

The Short- and Long-run Impacts of Worker and Total Sales of SMEs on Economic Growth in Central Java Province during 2009:1-2020:4

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The Short- and Long-run Impacts of Worker and Total Sales of SMEs on Economic Growth in Central Java Province during 2009:1-2020:4

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ABSTRACT

This study attempts to examine the impact of workers and total sales of SMEs on economic growth in Central Java Province throughout 2009:1 – 2020:4. The ARDL Bound Test is employed. The findings reveal that worker and total sales have a positive, significant, and linear impact on economic growth in the short-run. Total sales also have a positive, significant, and linear impact on economic growth in the long-run. Conversely, there is no evidence of workers' impact on economic growth. In addition, workers and total sales have a long-run cointegration on economic growth. Therefore, the local government of Central Java Province should emphasize the contribution of SME workers and total sales to stimulate economic growth in the long-run.

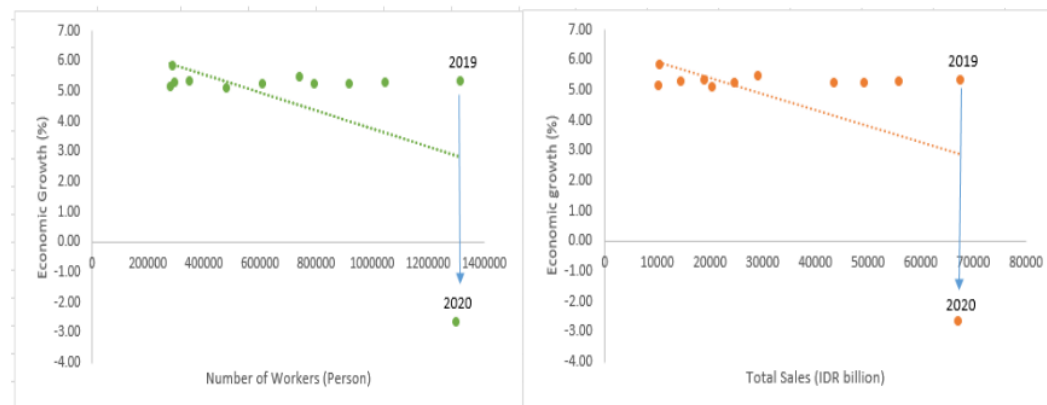
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1. Introduction

Small and Medium Enterprises (SMEs) contribute significantly to the Indonesian economy both in the short- and long-run. The government has responded to this contribution by enacting Law No. 20 of 2008 of the Republic of Indonesia concerning Micro, Small, and Medium Enterprises. During the COVID-19 pandemic, the government has facilitated the development of SMEs through Government Regulation of the Republic of Indonesia Number 7 of 2021 Concerning Convenience, Protection, and Empowerment of Cooperatives and Micro, Small, and Medium Enterprises. Therefore, a more specific and in-depth investigation of SMEs' contribution to economic growth in the short- and long-run can be carried out in Central Java Province.

An in-depth investigation of SMEs' contributions can be indicated by the number of workers and total sales (output). This contribution is directed at encouraging economic growth both at the national and local levels. Therefore, this study intends to estimate the short- and long-run impacts of workers and total sales of SMEs on economic growth in Central Java Province over the period of 2009:1-2020:4. Central Java Province is one of the provinces with the largest center for SME development in Indonesia. In addition, short- and long-run impacts can be traced using the ARDL Cointegration Bounds Test (Pesaran, Shin, & Smith, 2001).

Figure 1 describes the relationship between the number of workers and total sales of SMEs on economic growth in Central Java Province from 2009–2020. The figures reveal that before 2020, the increase in the number of workers and total sales was associated with an increase in economic growth. However, in 2020, the relationship between these variables was negative (the trend line was decreasing) due to the COVID-19 pandemic. That year, the economic growth rate was corrected significantly to -2.65%.



