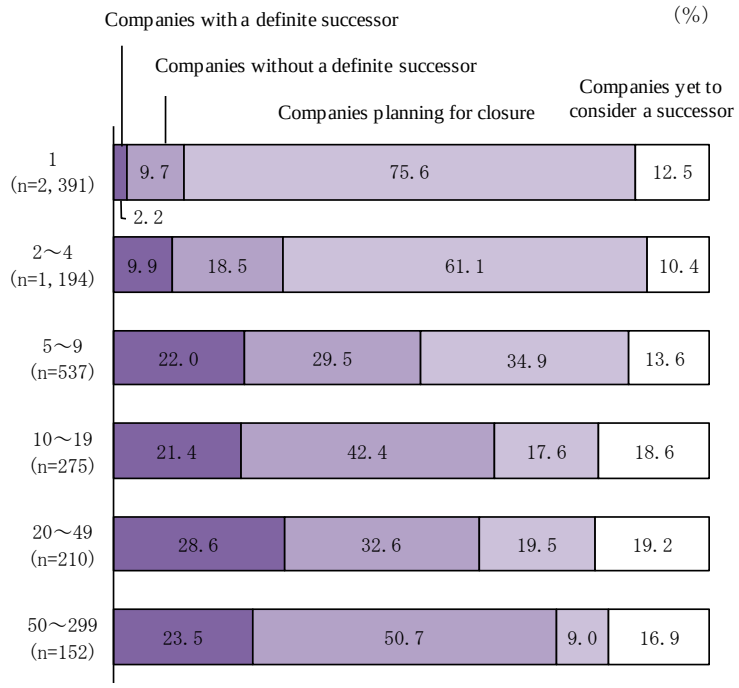
yet to consider a successor") accounted for 12.9%.

Compared with the 2015 Survey, the percentages of companies with a definite successor and companies without a definite successor were almost the same, but the percentage of companies planning for closure increased slightly from 50.0% in the 2015 Survey. As explained later, not all of them will immediately close business and companies that newly commence business will surely appear. Nevertheless, more than half of the currently operating SMEs in Japan will eventually disappear and this must exert a significant influence on Japanese economy and society.

(3) Workforce Size

Next, looking at the percentages of companies falling under respective types by workforce size, companies with a definite successor accounted for 2.2% among companies with only one workforce and 9.9% among companies with two to four workforces (Figure-2). The percentage increases to 22.0% among companies with five to nine workforces but is between 20% and 30% among the other three categories of companies with 10 or more workforces. Companies without a definite successor accounted for 9.7% among companies with "only one workforce", 18.5% among companies with "two to four workforces", and 29.5%

Figure-2 Distribution by Workforce Size

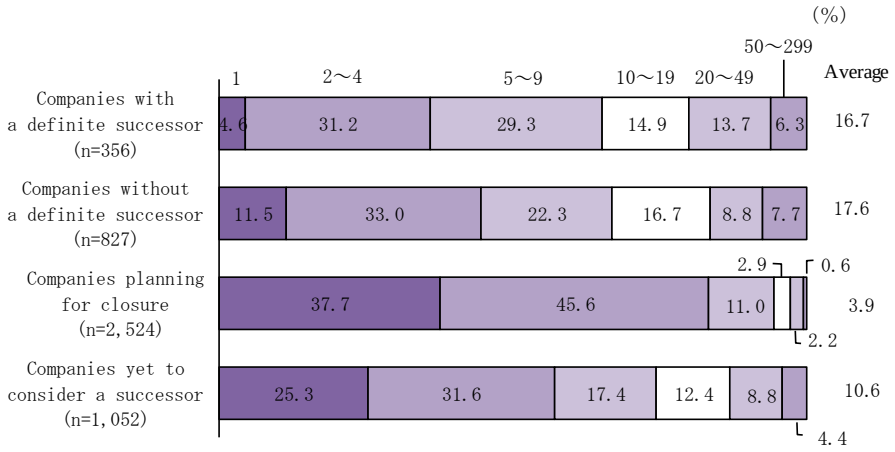


Source: Japan Finance Corporation Research Institute "Survey on Business Succession of SMEs" (2019) (hereinafter, the same up to Figure-9)

among companies with "five to nine workforces", showing increases as the workforce size becomes larger. The percentage of companies without a definite successor was 42.4% among companies with "10 to 19 workforces", 32.6% among companies with "20 to 49 workforces", and 50.7% among companies with "50 to 299 workforces", all showing the highest levels compared with the other three types. On the other hand, companies planning for closure accounted for as high as 75.6% among companies with "only one workforce" and reached 61.1% among companies with "two to four workforces". The percentage decreases to 34.9% among companies with "five to nine workforces", and to 17.6% among companies with "10 to 19 workforces". The percentage decreases as the workforce size becomes larger. However, it should be noted that among companies with "50 to 299 workforces", whose closure is expected to exert a significant impact, 9.0% are planning business closure. Companies yet to consider a successor accounted for between 10% and 20% among all categories of workforce size.

By type, among companies with a definite successor, companies with "only one workforce" accounted for 4.6%, those with "two to four workforces" accounted for 31.2%, and those with "five to nine workforces" accounted for 29.3% (Figure-3). The average was 16.7 workforces, which is larger than the overall average of 9.3 workforces. Among companies without a definite successor, companies with only one workforce accounted for 11.5%, those with "two to four workforces" accounted for 33.0%, and those with "five to nine workforces" accounted for 22.3%. The average was 17.6 workforces, which is almost the same level as

Figure-3 Workforce Size (by Type)



companies with a definite successor. On the other hand, the average number of workforces among companies planning for closure was quite small at 3.9. Looking at the distribution, among companies planning for closure, companies with "only one workforce" accounted for 37.7% and those with "two to four workforces" accounted for 45.6%, which means that the number of workforces for nearly 80% is four or less. The average number of workforces of companies yet to consider a successor was 10.6. Their distribution shows a tendency that the number of workforces is larger than that of companies planning for closure but smaller than that of companies with a definite successor or companies without a definite successor.

(4) Business Type

By business type, the percentage accounted for by companies with a definite successor among the total was higher for "accommodations" (38.2%), "real estate" (25.3%), and "goods rental and leasing" (24.2%) (Table-3). These businesses own a relatively large number of immovables and movables. In contrast, the percentage of companies with a definite successor was low for "education and learning support" (2.8%) and "information and communications" (6.6%).

With regard to companies without a definite successor, the percentage was relatively high for "goods rental and leasing" (42.9%) and "transport" (28.9%), while the percentage accounted for by companies planning for closure was high for "scientific research, professional and technical services" (63.3%), "amusement services" (62.3%), and "eating and drinking services" (62.1%) but low for "goods rental and leasing" (21.4%) and "accommodations" (28.8%). A conclusion cannot be easily drawn, but it seems that the percentage of companies planning for closure is higher for business types that heavily depend on business owners' qualities and skills. Incidentally, the percentage of companies yet to consider a successor was high for "education and learning support" (25.5%) and "information and communications" (18.6%).

Table-3 Distribution by Business Type

(%)

	Companies with a definite successor	Companies without a definite successor	Companies planning for closure	Companies yet to consider a successor
Construction (n=406)	16.7	24.9	48.2	10.1
Manufacturing (n=354)	13.2	27.5	49.2	10.1
Information and communications (n=409)	6.6	21.0	53.8	18.6
Transport (n=114)	18.8	28.9	41.8	10.6
Wholesale trade (n=236)	20.3	23.3	43.6	12.8
Retail trade (n=576)	9.7	22.8	56.5	11.0
Real estate (n=184)	25.3	25.1	39.2	10.4
Goods rental and leasing (n=35)	24.2	42.9	21.4	11.5
Accommodations (n=16)	38.2	26.2	28.8	6.7
Eating and drinking services (n=175)	9.9	13.5	62.1	14.5
Amusement services (n=44)	10.1	11.9	62.3	15.7
Medical, health care and welfare (n=275)	10.6	28.6	47.2	13.7
Education and learning support (n=266)	2.8	17.2	54.5	25.5
Scientific research, professional and technical services (n=798)	8.6	15.6	63.3	12.5
Living-related and personal services (n=312)	13.2	13.4	60.8	12.6
Services, not elsewhere classified (n=502)	11.9	24.2	48.8	15.2
Other (n=57)	14.4	27.8	52.6	5.1
Overall (n=4,759)	12.5	22.0	52.6	12.9

Note: Businesses for which distribution ratios by type are higher and lower by 5 points compared with the figures in the row of "Overall" are shaded with dark grey and light grey, respectively.

