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Analyses of Topical Policy Issues

Adapting to the gig economy: Determinants of financial resilience among "Giggers"

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ABSTRACT

The growth of Malaysia's gig sector has been driven by the flexibility of gig work, digitalization, and the rise in unemployment. However, the lack of social protection and insurance has underscored the importance of understanding gig workers' financial resilience. This study examined the current state of Malaysian gig workers' financial resilience and identified its components. Analyzing responses from 452 gig workers to a structured survey conducted between June and November 2022 revealed that Malaysian gig workers exhibited low financial resilience when facing adverse shocks. This paper identified financial literacy, income level, and age as significant determinants of financial resilience. These findings underscored the necessity of financial literacy programs, income support initiatives, age-specific support programs, and regulatory framework enhancements to mitigate income volatility and assist gig workers in navigating financial and economic challenges.

1. Introduction

Malaysia has been moving toward a gig economy, where a greater reliance on digital platforms for on-demand tasks has changed the traditional employment landscape. The rapid advancement of technology, driven by the emergence of app-based digital platforms such as eRezeki, Grab, and MYfutureJobs, has opened up opportunities for the unemployed and underemployed to secure jobs. This technological shift offers a new online-based, flexible, yet potentially precarious form of work (Huang et al., 2020). The flexibility of gig employment, which typically involves short-term or task-based engagements complemented by developments in digitalization and a rising unemployment rate in the traditional labor market (Uchiyama et al., 2022), has contributed to the rise of Malaysia's gig sector. In addition, a study conducted by the Zurich-University of Oxford (2018) found that 38 % of full-time workers in Malaysia planned to join the gig economy in the next year, significantly exceeding the global average of 20%, highlighting the growth of the gig economy in Malaysia.

However, financial resilience among gig workers in Malaysia has drawn considerable attention to the potential risks associated with participation in the gig economy. Gig workers in Malaysia, who are not subject to the provisions of the Work Act of 1995 or other labor-related ordinances, are not entitled to the minimum wage benefits typically granted to traditional employment in the labor

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market. Moreover, existing labor laws in Malaysia lack specific provisions or ordinances regarding gig workers. On the other hand, the current voluntary social security and insurance scheme, initially designed for traditional employment registered with the Social Security Organization (SOCSO) and the Employees Provident Fund (EPF), has been extended to cover self-employed individuals and gig workers in Malaysia. However, low participation rate among self-employed individuals is a challenge. Furthermore, the COVID-19 pandemic significantly impacted the economy, with 46.6% of self-employed individuals losing their jobs and only 5% of self-employed individuals in Malaysia having sufficient savings for a minimum of three months (Department of Statistics Malaysia, 2020). The financial risks associated with the absence of social protections, including health insurance, retirement benefits, emergency savings, and potential wage exploitation have underscored the importance of better understanding the financial resilience of gig workers in Malaysia.

Furthermore, as they are not bound to any organization or company, gig workers lack access to organizational support such as training and other employment benefits (Chen et al., 2019). In addition, despite the COVID-19 pandemic rapidly changing the labor market and highlighting the significance of essential services relying on gig workers (Friedland and Balkin, 2023; Hasegawa et al., 2022), employers often seek gig workers for low-skilled jobs (Eriksson and Rooth, 2014; Kroft et al., 2013). Gig workers are typically readily available but often face low wages (Adermon and Hensvik, 2022). This situation highlights Malaysia as an interesting case study for lessons and policy considerations regarding gig worker development.

This situation raises the question: Are Malaysian gig workers financially resilient without the benefits of typical employee protections in the traditional labor market? Although a relatively new concept, financial resilience has been highlighted by policymakers and academics because it indicates ability to cope with adverse shocks (Salignac et al., 2016; Muir et al., 2016).