Source: Cooperation and SME Agency of Central Java Province (2021)

Figure 1. Relationship between Worker and Total Sales of SMEs on Economic Growth in Central Java Province, 2009-2020

Masroor & Asim (2019) argues that SMEs in developing countries deal with various business constraints, such as limited investment and lack of competitiveness in the market. Accordingly, the policymakers should facilitate the development of SME businesses through some factors such as production and market continuity, technology, business capital, business competition with large industries, and stable national economic conditions. The implementation of the SME business innovation strategy is constrained by economic cycles (Povolná, 2019). It means that increased economic growth benefits investment and business

innovation for SMEs and vice versa. Manzoor, Wei & Siraj (2021) revealed that, in the long-run, the output and credit of SMEs are determinants of economic growth, while in the short-run, both encourage economic development. SMEs operate using low-cost business resources and management. The policymakers can sustainably facilitate and encourage SMEs' business growth. Maow (2021) notes that entrepreneurship makes a significant contribution to increasing welfare and encouraging economic development. However, SMEs in Somalia encounter several business constraints, such as the limited availability of working capital, inadequate business management, and unsupportive government policies. Several ways can be pursued to reduce the SMEs' business constraints, including business cooperation with large companies and banks and the government's fiscal and non-fiscal stimulus.

Furthermore, this study contributes significantly to the existing literature in several ways. First, studies on the impact of SME workers and total sales on local economic growth in the short- and long-run have yet to be widely carried out by previous research. Second, the Central Java Province is one of the provinces in Indonesia that has developed SMEs significantly and sustainably. Third, the policymakers in Central Java Province can design SME businesses by increasing skills and labor productivity to support economic growth inclusively. Besides, facilitating an increase in SMEs' total sales (output) can be carried out through business (product) innovation and sustainable business strategies. Surya et al. (2021) found that economic growth supported by technological innovation will contribute to business productivity and improve people's welfare. Therefore, the government should pay more attention to technological innovation to create better business productivity. Specifically, four factors that can determine the productivity of the SME businesses in Makassar City include (a) technological innovation, (b) business diversification, (c) product marketing, and (d) business stability. They also mentioned that SMEs' technical quality is relatively low due to: (a) limited capabilities and expertise, (b) high business operational costs, and (c) asynchronous market guarantees for technology-based business development.

Hoang, Nahm & Dobbie (2021) focus more on the interrelationships between SME business indicators in Vietnam. They explained that female workers tend to be less innovative but no less productive than male workers. The innovative workers who are supported by technology tend to be more productive. Moreover, Myslimi & Kaçani (2016) noted that SMEs play an essential role in the economy in terms of employment, competition with large companies, national and global market players, reducing poverty rates, and reducing import levels. Findings in Albania show that SMEs are related to economic growth. Mujahid, Begam & Nargis (2019) reported that SMEs support the achievement of macroeconomic policy objectives, including job creation, reducing poverty levels, and promoting economic growth. Therefore, they found that the output of SMEs had a positive and significant impact on economic growth in Pakistan from 1980-2017. Woźniak et al. (2019) explained that SMEs are essential in driving economic growth and reducing the unemployment rate. They revealed that from 1996 to 2016, SMEs in Poland stimulated economic growth. The contribution of medium-scale businesses is more significant than that of micro and small-scale businesses.

Gómez (2018) notes that the Solow, Ramsey-Cass-Koopmans (RCK), and Diamond models can be the basic concepts for determining output. The main input factors are labor and capital. The critical point that should be emphasized is the efficiency and effectiveness of inputs. Therefore, inputs must be available and of good quality to produce significant and sustainable outputs. In addition, Habyarimana & Opoku (2018) stated that technology and research and development (R&D) are triggers for economic growth and development. Thus, modern economic theory emphasizes not only capital, land, and labor as determinants of output but also science and technology (C&T) and R&D. The condition indicates that higher

quality of C&T and R&D will lead to higher the economic growth. Gil, Afonso & Brito (2019) pay more attention to the role of technology and R&D as contributors to economic growth. Technology and R&D can help form a skilled and productive workforce.

The achievement of significant economic growth can be caused by factors such as the quality of human resources, level of savings and investment, trade openness, and law enforcement in the Republic of Korea (Han & Lee, 2020). They explained that a productive and efficient workforce is the economy's driving force. Furthermore, Harnphattananusorn & Puttitanun (2021) describe that structural changes in population have significant implications for economic growth in the long-run. The population will be part of the labor supply for the industry. They argue that labor productivity is a significant factor that should be maintained.

This study is organized into several sections. The first section discusses research issues, aims, and contributions to the existing literature. The second section synthesizes previous literature, which serves as the framework for this study. The next section is a research method covering data and econometric techniques (ARDL Bound Test). The fourth section covers results and discussion. The last section is the conclusion.