(5) Business Conditions

Companies' business conditions are also considered to exert a significant influence on their prospects for business succession. By type, among companies with a definite successor, approximately 70% evaluated their business conditions positively compared with other companies in the same industry, with 16.3% responding as "good" and 55.1% "somewhat good" (Figure-4). Those evaluating their business conditions as "somewhat bad" and "bad" were only 22.7% and 5.9%, respectively. Among companies without a definite successor, those evaluating their business conditions as "good" and "somewhat good" accounted for 10.4% and 50.3%, respectively. The percentages of positive responses were slightly lower than those among companies with a definite successor. When it comes to companies planning for closure, those responding as "good" and "somewhat good" accounted for 2.9% and 28.2%, while those responding as "somewhat bad" and "bad" accounted for 42.2% and 26.7%. Nearly 70% of companies planning for closure evaluated their business conditions negatively. Companies yet to consider a successor showed a similar distribution to companies

Figure-4 Business Conditions Compared with Other Companies in the Same Industry (by Type)

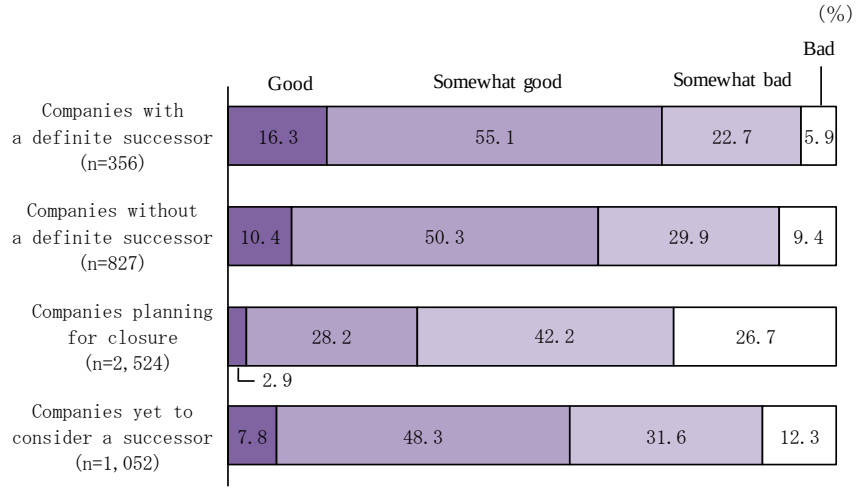
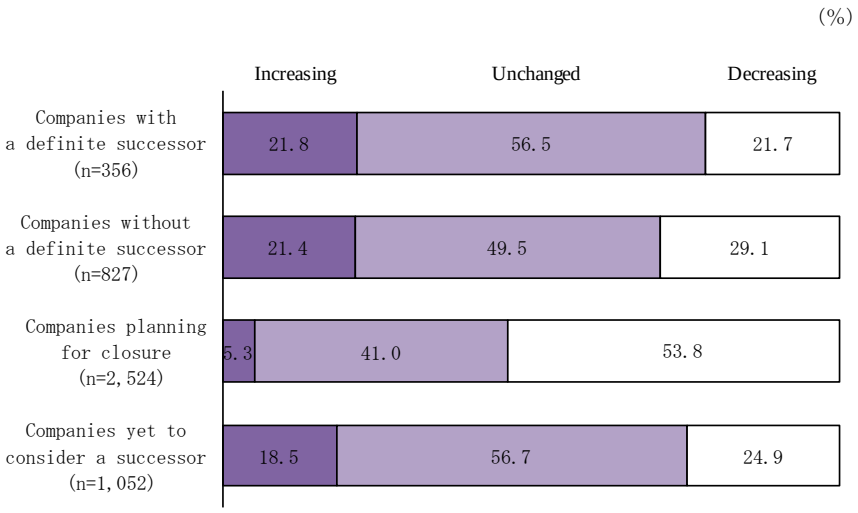


Figure-5 Current Sales (by Type)

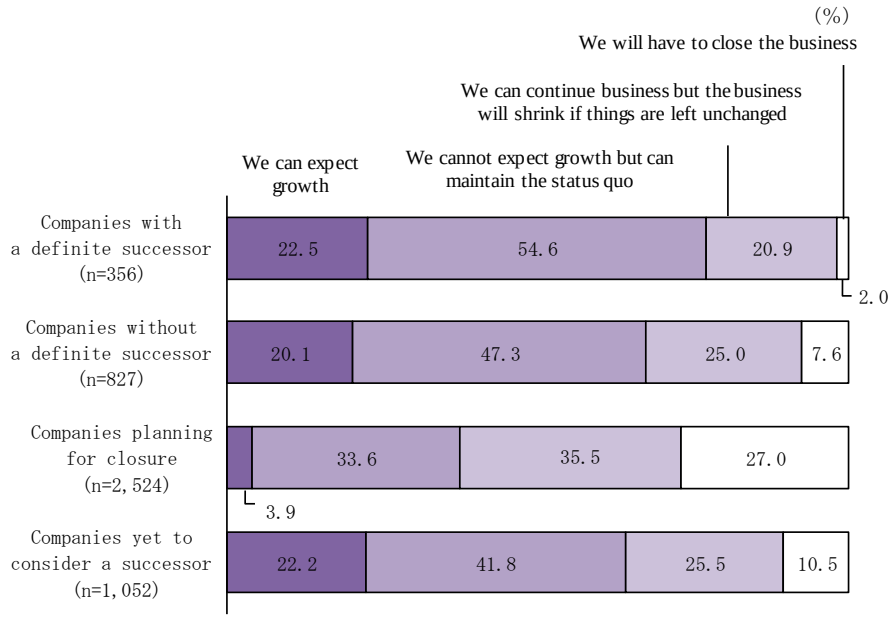


without a definite successor.

Regarding current sales, among companies with a definite successor, 21.8% responded that their sales are "increasing," 56.5% responded "unchanged," and 21.7% responded "decreasing." By contrast, among companies planning for closure, only 5.3% responded that their sales are "increasing," while over 50% (53.8%) responded that their sales are "decreasing" (Figure-5). Companies without a definite successor and companies yet to consider a successor showed similar figures to companies with a definite successor.

To questions on business prospects for the coming ten years, 22.5% of companies with a definite successor responded "we can expect growth," while 54.6% responded "we cannot expect growth but can maintain the status quo" (Figure-6). On the other hand, among companies planning for closure, only 3.9% responded "we can expect growth," while responses "we cannot expect growth but can maintain the status quo," "we can continue business but the business will shrink if things are left unchanged," and "we will have to close the

Figure-6 Business Prospects for the Coming Ten Years (by Type)



business" accounted for 33.6%, 35.5%, and 27.0%, respectively. The percentage of companies that cannot have prospects for the future was higher among companies planning for closure than companies in the other three types.

In this manner, companies planning for closure are generally inferior in current business performance to companies in the other three types and many of them lack future potential. Nevertheless, some are high-performing with good future prospects and their closure will cause a great loss.

(6) Owner's Age and Retirement Time

Business owners' attributes must have some influence on their prospects for business succession. Looking at the distribution of companies in terms of business owners' current ages, the percentages of "39 and younger" and "in the 40s" were the highest among companies yet to consider a successor, respectively accounting for 57.7% and 38.0% (Figure-7). The percentage of "in the 50s" was the highest among companies planning for closure at 49.4%. Over 50% of owners of companies planning for closure are in their 60s or 70 and older, with responses of "in the 60s" and "70 and older" respectively accounting for 57.1% and 59.1%. In contrast, among companies with a definite successor, the percentages of "39 and younger" and "in the 40s" were both below 10%. The percentage of "in the 60s" was over 10% at 12.5% and the percentage of "70 and older" was higher at 18.6% but was still below 20%. It is also notable that among companies without a definite successor, the percentages of "in the 60s" and "70 and older" were 22.7% and 20.7%, respectively, and that 7.7% of owners of companies yet to consider a successor are in their 60s and 1.6% of them are 70 and older. Considering owners' ages, a certain number of these companies may be unable to decide successors and end

Figure-7 Distribution by Owner's Age

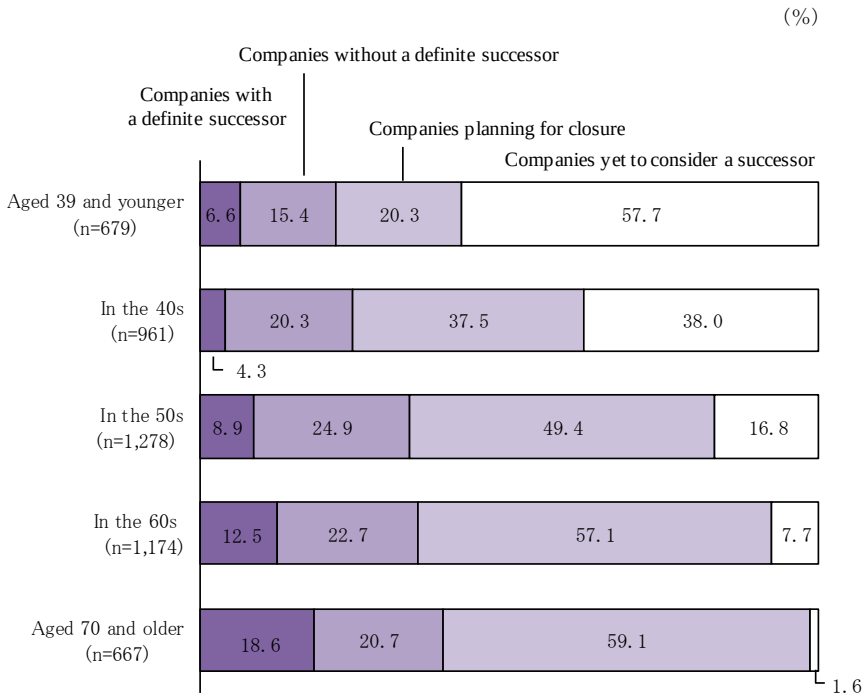
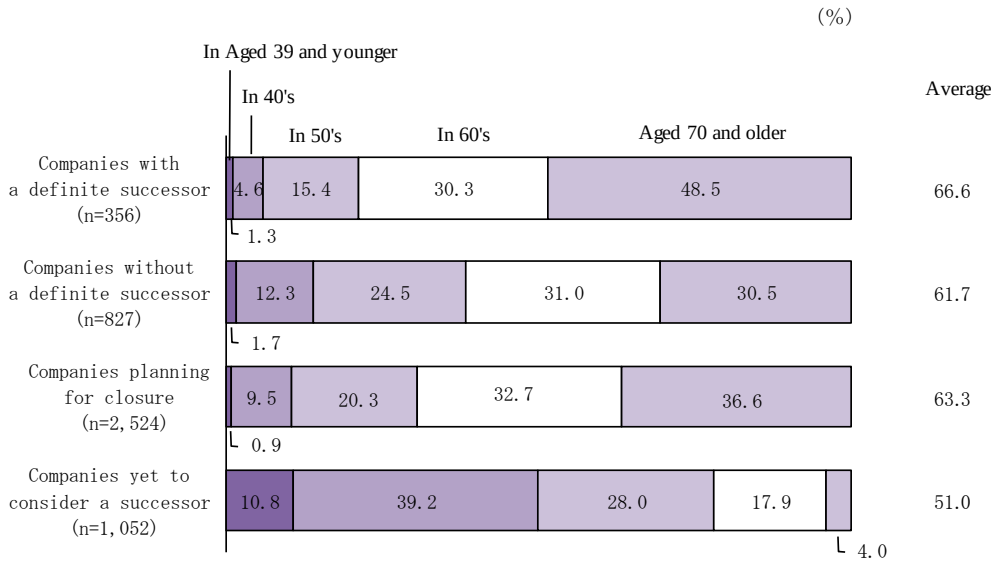