2. Research Method

2.1. Data

Economic growth in Central Java Province experienced fluctuations over the period of 2009:1 – 2020:4. This period is set to start after the 2008 global financial crisis period until the end of the significant impact of the COVID-19 pandemic on the Indonesian economy. A detailed description of economic growth and SME variables is shown in Table 1.

During the observation period, the average economic growth was 4.67%, with the minimum and maximum levels being -2.65% and 5.84%, respectively. Meanwhile, three macroeconomic variables that can be linked to the process of economic growth also fluctuate according to the dynamics of the national and local economies. These variables are foreign direct investment (FDI), unemployment rate (UER), and population (POP).

Table 1. Research Variables and Descriptive Statistics

Variable	Description	Mean	Minimum	Maximum
Economic growth of Central Java Province (EG)	An increase in the production of goods and services in one period compared with a previous period (%)	4.67	-2.65	5.84
Foreign direct investment (FDI)	Total value of foreign direct investment (million US\$)	1,016.63	59.10	2,723.20
Population (POP)	Total population (person)	33,746,644	32,289,825	36,516,035
Unemployment rate (UER)	Total unemployment rate (%)	5.62	4.44	7.33
Total Worker of SMEs (WORKER)	Total worker of SMEs (person)	699,744	278,000	1,312,400

Variable	Description	Mean	Minimum	Maximum
Total sales/revenues of SMEs (TOTALSALES)	Total sales/revenues of SMEs (billion IDR)	34,273	10,194	67,550
Total asset of SMEs (ASSET)	Total asset of SMEs (billion IDR)	18,247	4,334	38,353
Number of SMEs (UNIT)	Total number of SMEs (unit)	108,773	65,878	167,391

Source: BPS, and Cooperation and SME Agency of Central Java Province (processed)

The four SMEs indicators provide insight that SMEs are a type of business that contributes significantly to the economy in the Central Java Province. For example, the total worker (WORKER) has an average of 699,744 workers. Interestingly, the average level of total sales is almost twice the total assets. This condition has implications for progressive SME business conditions. Moreover, the number of SMEs has an average of 108,773 units. Thus, the policymakers can focus on facilitating increased production capacity, marketing, quality human resources, low-interest rate capital, technology adoption, and mastery of supply chains in local, national, and global markets.

2.2. The Econometric Technique

SMEs can become a locomotive for achieving economic growth in developing countries, including Indonesia. Accordingly, short- and long-run estimates of the impact of SME business indicators on economic growth can be carried out. Mujahid, Begam & Nargis (2019) argued that SMEs encourage local businesses, export achievement, and workforce absorption in Pakistan. They found that the output of SMEs contributed significantly to economic growth. Furthermore, Begum *et al.* (2022) argued that SMEs' output was an essential key to the industrialization process in Bangladesh from 1978–2020. They revealed that SMEs' output has a significant impact on economic growth. The policymakers can concern on initiating and facilitating strategies to sustainably increase SMEs' output and R&D investment. Meanwhile, Aladin *et al.* (2021) estimated the impact of the number and workers of SMEs on Indonesia's economic growth from 1999–2019. They explained that the number of SMEs and economic growth have one-way causality. The number of SMEs has a positive and significant impact on economic growth. However, there is no evidence of causality between SME employment and economic growth.

This study emphasizes the estimation of the short- and long-run impact of workers and total sales on the economic growth in Central Java Province throughout 2009:1–2020:4 using the ARDL Bound Test. The basic model of the ARDL Bound Test has been introduced by Pesaran, Shin & Smith (2001). Therefore, the ARDL Bound Test of the impact of workers on economic growth, in the long-run, can be formulated as follows:

$$EG_t = a + \sum_{i=1}^n b_i FDI_{t-i} + \sum_{i=1}^n c_i POP_{t-i} + \sum_{i=1}^n d_i UER_{t-i} + \sum_{i=1}^n e_i WORKER_{t-i} + \sum_{i=1}^n f_i ASSET_{t-i} + \sum_{i=1}^n g_i UNIT_{t-i} + \varepsilon_t \quad 1$$

EG is economic growth, while three macroeconomic variables are explanatory variables (FDI = foreign direct investment, POP = total population, and UER = unemployment rate).