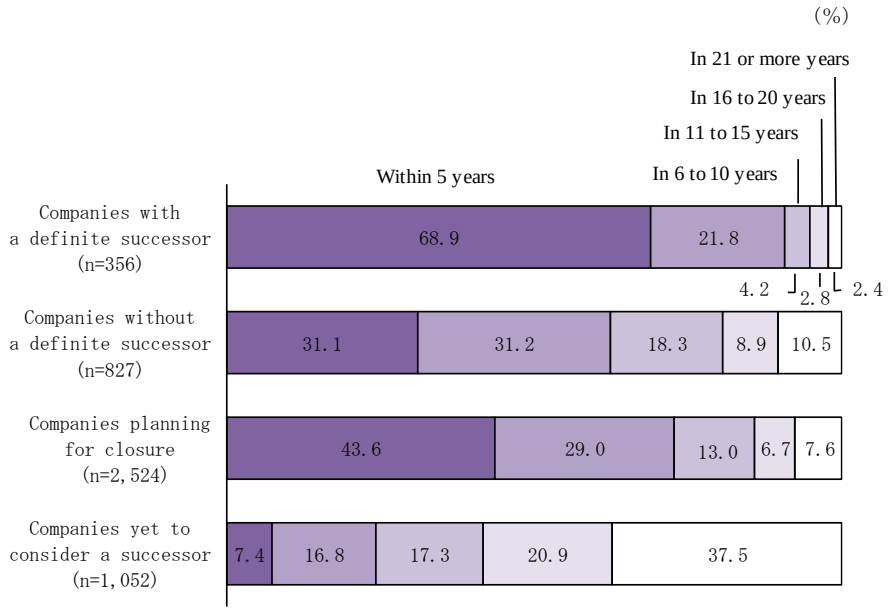
Figure-8 Owners' Ages (by Type)



up closing their businesses.

By type, among companies with a definite successor, 48.5% of owners are 70 and older and 30.3% are in their 60s. Accordingly, approximately 80% of owners of companies with a definite successor are 60 and older (Figure-8). The average was 66.6 years old, the highest among the four types. 68.9% of owners are planning to retire "within five years," and 21.8% "in six to ten years." Over 90% of owners are thus planning to retire within ten years. Companies with a definite successor are thus expected to succeed their

Figure-9 Time for Owners' Retirement (by Type)



Notes: Calculations for companies with a definite successor were made by subtracting responses to the question concerning "the successor's current age" from responses to the question concerning "the successor's age at the time of business succession (rough plan)." For the other three types, calculations were made by subtracting owners' current ages from responses to the question concerning "the age until when the owner wants to manage his/her current business."

business to the next generation in the near future (Figure-9).[7] The average age of owners of companies without a definite successor was 61.7 years old, lower than the average among companies with a definite successor. However, 31.0% are in their 60s and 30.5% are 70 and older. Many of the owners of companies without a definite successor are already aged, and 31.1% of them are planning to retire "within five years" and 31.2% "in six to ten years." These companies without a definite successor need to decide successors as early as possible. The average age of owners of companies planning for closure was 63.3 years old, with 32.7% being in their 60s and 36.6% being 70 and older. Considering their age, many of them are expected to close their businesses relatively soon. Actually, 43.6% are planning to retire "within five years," and 29.0% "in six to ten years." Nearly 70% of them are thus planning to retire within ten years. The average age of owners of companies yet to consider a successor was 51.0 years old. Nearly 80% of owners are aged 59 and younger, with 10.8% being aged 39 and younger, 39.2% in their 40s, and 28.0% in their 50s. They are unlikely to face a successor problem for the time being. However, 17.9% of them are in their 60s and 4.0% are aged 70 and older and these owners may normally need to consider their successors. To the question concerning the time for retirement, 17.3% of owners of companies yet to consider a successor responded that they are

[7] Calculations of time for owners' retirement for companies with a definite successor were made by subtracting responses to the question concerning "the successor's current age" from responses to the question concerning "the successor's age at the time of business succession (rough plan)." For the other three types, calculations were made by subtracting owners' current ages from responses to the question concerning "the age until when the owner wants to manage his/her current business."

Table-4 Number of Companies to be Lost (Companies Planning for Closure)

	Number (companies)	Rate (%)
Companies planning for closure	2,002,363	52.6
SMEs	3,808,027	100.0

Source: Japan Finance Corporation Research Institute "Survey on Business Succession of SMEs" (2019) ; Ministry of Internal Affairs and Communications and the Ministry of Economy, Trade and Industry"Economic Census for Business Activity" (2016) (hereinafter, the same up to Table 16, unless otherwise noted)

Notes: 1. SMEs are defined as companies with no more than 299 workforces (the same applies hereinafter).
2. Percentages indicated in this table are rounded off to one decimal place, but calculations were made using figures without rounding off (the same applies hereinafter).
3. Other figures in this table are rounded to the nearest integers(the same applies hereinafter).

planning to retire "in 11 to 15 years," 20.9% "in 16 to 20 years," and 37.5% "in 21 or more years." The percentage of owners who do not seem to have the necessity to decide their successors was high as a whole. However, on the other hand, 7.4% are planning to retire "within five years" and 16.8% "in six to ten years." If owners' health problems or other problems occur before deciding successors, there is the possibility that these companies may go out of business. It depends on each owner's way of thinking, but it will also be necessary to suggest to aged owners of these companies yet to consider a successor deciding their successors earlier.

3. Number of Companies and Workforces that will be Lost

In Section 2, we overviewed SMEs' prospects for business succession and confirmed that the percentage of companies planning for closure has reached 52.6% of the total and that many of them are highly likely to close their businesses relatively soon. In this Section, we will estimate the macroeconomic impacts of closure of SMEs using the data from the SME Business Succession Survey. As in Section 2, SMEs are defined as companies with no more than 299 workforces in this Section.

First, we will check how many SMEs are planning to close their businesses nationwide. In the 2016 Economic Census, the number of companies with no more than 299 workforces was 3,808,000. When making a calculation based on the percentage of companies planning for closure, 2,002,000 SMEs are predicted to go out of business in the future (Table-4). The number of workforces working for these SMEs was 31,858,000, accounting for 58.1% of the total number of workforces of private companies (excluding those in the agriculture, forestry and fisheries industry and public enterprises categories) including large companies (54,857,000). We estimated the possible loss of employment among these by the following method.

We calculated the total numbers of workforces of companies categorized into 40 cells depending on legal organization, workforce sizes, and owners' ages for all types of companies with a definite successor, companies without a definite successor, companies planning for closure, and companies yet to consider a successor, as shown in Formula [i]. When adding up the numbers of workforces (including business owners) for these four types, which were obtained by multiplying those total numbers by respective weights, the

Table-5 Number of workforces to be Lost (Companies Planning for Closure)

	Number of workforce (persons)		Rate (%)
	Economic Census	SME Business Succession Survey	
Companies planning for closure	7,042,835	7,825,343	22.1
SMEs	31,858,499	35,398,198	100.0

Notes: 1. Figures in the column of "SME Business Succession Survey" are estimates based on the results of the SME Business Succession Survey.
2. Figures in the column of "Economic Census" are the figure published in the Economic Census for SMEs, and the calculation result based on the rate of the estimate mentioned in Note 1 after corrections for companies planning for closure.
3. Workforce includes the entreprenuer/CEO (the same applies hereinafter).

calculation result was 35,398,000 workforces.[8] Out of these, the number of workforces of companies planning for closure was 7,825,000, accounting for 22.1% of the total (Table-5). [9]

Number of workforces (integrated results of the SME Business Succession Survey; by type)
＝Σ (Total of the numbers of workforces of respective cells × Weights) …[i]

Here, it should be noted that the total of numbers for the four types calculated based on the results of the SME Business Succession Survey does not coincide with the number of workforces of SMEs in the Economic Census (31,858,000 workforces). This error is caused by the fact that the data on owners' ages used here are not from the Economic Census. Accordingly, we performed corrections as shown in Formula [ii].

Number of workforces (definite figure; by type)
＝ Number of workforces of SMEs in the Economic Census
× Number of workforces (integrated results of the SME Business Succession Survey; by type)
/ Number of workforces (integrated results of the SME Business Succession Survey; total of the four types) …[ii]

As a result, the number of workforces of companies planning for closure after corrections was 7,043,000. This is the number of workforces including business owners that are expected to be lost if all these companies planning for closure close their businesses as planned.