WORKER is the total worker of SMEs, which is a long-term determinant of economic growth. Meanwhile, ASSET and UNIT are SMEs' total assets and units, respectively. The “a” is the intercept of the model in the long-run. Further, b, c, d, e, f, and g are slopes of independent variables, in which b, c, e, f, and g > 0 but d < 0. ε denotes the error term, while t indicates 2009:1 – 2020:4.

$$EG_t = a + \sum_{i=1}^n b_i FDI_{t-i} + \sum_{i=1}^n c_i POP_{t-i} + \sum_{i=1}^n d_i UER_{t-i} + \sum_{i=1}^n e_i TOTALSALES_{t-i} + \sum_{i=1}^n f_i ASSET_{t-i} + \sum_{i=1}^n g_i UNIT_{t-i} + \varepsilon_t \quad 2$$

Equation (2) describes the impact of the total sales of SMEs on economic growth in the long-run.

Meanwhile, the short-run estimation model for the impact of workers of SMEs on economic growth can be written as follows:

$$\Delta EG_t = a + \sum_{i=1}^n \gamma_{1i} EG_{t-i} + \sum_{i=1}^n \gamma_{2i} \Delta FDI_{t-i} + \sum_{i=1}^n \gamma_{3i} \Delta POP_{t-i} + \sum_{i=1}^n \gamma_{4i} \Delta UER_{t-i} + \sum_{i=1}^n \gamma_{5i} \Delta WORKER_{t-i} + \sum_{i=1}^n \gamma_{6i} \Delta ASSET_{t-i} + \sum_{i=1}^n \gamma_{7i} \Delta UNIT_{t-i} + \gamma_8 ECT_{t-1} + \varepsilon_t \quad 3$$

ECT is an error correction term for the speed of adjustment of the model in the short-run. Besides, $\gamma_8 < 0$. Furthermore, Equation (4) illustrates the impact of total sales of SMEs on economic growth in the short-run.

$$\Delta EG_t = a + \sum_{i=1}^n \gamma_{1i} EG_{t-i} + \sum_{i=1}^n \gamma_{2i} \Delta FDI_{t-i} + \sum_{i=1}^n \gamma_{3i} \Delta POP_{t-i} + \sum_{i=1}^n \gamma_{4i} \Delta UER_{t-i} + \sum_{i=1}^n \gamma_{5i} \Delta TOTALSALES_{t-i} + \sum_{i=1}^n \gamma_{6i} \Delta ASSET_{t-i} + \sum_{i=1}^n \gamma_{7i} \Delta UNIT_{t-i} + \gamma_8 ECT_{t-1} + \varepsilon_t \quad 4$$

3. Results and Discussion

3.1. The Main Findings: ARDL Estimation

The initial step in estimating the ARDL model is determining the ARDL model under optimal lag. This ARDL model reveals the impact of workers (Model 1) and total sales (Model 2) of SMEs on economic growth in Central Java Province during 2009:1-2020:4. The findings describe that Model 1 has ARDL (2, 0, 1, 2, 1, 1, 2, 2, 2), while Model 2 has ARDL (2, 2, 2, 2, 2, 2, 1, 2, 0) (Table 2).

The ARDL model of economic growth is indicated by the level of significance of the dependent variable lag (EG (-1)) at the 1% level for both Models 1 and 2. It means that the previous period's economic growth determines the current period's economic growth rate. Foreign direct investment (FDI) significantly affects economic growth under Model 2. FDI in the current period has a negative impact, while FDI (-1) has a positive impact. This finding has the consequence that economic growth benefits from FDI in the previous period.

Table 2. Results of ARDL Estimation

	Model 1 ARDL(2, 0, 1, 2, 1, 1, 2, 2, 2)	Model 2 ARDL(2, 2, 2, 2, 2, 2, 1, 2, 0)
Constant	5.151 (3.78)***	1.748 (1.33)
D(EG(-1))	0.913 (26.52)***	0.950 (24.18)***
D(FDI)	0.001 (1.04)	-0.001 (-2.11)*
D(FDI(-1))		0.001 (2.81)***
D(POP)	-0.001 (-3.75)***	-0.001 (-16.40)***
D(POP(-1))		0.001 (13.39)***
D(UER)	-0.363 (-6.61)***	-0.121 (-4.87)***