However, these companies planning for closure will not close business immediately. By time of planned business closure, 873,000 companies would close business "within five years" (43.6%) and 582,000 companies "in six to ten years" (29.0%). The total of these companies that would close business within ten years was estimated to be 1,454,000, accounting for 72.6% of companies planning for closure as a whole.

[8] For weights, see the reference tables at the end of this paper.
[9] Calculation results for companies with a definite successor, companies without a definite successor, and companies yet to consider a successor are omitted (hereinafter the same applies unless otherwise noted).

Table-6 Number of Companies to be Lost (Companies Planning for Closure by Time of Planned Business Closure)

Time of planned business closure	Number (companies)		Aggregated total (companies)	
		Rate (%)		Rate (%)
Within 5 years	872,675	43.6	872,675	43.6
In 6 to 10 years	581,547	29.0	1,454,223	72.6
In 11 to 15 years	260,743	13.0	1,714,965	85.6
In 16 to 20 years	135,045	6.7	1,850,010	92.4
In 21 or more years	152,353	7.6	2,002,363	100.0

Note: For time of planned business closure, calculations were made by subtracting owners' current ages from responses to the question concerning "the age until when the owner wants to manage his/her current business" (the same applies hereinafter).

Table-7 Number of Employees to be Lost (Companies Planning for Closure by Time of Planned Business Closure)

Time of planned business closure	Number (persons)		Aggregated total (persons)	
		Rate (%)		Rate (%)
Within 5 years	3,111,022	44.2	3,111,022	44.2
In 6 to 10 years	1,961,521	27.9	5,072,543	72.0
In 11 to 15 years	1,010,856	14.4	6,083,398	86.4
In 16 to 20 years	460,004	6.5	6,543,402	92.9
In 21 or more years	499,433	7.1	7,042,835	100.0

This means that business closures will progress at a considerable speed (Table-6).[10] On the other hand, nearly 30% are planning to continue business for 11 or more years, as 261,000 companies (13.0%) are planning to close business "in 11 to 15 years," 135,000 companies (6.7%) "in 16 to 20 years," and 152,000 companies (7.6%) "in 21 or more years."

In the same manner, decreases of employment due to business closure will not occur immediately. The results of the estimation of the number of workforces to be lost by time of planned business closure are as shown in Table-7. In the similar manner to the case of the estimation on the basis of the number of companies, 3,111,000 workforces (44.2%) were estimated to lose jobs "within five years," and 1,962,000 workforces (27.9%) "in six to ten years," suggesting a loss of jobs for 5,073,000 workforces, which account for nearly 70% of the total, within ten years. However, conversely, employment for nearly 30% of the workforces would be maintained at least ten years.

[10] Estimation by dividing the period more finely, for each year for example, may be possible but the number of companies falling under each period becomes smaller and this may cause a larger error. Therefore, we divided the period by five years (hereinafter the same applies).

Table-8 Added Value per Workforce

	Number (workforces)	Added value per workforce (10,000 yen)	Used data (numbers of the reference table)
Individual proprietorships	1	237	(i)
	2-4	288	(iv)
	5-299	418	(v) to (x)
Incorporated companies	1-4	288	(iv)
	5-9	402	(v)
	10-19	451	(vi)
	20-49	485	(vii) and (viii)
	50-299	554	(ix) and (x)

Note: 1. Used data from the Economic Census are indicated with numbers as shown in the reference table below. When multiple categories are indicated, weighted averages are calculated depending on the numbers of workforces belonging to respective categories.

Reference Table: Categories in the Economic Census

Legal organization	Category by workforce size		
(i)Individual proprietorships	(iv) 1-4	(vii) 20-29	(x) 100 or more
(ii)companies	(v) 5-9	(viii) 30-49	
(iii)corporations other than companies	(vi) 10-19	(ix) 50-99	

2. Category (x) includes companies with 300 or more workforces, but the relevant data are used here by deeming them as the data for companies with 100 to 299 workforces.
3. The Economic Census was published as the results of the 2016 survey, but the data contained therein are for those in 2015, the preceding year.

4. Amount of Added Value to be Lost

Business closure also leads to a loss of added value that has been created by the relevant companies. As the SME Business Succession Survey does not cover the amounts of added value, we here used the data on the amounts of added value per workforce, which we calculated based on the data from the Economic Census,[11] and as no data by age are available, we assumed that there are no differences in the amounts of added value depending on business owners' ages. Table-8 shows the amounts of added value per workforce by legal organization and workforce size. Categories used in the estimation and categories in the Economic Census are not the same. Therefore, we adopted data for categories that were considered most similar. We calculated weighted averages based on the number of workforces for some categories.

The estimation method is almost the same as the one employed for estimating the number of workforces. First, we calculated the total of the amounts of added value of respective cells based on the amounts of added

[11] Amounts of added value and sales (explained later) in the 2016 Economic Census, which we used for the analyses for this paper, are data for 2015, the preceding year of the survey year.

Table-9 Amount of Added Value to be Lost (Companies Planning for Closure)

	Amount of added value (million yen)		Rate (%)
	Economic Census	SME Business Succession Survey	
Companies planning for closure	25,148,779	29,239,609	17.9
SMEs	140,207,905	163,014,841	100.0

Notes: 1. Same as Notes 1 and 2 of Table-5
2. Figures for SMEs in the column of "Economic Census" are integrated figures by workforce size of Table 8-3 of Tabulation of Enterprises, etc. In Table 8-3, the largest category of workforce size is "100 or more." Therefore, we calculated the figure for "100 to 299 workforces" by dividing the total number of workforces by workforce size of Table 7 of Tabulation of Enterprises, etc. in accordance with the number of workforces.

value per workforce and the numbers of workforces of respective cells (Formula [iii]).

Total of the amounts of added value of respective cells
＝Amounts of added value per workforce of respective cells
× Total number of workforces of respective cells …[iii]

Then, we obtained the amount of the overall added value by summing up the total of added value for each cell multiplied by the relevant weight, respectively (Formula [iv]).

Amount of added value (integrated results of the SME Business Succession Survey; by type)
＝Σ (Total amount of added value of respective cells × Weights) …[iv]

Lastly, we performed corrections of figures in accordance with the amount of SMEs' added value in the Economic Census (Formula [v]).

Amount of added value (definite figure; by type)
＝ Amount of SMEs' added value in the Economic Census
× Amount of added value (integrated results of the SME Business Succession Survey; by type)
/ Amount of added value (integrated results of the SME Business Succession Survey; total of the four types) …[v]

Results of the estimation are shown in Table-9. The amount of added value to be lost was calculated to be 25.1 trillion yen after corrections, which accounts for 17.9% of the total amount of added value that SMEs are creating. This is equivalent to 8.7% of the overall total amount of added value created by private companies (excluding those in the agriculture, forestry and fisheries industry and public enterprises categories) including large companies (288.3 trillion yen) and 4.6% of the GDP for 2018 (547.1 trillion yen).[12]

[12] The gross national product is the annual nominal GDP (expenditure approach) for 2018. Hereinafter, the same figure is used

Table-10 Amount of Added Value to be Lost (Companies Planning for Closure by Time of Planned Business Closure)

Time of planned business closure	Amount of added value (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	10,968,231	43.6	10,968,231	43.6
In 6 to 10 years	6,977,869	27.7	17,946,101	71.4
In 11 to 15 years	3,821,977	15.2	21,768,078	86.6
In 16 to 20 years	1,653,201	6.6	23,421,279	93.1
In 21 or more years	1,727,501	6.9	25,148,779	100.0

We also estimated the amounts of added value to be lost by time of planned business closure. The results are as shown in Table-10. Added value to be lost "within five years" is 11.0 trillion yen (43.6% of the total), and that to be lost "in six to ten years" is 7.0 trillion yen (27.7% of the total). As in the case of the employment, approximately 70% of added value is expected to be lost within ten years. The amount to be lost "within five years" and "in six to ten years" is equivalent to 2.0% and 1.3% of the GDP, respectively. When simply dividing these, GDP would decrease by 0.4% annually for the coming five years and by 0.3% annually from the sixth to the tenth year from now due to closures of SMEs. The impacts will not be small.

5. Sales to be Lost

We also estimated sales to be lost in the same manner as in the case of the amount of added value to be lost. We used the data on annual sales, which we obtained through the SME Business Succession Survey. However, we excluded some unnatural responses such as those stating that sales are extremely small compared with the number of workforces. Accordingly, we conducted calculations based on the average sales per workforce among companies that gave valid responses. The specific estimation method is as shown below. The data from the Economic Census that we used for the estimation are shown in Table-11.[13]

First, we calculated the total sales of respective cells based on the sales per workforce and the total number of workforces of respective cells (Formula [vi]).

Total sales of respective cells
＝Sales per workforce of respective cells (companies that gave valid responses)
× Total number of workforces of respective cells …[vi]

Then, we obtained the overall sales by summing up the total sales for each cell multiplied by the relevant

for the GDP in this paper.
[13] As mentioned in Footnote 11, sales in the Economic Census are the data for 2015.

Table-11 Sales per Workforce

	Number (workforces)	Amount of Sales per workforce (10,000 yen)	Used data (numbers of the reference table)
Individual proprietorships	1	560	(i)
	2-4	1,085	(iv)
	5-299	2,211	(v) to (x)
Incorporated companies	1-4	1,085	(iv)
	5-9	1,717	(v)
	10-19	1,871	(vi)
	20-49	2,165	(vii) and (viii)
	50-299	3,467	(ix) and (x)

Note: Same as Notes for Table-8

Table 12 Sales to be Lost (Companies Planning for Closure)

	Amount of sales (million yen)		Rate (%)
	Economic Census	SME Business Succession Survey	
Companies planning for closure	110,268,847	130,225,901	15.3
SMEs	719,891,145	850,180,950	100.0

Notes: 1. Same as Notes 1 and 2 of Table-5
2. Same as Note 2 of Table-9

weight, respectively (Formula [vii]).

Sales (integrated results of the SME Business Succession Survey; by type)
＝Σ (Total sales of respective cells × Weights) …[vii]

Lastly, we performed corrections of figures in accordance with SMEs' sales in the Economic Census (Formula [viii]).

Sales (definite figure; by type)
＝ SMEs' sales in the Economic Census
× Sales (integrated results of the SME Business Succession Survey; by type)
/ Sales (integrated results of the SME Business Succession Survey; total of the four types) …[viii]

Results of the estimation are shown in Table-12. The sales to be lost were calculated to be 110.3 trillion yen after corrections, which is equivalent to 15.3% of the total sales of SMEs in the Economic Census and 6.8% of the total sales of private companies (excluding those in the agriculture, forestry and fisheries industry

Table-13 Sales to be Lost (Companies Planning for Closure by Time of Planned Business Closure)

Time of planned business closure	Sales (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	48,154,734	43.7	48,154,734	43.7
In 6 to 10 years	30,500,088	27.7	78,654,821	71.3
In 11 to 15 years	17,423,657	15.8	96,078,478	87.1
In 16 to 20 years	6,832,921	6.2	102,911,399	93.3
In 21 or more years	7,357,448	6.7	110,268,847	100.0

and public enterprises categories) including large companies (1,617.8 trillion yen).

We also estimated the sales to be lost by time of planned business closure. The sales to be lost "within five years" amounted to 48.2 trillion yen, accounting for 43.7% of the total, and those to be lost "in six to ten years" were estimated to be 30.5 trillion yen, accounting for 27.7% of the total. As in the case of the employment and the amount of added value, approximately 70% of the sales are expected to be lost within ten years (Table-13).

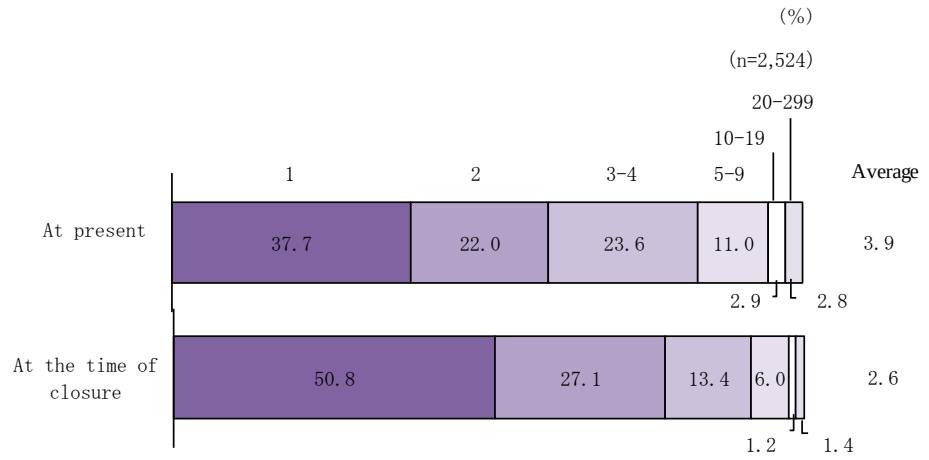
6. Decreases in the Number of Workforces toward Business Closure

Companies planning for closure may downsize their businesses before closure. The number of workforces of companies planning for closure was found to be four or less for nearly 80% of the companies (one workforce: 37.7%; two workforces: 22.0%; three to four workforces: 23.6%) (Figure-10). The average was 3.9 workforces. They basically tend to be especially small-sized compared with companies falling under the other three types. At the time of business closure, 50.8% had only one workforce. This suggests that almost half of those companies plan to downsize their businesses to the level that the owners deal with everything solely by themselves without hiring workforces. At the time of business closure, 27.1% of companies had two workforces, 13.4% had three to four workforces. Approximately 90% of them had four or less workforces and the average has declined to 2.6 workforces.

Such gradual downsizing may ease the shock upon loss of employment due to business closure. However, conversely, the loss of employment can be said to be accelerated. Accordingly, we estimated the impacts of decreases in workforces ahead of business closures.

On the assumption that the number of workforces would decrease at a certain pace from now up to the time of business closure, we calculated the estimated numbers of workforces after the lapse of five years, ten years, 15 years, and 20 years for each company responding to the SME Business Succession Survey. Specifically, as shown in Formula [ix], we calculated a decrease in the number of workforces for each year based on the current number of workforces, the number of workforces at the time of business closure, and the

Figure-10 Workforce Sizes at Present and at the Time of Closure (Companies Planning for Closure)



Source: Same as Figure-2
(Notes) 1. For the current number of employees, the same data as Figure 3 were used, but size categories are different.
2. The numbers of employees at the time of closure are based on responses to the question concerning " the number of employees that the owner wants to hold at the time of closing his/her business."

number of years up to business closure, and then obtained the number of workforces after the lapse of X years as shown in Formula [x] for each company.

Annual decrease in the number of workforces
＝ (Current number of workforces－Number of workforces at the time of business closure)
/ Number of years up to business closure …[ix]

Number of workforces after the lapse of X years
＝ Current number of workforces
－ (Annual decrease in the number of workforces × X years)

However, in the case that X is greater than or equal to the number of years up to business closure,
Number of workforces after the lapse of X years＝0 …[x]

Then, we estimated the number of workforces at each point in time as shown in Formula [xi], and performed corrections of figures using data from the Economic Census as shown in Formula [xii]. For corrections, we used data on the current number of workforces from the SME Business Succession Survey and the Economic Census, which we used for Formula [ii] (Table-5).

Table-14 Number of Employees to be Lost (Companies Planning for Closure by Time of Planned Business Closure in Consideration of Decreases in the Number of Workforces before the Closure)

Time of planned business closure	Number (persons)		Aggregated total (persons)	
		Rate (%)		Rate (%)
Within 5 years	3,714,112	52.7	3,714,112	52.7
In 6 to 10 years	1,594,774	22.6	5,308,886	75.4
In 11 to 15 years	823,999	11.7	6,132,886	87.1
In 16 to 20 years	480,988	6.8	6,613,874	93.9
In 21 or more years	428,961	6.1	7,042,835	100.0

Table-15 Amount of Added Value to be Lost (Companies Planning for Closure by Time of Planned Business Closure in Consideration of Decreases in the Number of Employees before the Closure)

Time of planned business closure	Amount of added value (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	13,451,020	53.5	13,451,020	53.5
In 6 to 10 years	5,526,860	22.0	18,977,879	75.5
In 11 to 15 years	2,955,289	11.8	21,933,168	87.2
In 16 to 20 years	1,771,235	7.0	23,704,403	94.3
In 21 or more years	1,444,376	5.7	25,148,779	100.0

Number of workforces at each point in time (integrated results of the SME Business Succession Survey; by type)

＝Σ (Total of numbers of workforces at each point in time of respective cells × Weights) …[xi]

Furthermore, based on the number of workforces for each company thus obtained, we calculated their amount of added value and sales at each point in time by using data per workforce from the Economic Census. In the same manner as in the case of the numbers of workforces, we performed corrections using data from the SME Business Succession Survey and the Economic Census as shown in Table-9 for the amounts of added value and in Table-12 for sales.

Estimation results are as shown below. The number of workforces to be lost "within five years" was 3,714,000 (52.7% of the total), and 1,595,000 workforces (22.6% of the total) are expected to lose jobs "in six to ten years" (Table-14). Within ten years, jobs for 5,309,000 workforces were estimated to be lost, which accounts for 75.4% of the total. Compared with the estimation without considering downsizing of businesses as shown in Table-7, employment decrease is faster by 236,000 workforces or 3.4% of the total.

The amount of added value to be lost "within five years" was estimated to be 13.5 trillion yen (53.5% of the total) and 5.5 trillion yen worth of added value (22.0% of the total) is expected to be lost "in six to ten years" (Table-15). Within ten years, 19.0 trillion yen worth of added value (75.5% of the total) is expected to

Table-16 Sales to be Lost (Companies Planning for Closure by Time of Planned Business Closure in Consideration of Decreases in the Number of Employees before the Closure)

Time of planned business closure	Sales (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	60,271,975	54.7	60,271,975	54.7
In 6 to 10 years	23,723,062	21.5	83,995,037	76.2
In 11 to 15 years	12,822,574	11.6	96,817,611	87.8
In 16 to 20 years	7,339,110	6.7	104,156,721	94.5
In 21 or more years	6,112,125	5.5	110,268,847	100.0

be lost. Compared with the estimation without considering downsizing of businesses (Table-10), a loss of added value accelerates by 1.0 trillion yen or 4.1% of the total.

Sales to be lost "within five years" amounted to 60.3 trillion yen (54.7% of the total) and 23.7 trillion yen worth of sales (21.5% of the total) is expected to be lost "in six to ten years" (Table-16). Sales to be lost in ten years were estimated to be 84.0 trillion yen (76.2% of the total), showing an increase of 5.3 trillion yen or 4.8% compared with the estimation shown in Table-13.

7. Business Closures of Companies Other than Companies Planning for Closure

Based on the results of the SME Business Succession Survey, we categorized companies into four types. We wondered if there were any possibility that companies with a definite successor, companies without a definite successor, and companies yet to consider a successor would also go out of business, in addition to companies planning for closure.