	Model 1	Model 2
	ARDL(2, 0, 1, 2, 1, 1, 2, 2, 2)	ARDL(2, 2, 2, 2, 2, 2, 1, 2, 0)
D(UER(-1))	0.369 (8.88)***	0.105 (3.66)***
D(WORKER)	0.001 (1.48)	
D(WORKER ₂)	-0.001 (-2.64)**	
D(WORKER ₃)	0.001 (4.22)***	
D(WORKER ₃ (-1))	-0.001 (-5.71)***	
D(TOTALSALES)		0.001 (2.79)***
D(TOTALSALES(-1))		-0.001 (-3.38)***
D(TOTALSALES ₂)		-0.001 (-2.83)***
D(TOTALSALES ₂ (-1))		0.001 (4.54)***
D(TOTALSALES ₃)		-0.001 (-2.11)*
D(ASSET)	0.001 (0.29)	0.001 (5.94)***
D(ASSET(-1))	0.001 (0.35)	-0.001 (-6.38)***
D(UNIT)	-0.001 (-1.90)*	-0.001 (-2.05)*
D(UNIT(-1))	0.001 (4.64)	
Adjusted R-squared	0.99	0.99
F-statistic	8434.08***	45603.66***
Durbin-Watson stat	2.17	2.51
Observations	47	46

Note: The t-statistics is in the parentheses (). *, **, and *** are statistically significant at the 1%, 5%, and 10%, respectively.

The current period population (POP) has a negative and significant impact on economic growth at the 1% level, both under Models 1 and 2. Meanwhile, the population of the previous period has a positive and significant impact on economic growth at the 1% level under Model 2. Furthermore, the current period unemployment rate has negative and significant impact at the 1% level, while the unemployment rate of the previous period (lag) contributes positively and significantly at the 1% level both under Models 1 and 2.

The impact of SME workers on economic growth is nonlinear, following the U-shaped relationship under Model 1. This finding means that higher workers encourage higher economic growth. The number of workers continues to decline until a certain level, showing negative implications of SME workers on economic growth. And then, the impact of workers is positive again on economic growth. In contrast, the impact of total SME sales on economic growth is linear. The linear impact begins with a positive relationship which continues towards a negative relationship.

Under Model 1, the assets of SMEs have positive and significant impacts on economic growth at the 1% level, while under Model 2, the assets have negative and significant impacts at the 1% level. In addition, business units of SMEs have a negative and significant impact on economic growth at the 10% level under both Models 1 and 2. The adjusted R-squared reaches 0.99 or 99% under both Models 1 and 2. F-statistics are also significant at the 1% level.

2.2. The Short-Run Coefficient

Equations (3 and 4) express the short-run impact of workers and total sales of SMEs on economic growth in Central Java Province during 2009:1-2020:4. The variable speed of adjustment (ECT (-1)) has a negative and significant impact at the 1% level under Model 2

(Table 3). The condition means that Model 2 reveals a significant contribution of the total sales of SMEs to economic growth in the short-run.

The current economic growth is determined by the negative and significant previous economic growth (EG (-1)) at the 1% level both under Models 1 and 2. Foreign direct investment (FDI), population (POP), and unemployment rate (UER) have a negative and significant impact on economic growth at the 1% level under Model 2. This condition exhibits that increasing FDI, POP, and UER will further suppress economic growth in the short-run. Thus, the policymakers should emphasize productive and labor-intensive investment, the number of skilled and productive people, and reducing unemployment.

The impacts of workers and total sales on economic growth in the short-run were linear at the 1% level. The higher number of workers and the total sales value of SMEs have implications for higher economic growth in Central Java Province. These findings show that workers and total sales of SMEs contribute significantly to the progress of economic growth in the short-run.

Assets of SMEs have a positive and significant impact on economic growth at the 1% level under Model 2. Higher assets of SMEs encourage higher economic growth in the short-run. The local governments and SME business actors can work together to enhance the development of SME businesses to be more progressive and sustainable. The development of SME businesses can create more significant asset accumulation for economic development in Central Java Province. Meanwhile, the number of SME business units has negative and significant implications for economic growth under both Models 1 and 2. This condition means that an increasing number of SME business units can harm the economic growth rate in the short-run.