Japan Finance Corporation Research Institute conducted the "Survey on Retirement of Business Owners and Business Closure" (hereinafter, the "Business Closure Survey") targeting former owners of closed companies in October 2019. From this survey results, looking at responses to the question concerning whether owners had thought about their successors, it was found that the majority (93.4%) had "closed business without seeking a successor" (Table-17).[14] We considered these companies to be equivalent to companies planning for closure. There were also responses that they "sought a candidate but could not find the right person" (3.2%) and that they "could not obtain consent from an expected successor" (1.8%). These are considered to fall under the type of companies without a definite successor. Closed companies responding

[14] It was a questionnaire survey via the internet and the number of valid responses was 500. Through a preliminary survey targeting individuals aged 45 and older who were not doing business at that time, out of monitors registered with a research company, former business owners were extracted. A detailed survey targeted those extracted former business owners (excluding those who held 300 or more workforces at the time of business closure, closed their businesses in 2009 or earlier, and had engaged in agriculture, forestry and fisheries, real estate rental and leasing services, and photovoltaic business). Targeted former owners are those who chose any of the reasons for business closure (multiple answers) categorized into "reasons on the owner's side" instead of those categorized into "difficulties in continuing business." As cases of business closure solely due to difficulties in continuing business are excluded, it should be noted that certain errors may occur.

Table-17: Percentages of Business Closures among Companies with a Definite Successor and Companies without a Definite Successor

(%)

	Survey on Business Succession of SMEs (SME Business Succession Survey)		Survey on Retirement of Business Owners and Business Closure (Business Closure Survey)		Percentage of companies that actually close business (b÷a)
	Response rate	Percentage against companies planning for closure (a)	Response rate	Percentage against companies planning for closure (b)	
Companies with a definite successor	12.5	23.7	1.6	1.7	7.2
Companies without a definite successor	22.0	41.9	5.0	5.4	12.8
Companies planning for closure	52.6	100.0	93.4	100.0	100.0

Source: Japan Finance Corporation Research Institute "Survey on Business Succession of SMEs" (2019) and Japan Finance Corporation Research Institute "Survey on Retirement of Business Owners and Business Closure" (2019)

Notes: 1. Based on the options to the question concerning whether owners had thought about their successors in the Business Closure Survey, respondents who had actually "closed their businesses without seeking a successor" were considered to fall under companies planning for closure, those who had actually closed their businesses due to such reasons as that they "sought a candidate but could not find the right person" or that they "could not obtain consent from an expected successor" were considered to fall under companies without a definite successor, and those who had actually closed their businesses because they "could not succeed business to the successor already determined for certain reasons" were considered to fall under companies with a definite successor. Then, we assumed that these percentages can be applied to the percentages of respondents to the SME Business Succession Survey that will actually close business.

2. The percentages of companies that will actually close business are those among respective types in the SME Business Succession Survey. See Footnote 17 for the details of the calculation method.

that they "could not succeed business to the successor already determined for certain reasons" (1.6%) may fall under the type of companies with a definite successor.[15] The time when each of those former owners thought about their successor was unknown and errors may be large accordingly, but we assumed that percentages of respondents to the Business Closure Survey that fall under the types of companies with a definite successor, companies without a definite successor, and companies planning for closure can also be applied to the future prospects of respondents to the SME Business Succession Survey. Based on this assumption, we calculated the percentage of companies that would eventually close business, out of companies with a definite successor and companies without a definite successor.[16]

We obtained the result that 7.2% of companies with a definite successor and 12.8% of companies without

[15] In reality, there may be cases where companies without a definite successor become companies with a definite successor or companies with a definite successor become companies without a definite successor. Accordingly, company types may vary depending on which point in time is set as the base time.

[16] Some companies that are yet to consider a successor may eventually close business, but it is difficult to estimate the percentage and time of business closure among them. Therefore, they were excluded from the estimation here. Owners of companies yet to consider a successor are generally young and their business closures are expected to be delayed. Therefore, their impacts on the estimation for the period of five years or ten years would not be particularly significant.

a definite successor are likely to close business.[17] These figures seem rather large, but considering the fact that 9.4% of companies with a definite successor are planning to succeed their businesses to their successors in ten years or further in the future and that 30.5% of owners of companies without a definite successor are 70 and older, these figures may be reasonable.[18]

The method of calculating the impacts of business closures is the same as that employed in the case of companies planning for closure explained in Section 3 to Section 5. We assumed that the final percentages of business closure would be 7.2% for companies with a definite successor and 12.8% for companies without a definite successor and that the distribution of the number of years up to business closure would be the same for both types as that of companies planning for closure. As it is impossible to currently identify which respondents will actually close their businesses, we assumed that the number of workforces would decrease at the same pace as supposed decreases in the number of companies. Decreases in workforces for respective companies, which we took into account in Section 6, were ignored here. Furthermore, we also assumed that the amount of added value and sales would decrease at the same pace as supposed decreases in the number of companies in the same manner as in the case of the number of workforces.

The estimation results for companies with a definite successor are as shown in Table-18.[19] The number of companies with a definite successor to be lost due to business closure accounted for 1.7% against the total number of companies planning for closure. When multiplying the number of companies planning for closure (2,002,000 companies) shown in Table-4 by this percentage, the number of companies with a definite successor that are expected to close business in the end was 34,000. This figure is not small but is not large enough to exert a significant influence to raise the overall number of business closures. By time of planned business closure, 15,000 companies were estimated to close business "within five years" and 10,000 companies "in six to ten years." Some 25,000 companies in total would close business within ten years.

With regard to the number of workforces of companies with a definite successor, 237,000 workforces were estimated to lose jobs "within five years" and 158,000 workforces "in six to ten years." Workforces who would lose jobs in ten years would amount to some 395,000. We obtained the estimation result that employment for 544,000 workforces would be lost eventually. This figure is equivalent to 7.7% of the final number of employment to be lost caused by companies planning for closure (7,043,000 workforces), which is higher than 1.7%, the percentage of companies with a definite successor against companies planning for closure in terms of the number of companies. This is because the average number of workforces is larger

[17] The percentage of companies with a definite successor against companies for closure was 23.7% in the SME Business Succession Survey and 1.7% in the Business Closure Survey. Accordingly, supposing that out of 23.7% of companies with a definite successor in the SME Business Succession Survey, 1.7% closed business and the remaining 22.0% succeeded business, the percentage of companies with a definite successor in the SME Business Succession Survey that would actually close business was calculated to be 7.2% (1.7% / 23.7%). In the same manner, the percentage of companies without a definite successor in the SME Business Succession Survey that will actually close business was calculated to be 12.8% (5.4% / 41.9%).

[18] See Figure-8 and Figure-9.

[19] We assumed that the distribution of the number of years up to business closure is the same for companies with a definite successor and companies planning for closure. As we assumed that the number of workforces, the amount of added value and sales would decrease at the same pace as supposed decreases in the number of companies, the percentages for (1) to (4) of Table-18 are all the same as those in Table-6.

Table-18 Impacts of Business Closures of Companies with a Definite Successor (by Time of Planned Business Closure)

(1) Number of companies to be lost

Time of planned business closure	Number (companies)		Aggregated total (companies)	
		Rate (%)		Rate (%)
Within 5 years	14,949	43.6	14,949	43.6
In 6 to 10 years	9,962	29.0	24,912	72.6
In 11 to 15 years	4,467	13.0	29,378	85.6
In 16 to 20 years	2,313	6.7	31,692	92.4
In 21 or more years	2,610	7.6	34,302	100.0

(2) Number of workforces to be lost

Time of planned business closure	Number (persons)		Aggregated total (persons)	
		Rate (%)		Rate (%)
Within 5 years	236,892	43.6	236,892	43.6
In 6 to 10 years	157,864	29.0	394,756	72.6
In 11 to 15 years	70,780	13.0	465,536	85.6
In 16 to 20 years	36,659	6.7	502,195	92.4
In 21 or more years	41,357	7.6	543,552	100.0

(3) Amount of added value to be lost

Time of planned business closure	Amount of added value (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	2,008,914	43.6	2,008,914	43.6
In 6 to 10 years	1,338,733	29.0	3,347,647	72.6
In 11 to 15 years	600,235	13.0	3,947,882	85.6
In 16 to 20 years	310,876	6.7	4,258,758	92.4
In 21 or more years	350,719	7.6	4,609,477	100.0

(4) Sales to be lost

Time of planned business closure	Sales (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	8,963,490	43.6	8,963,490	43.6
In 6 to 10 years	5,973,236	29.0	14,936,726	72.6
In 11 to 15 years	2,678,163	13.0	17,614,889	85.6
In 16 to 20 years	1,387,083	6.7	19,001,972	92.4
In 21 or more years	1,564,860	7.6	20,566,831	100.0

among companies with a definite successor than among companies planning for closure.[20]

The amount of added value and sales that would be finally lost were calculated to be 4.6 trillion yen and 20.6 trillion yen, being equivalent to 18.3% and 18.7%, respectively, of the figures for companies planning for closure. These are even higher than 7.7% in terms of the number of workforces to be lost. As shown in Table-8 and Table-11, the amount of added value and sales per workforce are apt to be larger as the workforce size becomes larger. Therefore, the impacts of the closure of companies with a definite successor become larger for the amount of added value and sales than for the number of workforces.

In this manner, the probability of business closure is not so high for companies with a definite successor but the economic impacts of their business closures are relatively large. This suggests that efforts by companies with a definite successor to foster their successors to ensure smooth business succession to the next owners are important not only for respective companies but also for the Japanese economy as a whole.

Then, the number of companies without a definite successor that are expected to close business in the end was considered to be 5.4% against the total number of companies planning for closure and was calculated to be 107,000 (Table-19).[21] This figure is approximately three times that for companies with a definite successor. By time of planned business closure, 47,000 companies would close business "within five years" and 31,000 companies "in six to ten years." 78,000 companies in total would go out of business within ten years.

Regarding the number of workforces of companies without a definite successor, 701,000 workforces would lose jobs "within five years" and 467,000 workforces "in six to ten years." Workforces who would lose jobs in ten years would amount to some 1,168,000, and a total of 1,608,000 workforces would eventually lose jobs. This is equivalent to 22.8% of the final number of employments to be lost caused by companies planning for closure.

The amount of added value and sales that would be finally lost were calculated to be 14.4 trillion yen and 64.3 trillion yen, being equivalent to 57.3% and 58.3%, respectively, of the figures for companies planning for closure. The impacts of closures of companies without a definite successor on the economy as a whole would be larger than in the case of companies with a definite successor. This is because the number of companies that are supposed to go out of business was larger among companies without a definite successor. As mentioned earlier, considerably more than a few owners of companies without a definite successor are aged, and more than 30% of them are still looking for their successors.[22] In order to avoid their business closure, it is necessary to encourage them to find a successor and obtain his/her consent as soon as possible. The national government may need to consider offering political support to increase possibilities of business succession to workforces or business partners, in lieu of owners' children or relatives.

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[20] See Figure-3.
[21] Same as Footnote 19
[22] See Table-2. Companies without a definite successor accounted for 22.0% of the total and 7.6% of the total are currently seeking a successor, accounting for 34.5% among companies without a definite successor.

Table-19 Impacts of Business Closures of Companies without a Definite Successor (by Time of Planned Business Closure)

(1) Number of companies to be lost

Time of planned business closure	Number (companies)		Aggregated total (companies)	
		Rate (%)		Rate (%)
Within 5 years	46,717	43.6	46,717	43.6
In 6 to 10 years	31,132	29.0	77,849	72.6
In 11 to 15 years	13,958	13.0	91,808	85.6
In 16 to 20 years	7,229	6.7	99,037	92.4
In 21 or more years	8,156	7.6	107,193	100.0

(2) Number of workforces to be lost

Time of planned business closure	Number (persons)		Aggregated total (persons)	
		Rate (%)		Rate (%)
Within 5 years	700,933	43.6	700,933	43.6
In 6 to 10 years	467,099	29.0	1,168,031	72.6
In 11 to 15 years	209,429	13.0	1,377,460	85.6
In 16 to 20 years	108,468	6.7	1,485,928	92.4
In 21 or more years	122,370	7.6	1,608,298	100.0

(3) Amount of added value to be lost

Time of planned business closure	Amount of added value (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	6,277,857	43.6	6,277,857	43.6
In 6 to 10 years	4,183,541	29.0	10,461,398	72.6
In 11 to 15 years	1,875,734	13.0	12,337,132	85.6
In 16 to 20 years	971,487	6.7	13,308,619	92.4
In 21 or more years	1,095,998	7.6	14,404,617	100.0

(4) Sales to be lost

Time of planned business closure	Sales (million yen)		Aggregated total (million yen)	
		Rate (%)		Rate (%)
Within 5 years	28,010,906	43.6	28,010,906	43.6
In 6 to 10 years	18,666,363	29.0	46,677,269	72.6
In 11 to 15 years	8,369,258	13.0	55,046,527	85.6
In 16 to 20 years	4,334,635	6.7	59,381,162	92.4
In 21 or more years	4,890,186	7.6	64,271,348	100.0

8. Conclusion

The estimation results are compiled in Table-20. We will overview our analyses again and confirm the significance of the impacts of closure of SMEs in comparison with macro data.[23]

Among only companies planning for closure, the number of companies that are expected to close business in the future was estimated to be 1,454,000 in ten years from now and finally 2,002,000 at the time when present owners all retire, respectively accounting for 38.2% and 52.6% of the total number of SMEs at present. When adding up the numbers of companies with a definite successor and companies without a definite successor that are expected to close their businesses, the number of business closures would be 1,557,000 in ten years from now and 2,144,000 in the end. This means that 40.9% of SMEs would close business in ten years and finally 56.3% of SMEs would disappear. Annual decreases in the number of companies were calculated to be 187,000 for the coming five years and 125,000 from the sixth to the tenth year from now, respectively accounting for 4.9% and 3.3% of the total number of SMEs at present.

The number of workforces to be lost solely among companies planning for closure was estimated to be 5,073,000 in ten years from now and 7,043,000 in the end, respectively accounting for 15.9% and 22.1% of the total number of SMEs' workforces at present. Taking into consideration decreases in workforces toward business closure, the number would become 5,309,000 in ten years from now, accounting for 16.7% of SMEs as a whole. When adding up the numbers of companies with a definite successor and companies without a definite successor that are supposed to close business, the number of workforces to be lost would be 6,872,000 in ten years from now and 9,195,000 in the end, which respectively account for 21.6% and 28.9% of the total number of workforces of SMEs. Annual decreases in the number of workforces were calculated to be 930,000 for the coming five years and 444,000 from the sixth to the tenth year from now, accounting for 2.9% and 1.4% of the total number of SMEs' workforces at present.

Amount of added value to be lost solely among companies planning for closure was estimated to be 17.9 trillion yen in ten years from now and 25.1 trillion yen in the end, respectively accounting for 12.8% and 17.9% of the total amount of added value of SMEs. When considering decreases in workforces toward business closure, 19.0 trillion yen worth of added value would be lost in ten years from now, accounting for 13.5% of the total amount of added value of SMEs. Furthermore, when taking into account companies with a definite successor and companies without a definite successor, the amount of added value to be lost would increase to 32.8 trillion yen in ten years from now and 44.2 trillion yen in the end. These amounts are equivalent to 23.4% and 31.5% of the amount of added value currently being created by SMEs, and are equivalent to 6.0% and 8.1% of the GDP for 2018 (547.1 trillion yen). Annual decreases in the amount of

[23] The macro data at the present moment used in this Section are those from the 2016 Economic Census in the same manner as in the preceding Sections. Numbers of companies and workforces are data for 2016 and amounts of added value and sales are data for 2015, the preceding year. The gross domestic product is the annual nominal GDP (expenditure approach) for 2018.

Table-20 Major Estimation Results

(1) Number of companies to be lost (companies; %)

Time of planned business closure	Companies planning for closure	Total
Ten years from now	1,454,223 (38.2)	1,556,983 (40.9)
Overall	2,002,363 (52.6)	2,143,858 (56.3)

(2) Number of workforces to be lost (persons; %)

Time of planned business closure	Companies planning for closure	Companies planning for closure (in consideration of decreases in the number of workforces)	Total
Ten years from now	5,072,543 (15.9)	5,308,886 (16.7)	6,871,674 (21.6)
Overall	7,042,835 (22.1)	7,042,835 (22.1)	9,194,685 (28.9)

(3) Amount of added value to be lost (%)

Time of planned business closure	Companies planning for closure	Companies planning for closure (in consideration of decreases in the number of workforces)	Total
Ten years from now	17,946,101 (12.8)	18,977,879 (13.5)	32,786,925 (23.4)
Overall	25,148,779 (17.9)	25,148,779 (17.9)	44,162,874 (31.5)

(4) Sales to be lost (million yen; %)

Time of planned business closure	Companies planning for closure	Companies planning for closure (in consideration of decreases in the number of workforces)	Total
Ten years from now	78,654,821 (10.9)	83,995,037 (11.7)	145,609,032 (20.2)
Overall	110,268,847 (15.3)	110,268,847 (15.3)	195,107,026 (27.1)

Notes: 1. Estimation results are extracted or integrated from the tables in this paper.
2. The total for the number of companies is the total summing up of companies planning for closure, companies with a definite successor, and companies without a definite successor. The total for the others is the total summing up of companies planning for closure (in consideration of decreases in the number of workforces), companies with a definite successor, and companies without a definite successor.
3. Consideration of decreases in the number of workforces means consideration of the impact of decreases in workforces at respective companies toward business closure.
4. Figures in the parentheses are percentages against data for SMEs as a whole in the 2016 Economic Census.

added value were calculated to be 4.3 trillion yen for the coming five years and 2.2 trillion yen from the sixth to the tenth year from now, accounting for 3.1% and 1.6% of the annual total of added value of SMEs and 0.8% and 0.4% of the GDP for 2018.

Lastly, sales to be lost solely among companies planning for closure was estimated to be 78.7 trillion yen in ten years from now and 110.3 trillion yen in the end, respectively accounting for 10.9% and 15.3% of the total sales of SMEs. When considering decreases in workforces toward business closure, sales to be lost would be 84.0 trillion yen in ten years from now, accounting for 11.7% of the total sales of SMEs. Furthermore, when taking into account companies with a definite successor and companies without a definite successor, sales to be lost would reach 145.6 trillion yen in ten years from now and 195.1 trillion yen in the end. These account for 20.2% and 27.1% of the total sales of SMEs. Annual decreases in sales were calculated to be 19.4 trillion yen for the coming five years and 9.7 trillion yen from the sixth to the tenth year from now, accounting for 2.7% and 1.3% of the current annual total sales of SMEs.