Table 3. The Short-Run Impact of Worker and Total Sales of SMEs on Economic Growth during 2009:1-2020:4

	Model 1	Model 2
	ARDL(2, 0, 1, 2, 1, 1, 2, 2, 2)	ARDL(2, 2, 2, 2, 2, 2, 1, 2, 0)
ECT(-1)	-0.033 (1.19)	-0.144 (-3.73)***
D(EG(-1))	-0.488 (-4.11)***	-0.812 (-5.98)***
D(FDI)	0.001 (0.87)	-0.001 (-3.89)***
D(FDI(-1))		-0.001 (-2.49)**
D(POP)	-0.001 (-8.60)***	-0.001 (-17.93)***
D(POP(-1))		-0.001 (-5.67)***
D(UER)	-0.191 (-3.90)***	-0.149 (-7.50)***
D(UER(-1))	-0.203 (-3.58)***	-0.073 (-2.80)**
D(WORKER)	-0.001 (-4.41)***	
D(WORKER2)	0.001 (4.87)***	
D(WORKER3)	0.001 (-4.17)***	
D(WORKER3(-1))	0.001 (3.90)***	
D(TOTALSALES)		0.001 (6.03)***
D(TOTALSALES(-1))		0.001 (2.73)**
D(TOTALSALES2)		0.001 (-5.13)***
D(TOTALSALES2(-1))		0.001 (-3.46)***
D(TOTALSALES3)		0.001 (2.15)**
D(ASSET)	-0.001 (-0.82)	0.001 (7.24)***
D(ASSET(-1))	-0.001 (-2.47)**	0.001 (4.37)***

	Model 1	Model 2
	ARDL(2, 0, 1, 2, 1, 1, 2, 2, 2)	ARDL(2, 2, 2, 2, 2, 2, 1, 2, 0)
D(UNIT)	-0.001 (-1.96)*	-0.001 (-2.18)**
D(UNIT(-1))	-0.001 (-3.49)***	

Note: The t-statistics is in the parentheses (). *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

3.3. The Long-Run Coefficient

Equations (1 and 2) explain the impact of SMEs' workers and total sales on the economic growth of Central Java Province in the long-run. The findings reveal that foreign direct investment (FDI) has a positive and significant contribution at the 5% level under Model 2 (Table 4). Conversely, the population (POP) and unemployment rate (UER) have a negative and significant effect in the long-run. It means that a higher population and unemployment rate result in a lower economic growth in Central Java Province. Accordingly, the local governments can pay attention to the number of skilled and productive populations to stimulate economic growth long-run. Besides, the unemployment rate can also be reduced gradually to a certain level that is useful for sustaining sustainable economic growth.

Total sales of SMEs have a positive, linear, and significant effect on economic growth at the 5% level in the long run under Model 2. This finding reveals that higher total sales of SMEs can stimulate economic growth in the long-run. In addition, the assets of SMEs also have a positive and significant impact on economic growth at the 1% level in the long-run. The higher assets of SMEs result in higher economic growth in Central Java Province. Conversely, the number of SME business units has a detrimental impact on economic growth at the 10% level in the long-run under Model 2.

Table 4. The Long-Run Impact of Worker and Total Sales of SMEs on Economic Growth during 2009:1-2020:4

	Model 1	Model 2
	ARDL(2, 0, 1, 2, 1, 1, 2, 2, 2)	ARDL(2, 2, 2, 2, 2, 2, 1, 2, 0)
Constant	33.798 (1.11)	41.356 (10.43)***
FDI	-0.002 (-0.62)	0.001 (2.62)**
POP	-0.001 (-0.73)	-0.001 (-9.26)***
UER	-0.478 (-0.63)	-0.180 (-1.70)*
WORKER	-0.001 (-1.19)	
WORKER2	0.001 (1.17)	
WORKER3	0.001 (-1.18)	
TOTALSALES		0.001 (2.57)**
TOTALSALES2		0.001 (1.81)*
TOTALSALES3		0.001 (-2.58)**
ASSET	-0.001 (-0.81)	0.001 (4.93)***
UNIT	-0.001 (-0.70)	-0.001 (-2.02)*

Note: The t-statistics is in the parentheses (). *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

3.4. The ARDL Bound Test

The ARDL Bound Test reveals long-run cointegration of the impact of workers and total sales on economic growth for Central Java Province in 2009:1-2020:4 (Table 5). The findings reveal that Models 1 and 2 have long-run cointegration. This condition is expressed

by the ARDL-statistics values > critical value bounds, namely: 7.70 (Model 1) and 8.45 (Model 2). It means that the impact of workers and total sales on economic growth is cointegrated in the long-run.