We will compare these estimation results with the preceding studies introduced at the beginning. Murakami, Kodama and Higuchi (2017) estimated that 2,735,000 companies would close their businesses and 18,237,000 workforces would lose jobs from 2015 to 2040. The results of our estimates, namely, closures of 2,144,000 companies and loss of jobs for 9,195,000 workforces, are less than the estimates by Murakami, Kodama and Higuchi (2017). This is because the number of companies as of the base year was larger for the estimation by Murakami, Kodama and Higuchi (2017) and they estimated the percentage of closure among companies without a definite successor at a higher level.[24] Our estimation may be rather optimistic but the calculation results can be judged as reasonable in consideration of the difference in assumptions.[25]

Next, we will make a comparison with the estimates by the Ministry of Economy, Trade and Industry (hereinafter, "METI") (2017). Regarding the impacts of business closures from 2016 to 2025, METI estimated that some 1,270,000 companies would close business, some 6,500,000 workforces excluding business owners would lose jobs, and some 22 trillion yen worth of added value would be lost. Our estimate of business closures in ten years from now was 1,557,000, slightly larger than METI's estimate. On the other hand, with regard to the loss of employment, our estimate of 6,872,000 workforces in ten years from now was smaller than the number obtained by adding one owner per company to METI's estimate (some 7,770,000 workforces in total). However, our estimate of the ultimate loss of 9,195,000 workforces was significantly larger than METI's estimate. With regard to added value, our estimate of a loss of 32.8 trillion yen worth of added value in ten years from now was larger than METI's estimate, but our estimate solely for companies planning for closure was smaller. In this manner, figures vary due to differences in estimation methods, but deviations are

[24] They assumed that 51.0% of companies without a definite successor, who responded that they are "currently seeking a successor" or they "have a candidate successor in mind but have yet to obtain his/her consent," would all close business, but did not include companies with a definite successor in tabulation.

[25] We made similar calculations as Murakami, Kodama and Higuchi (2017) by using the data for this paper and obtained highly similar results that 57.7% of companies without a definite successor would close business, and as a result, the total number of business closures would be 2,486,000 and 15,113,000 workforces would lose jobs.

not large, and our estimation and METI's estimation are not contradictory.

Our estimates are also found to be consistent in comparison with recent data on companies that have actually closed business. According to Small and Medium Enterprise Agency (2019), in the four years from 2012 to 2016, the number of SMEs that went out of business was 833,000 with the annual average being approximately 192,000, and the number of workforces who lost jobs due to closure of SMEs was 4,420,000 with the annual average being approximately 1,020,000.[26] These figures are quite close to our estimates of annual average for the coming five years, namely, closures of 187,000 companies and a loss of employment for 930,000 workforces. Small and Medium Enterprise Agency (2019) also calculated the amount of added value that was lost due to closure of companies including large companies. The results were 12.8 trillion yen from 2011 to 2013 and 4.9 trillion yen from 2013 to 2015, totaling 17.7 trillion yen. Annual average loss from 2011 to 2015 was approximately 4.4 trillion yen.[27] The number of large companies that go out of business is generally small and their impacts on the entirety are limited. Therefore, there is no major discrepancy between this figure and our estimate of annual loss in added value for the coming five years (4.3 trillion yen).

Our estimates naturally contain errors because they are based on business owners' intentions at the present and the actual time of business closure and circumstances for business succession may vary. For example, owner's health problems, a natural disaster, a serious economic shock or poor business results may cause unexpected business closures. In such cases, closure of companies planning for closure would be highly likely to be accelerated. The percentages of closure for companies with a definite successor and companies without a definite successor were calculated based on responses to the questionnaire targeting former owners of closed companies. Therefore, unexpected business closures may be somewhat reflected in calculation results.[28] On the other hand, we assumed that companies yet to consider a successor would not close business, but in actuality a certain percentage of them may naturally go out of business.[29]

Given the life cycle of SME owners, the closure of SMEs is unavoidable. As we conducted calculations using figures close to actual data, such as numbers of companies and workforces that have actually been lost, which we obtained from the Economic Census, our estimates may be considered to forecast the future with a certain degree of accuracy. Japanese economic activities will shrink if things are left as they are. To avoid such a situation, it is necessary to create new employment and added value through promoting new startups

[26] We processed the results of the "Economic Census for Business Frame" (2014) by the Ministry of Internal Affairs and Communications and the "Economic Census for Business Activity" (2012 and 2016) by the Ministry of Internal Affairs and Communications and the Ministry of Economy, Trade and Industry. Figures are the total of small companies and large companies. Calculations were made for the changes in the four years and four months (52 months) from February 2012 to June 2016, and annual averages were obtained through multiplying the total by 12/52. In addition, 1,000 large companies closed business during this period, causing a loss of employment for 610,000 workforces.

[27] We processed the "Economic Census for Business Activity" (2012 and 2016) by the Ministry of Internal Affairs and Communications and the Ministry of Economy, Trade and Industry. As the breakdown by company size was unknown, figures are for all companies including large companies. Calculations were based on data for the whole year of 2011 and 2015, and annual averages were obtained through multiplying the total by 1/4.

[28] Business closure solely due to "difficulties in continuing business" were excluded from tabulation, and this may also be considered as a cause of errors.

[29] Owners of companies yet to consider a successor are relatively young and nearly 80% of them are younger than 60 (see Figure-8). Accordingly, any impact of their business closure is considered to appear later than in the case of business closure of companies falling under the other three types.

and business expansion of existing companies.

More than a few companies planning for closure have no financial problems. It would be socioeconomically effective to have third parties take over the entire business of these companies or part of their management resources. Proper matching of transferrers with transferees will become important. If matching works successfully, this will also be beneficial to a retiring owner.

Furthermore, companies that are not considering business closure at present need to ensure smooth business succession. If they fail, the impacts of the failure would be more significant than possible impacts to be exerted by companies planning for closure. In particular, looking for a successor will be an urgent task for companies without a candidate successor. A certain amount of time is required for business succession. Companies should start preparations backward from the time of planned business succession.

Diverse problems may occur upon owners' retirement, business succession, and business closure, and professional knowledge is often required for solving them. It is also necessary to develop systems for offering support by external support organizations and experts. Support organizations and experts are also required to make responses cooperatively while respectively taking advantage of their strengths in their areas of specialty. It is important to develop an environment to enable business owners to fully understand and utilize various support measures as needed. Financial institutions, support organizations and business partners, who have chances to directly contact business owners, may be able to encourage them to prepare a business succession plan and help their smooth business succession. If they find that business owners are planning closure, they may also be able to offer support for smooth business closure.

If we add up employment and added value that may be lost due to closure of SMEs, we find they will exert significant negative impacts macroeconomically. It is an urgent task for Japan to create diverse systems for supporting SMEs and their owners in order to minimize the expected impacts of business closures.

Reference Table: Weighting of Samples

(1) Workforce size and owner's age of respondents

(companies)

		Aged 39 and younger	In the 40s	In the 50s	In the 60s	Aged 70 and older	Total
Incorporated companies	1	344	419	494	475	281	2,013
	2-4	65	91	143	150	121	570
	5-299	64	50	51	54	26	245
Incorporated companies	1-4	111	181	315	263	132	1,002
	5-9	32	100	118	107	48	405
	10-19	25	42	76	57	27	227
	20-49	19	45	48	39	18	169
	50-299	19	33	33	29	14	128
Total		679	961	1,278	1,174	667	4,759

Source: Japan Finance Corporation Research Institute "Survey on Business Succession of SMEs" (2019)

(2) Actual distribution of companies

(companies)

		Aged 39 and younger	In the 40s	In the 50s	In the 60s	Aged 70 and older	Total
Incorporated companies	1	9,790	66,605	130,678	239,136	260,242	706,450
	2-4	13,014	95,948	169,538	301,658	401,174	981,333
	5-299	5,223	29,922	50,386	87,444	118,248	291,223
Incorporated companies	1-4	28,597	127,710	197,366	227,331	223,150	804,153
	5-9	16,024	80,649	114,181	120,333	106,596	437,783
	10-19	10,384	54,249	77,626	79,041	64,398	285,698
	20-49	6,655	36,085	53,816	56,170	40,647	193,374
	50-299	2,830	17,096	29,212	35,720	23,156	108,013
Total		92,518	508,264	822,802	1,146,832	1,237,611	3,808,027

Source: Ministry of Internal Affairs and Communications and the Ministry of Economy, Trade and Industry "Economic Census for Business Activity" (2016) (Table 7 of Tabulation of Enterprises, etc.; Table 7-3 of Tabulation of Establishments); Teikoku Databank Ltd.'s corporate information database (October 2019)

(Note) The number of companies for each cell was calculated by multiplying the total number of companies by employee size for individual proprietorships and incorporated companies from the Economic Census for Business Activity by the composition ratio by age respectively corresponding to categories in Teikoku Databank Ltd.'s corporate information database.

(3) Tabulation weight

		Aged 39 and younger	In the 40s	In the 50s	In the 60s	Aged 70 and older
Incorporated companies	1	28.5	159.0	264.5	503.4	926.1
	2-4	200.2	1,054.4	1,185.6	2,011.1	3,315.5
	5-299	81.6	598.4	988.0	1,619.3	4,548.0
Incorporated companies	1-4	257.6	705.6	626.6	864.4	1,690.5
	5-9	500.8	806.5	967.6	1,124.6	2,220.8
	10-19	415.4	1,291.6	1,021.4	1,386.7	2,385.1
	20-49	350.3	801.9	1,121.2	1,440.3	2,258.2
	50-299	148.9	518.0	885.2	1,231.7	1,654.0

(Note) In order to obtain data similar to the actual distribution of companies, the tabulation weight is set as a figure obtained by dividing the number of companies in Table (2) by the number of companies in Table (1) for each cell.

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Note: Materials denoted [in Japanese] are written in Japanese. Official English titles are also given if they exist; for materials with no official English title, the authors of this paper provide a tentative translation.