Table 5. Results of ARDL Bound Test

Test Statistic	Value	k
Model 1: ARDL(2, 0, 1, 2, 1, 1, 2, 2, 2)		
F-statistic	7.70	8
Model 2: ARDL(2, 2, 2, 2, 2, 2, 1, 2, 0)		
F-statistic	8.45	8
Critical Value Bounds		
Significance	Io Bound	I1 Bound
10%	1.95	3.06
5%	2.22	3.39
2.50%	2.48	3.7
1%	2.79	4.1

3.5. Discussion

The findings of this study reveal that, in the short-run, workers have significant implications for economic growth while, in the long-run, there is no empirical evidence. However, estimates of the impact of workers on economic growth have been cointegrated. Specifically, Hoang, Nahm & Dobbie (2021) concern on the contribution of SME workers' productivity in Vietnam. They found that male workers were more innovative in managing businesses, while female workers were more productive. Innovation is better formed when it is supported by the application of technology. Thus, SME workers need technology-based entrepreneurial skills to drive SME productivity and innovation sustainably. Consequently, SMEs' higher productivity and innovation can result in steady economic growth.

Mujahid, Begam & Nargis (2019) elaborated that SMEs in Pakistan have contributed to the economy and development of the domestic industry. SMEs also play an essential role in job creation and export performance. Therefore, they formulated several policies for stakeholders, including:

1. Strengthening the potential output of SMEs to boost export performance.
2. Industry 4.0 as a trigger for increasing SMEs' business innovation.
3. Increasing the skills and capabilities of SMEs to compete in the international market.
4. Equitable distribution of SMEs in various regions to provide greater space for industrialization and effective use of resources.
5. Government support for young entrepreneurs to reduce unemployment and stimulate economic growth.

Furthermore, this study also shows that total sales have contributed significantly to economic growth in both the short- and long-run. Bello, Jibir & Ahmed (2018) argued that SME business indicators contributed significantly on economic growth, especially in developing countries such as Nigeria during the 1986-2016 period. They suggest that the government can provide more opportunities for SME products in the domestic market and

place trade restrictions on imported products that substitute for SME products. In addition, Aladin et al. (2021) estimated the impact of the number and workers of SMEs on Indonesia's economic growth from 1999-2019. They revealed that the number of SMEs and economic growth have one-way causality. The number of SMEs has a positive and significant impact on economic growth. In contrast, there is no evidence of causality between SME employment and economic growth.

Manzoor, Wei & Siraj (2021) investigated the impact of SMEs on economic growth in Pakistan during the 1990-2019 period, both in the short- and long-run. They found that, in the long-run, SME output, SME credit, and the human development index are the driving factors for economic growth. Meanwhile, in the short-run, SME output, SME credit, the human development index, and the level of exports can determine economic growth. Therefore, the government can emphasize facilitating the growth of SMEs through appropriate and sustainable business strategies.

Mujahid, Begam & Nargis (2019) stated that SMEs are essential for achieving macroeconomic goals such as employment, poverty reduction, and economic growth. Thus, SMEs' business operations can be emphasized to achieve a certain level of business efficiency. They argued that the output of SMEs in Pakistan from 1980-2017 has contributed significantly to driving economic growth. In line with this, Begum et al. (2022) explained that the output of SMEs could be an essential key to the industrialization process in Bangladesh from 1978–2020. They reported that the output of SMEs has a significant impact on economic growth. Therefore, policymakers can emphasize on initiating and facilitating strategies to increase SMEs' output and research & development investment sustainably.

4. Conclusion

This study emphasizes the contribution of SMEs on economic growth in Central Java Province, a region with a relatively significant number of SMEs in Indonesia. Hence, this study aims to estimate the short- and long-run impact of workers and total sales of SMEs on economic growth in Central Java Province during 2009:1-2020:4. The ARDL Bound Test is addressed to qualify the study objective.

The findings reveal that workers have a non-linear and U-shaped relationship with economic growth under ARDL estimation. In contrast, the total sales of SMEs have a linear relationship impact. In the short-run, workers and total sales of SMEs have a positive, significant, and linear impact on economic growth. Besides, total sales also has a positive, significant, and linear impact on economic growth in the long-run. The workers and total sales have a long-run cointegration on economic growth.

Policy implications can be formulated in several ways. First, the local policymakers can emphasize facilitating the skills of workers of SMEs to boost work and business productivity. Second, SME business actors can improve business performance and worker quality through various training and assistance conducted by the Provincial Government of Central Java. Finally, SME business actors can boost total sales by modernizing production and marketing processes. This modernization can be employed by utilizing production technology and online marketing.

The Short- and Long-run Impacts of Worker and Total Sales of SMEs on Economic Growth in Central Java Province during 2009:1-2020:4

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