Considering this ambiguous insight, we investigated gig workers' financial resilience before formulating strategies to enhance their financial security. In addition, we examined factors contributing to gig workers' financial positions through the adoption of a newly developed multidimensional instrument for measuring financial resilience posited by Salignac et al. (2019), which encompasses not just financial standing but also capacity to leverage the advantages of financial inclusion, financial literacy, and social networking to enhance their financial well-being. The present study employed the ordered probit and Extended Regression Model (ERM) technique to ensure a rigorous analysis. This paper has significantly contributed to this topic's existing knowledge base for the following reasons. First, it has provided a profile and in-depth information on the financial position of Malaysian gig workers. Second, examining gig workers' ability to rebound in the case of uncertainties through investigation of financial resilience has provided a point of departure for the Malaysian government in developing a sustainable ecosystem and policy solutions for enhancing financial resilience for survival in the gig economy. The remainder of this paper is structured as follows. The following section presents a review of the existing related literature. Section 3 discusses the data and methodology used in the research. Section 4 presents the study's empirical results, and Section 5 concludes the paper.

2. Literature review

The concept of labor market segmentation, originating in the United States, has gained interest and discussion since the 1970s and was first identified based on race, gender, educational qualifications, and the industry in which individuals were employed. This situation led to distinct labor markets with varying working conditions, opportunities for advancement, salaries, and institutional arrangements. The dual labor market theory explains the two segments of the labor market: the high-wage primary segment and the low-wage secondary segment (Dickens and Lang, 1985). The primary and secondary segments differ mainly by income stability characteristics. In particular, the primary segment favors steady employment and job security, while the secondary segment is less favorable with little job security, including non-traditional employees such as gig workers.

Dual labor market theory evolved in response to economic changes from globalization, technological advancements, policy reforms, labor market restructuring, income inequality, and economic crises. This evolution is evident in European countries such as Italy, where it has led to the labor market duality. In the mid-1990s, labor market reforms in Italy brought about significant changes, increasing the prevalence of non-standard work arrangements such as part-time and fixed-term contracts, essentially creating a dual labor market. These reforms responded to persistently high unemployment rates in the 1980s and early 1990s, especially among marginalized groups such as youth and women. Furthermore, the global economic downturn in 2008–09 led to a substantial increase in temporary and fixed-term employment in Italy and other European countries. The dual market may result in diminished investment in human capital and decreased productivity, especially in the secondary sector. The weakened sense of attachment to a firm diminishes firms' incentives to invest in their workforce (Heckman and Pages, 2000). In comparison, gig workers in Malaysia have tended to fall into the second segment, with lower job security, wages, limited access to benefits, and limited legal protections, and may therefore face challenges in terms of unfair contracts, wages, and workplace safety.

Resilience is typically defined as an individual's ability to "bounce back" after adverse events and experiences, adapt to changing circumstances, and handle environmental stress (Abbott-Chapman et al., 2008). The concept of financial resilience has gained prominence in response to economic and financial crises and the ongoing COVID-19 pandemic. In the face of such challenges, emphasis has shifted to the capacity to rebound from adverse effects, making it more critical than ever in addition to solely identifying financial vulnerabilities.

The life cycle hypothesis (LCH) introduced by Modigliani and Brumberg (1954) posited the conceptual foundation of people's behavior in resource allocation throughout their life cycle. Individuals seek to tailor their consumption to their current situation and their expectation of future income while saving and investing for consumption in the event of shocks. The precautionary allocation of resources via saving, investment, and retirement planning activities facilitates individuals' rebounding in the event of a shock. Thus, the connection between LCH and financial resilience is established through individuals' financial behavior that impacts their financial

status and capacity to withstand economic setbacks.

Furthermore, the ability to rebound is more feasible where there is a connection between individuals and financial services which emphasizes financial inclusion. Macroeconomic theory on financial-led development by Schumpeter (1934) argued that the financial services sector plays an essential role in economic development. Development of the financial sector allows individual access to financial services, including savings mobilization, project evaluation, and risk management facilitated by financial intermediaries, equipping individuals with the tools needed to navigate and rebound from economic shocks.

Scholars emphasize the significant role of knowledge in improving an individual's financial well-being (Braunstein and Welch, 2002; Lusardi and Mitchell, 2014). Making informed decisions in spending, investing, saving, and retirement planning requires financial knowledge. Proficiency in managing money is essential to navigating opportunities and mitigating risks in dynamic economic conditions, thus rebounding after adverse shocks. It not only ensures financial stability but also develops financial resilience to adapt to changing circumstances.

On the other end of the spectrum, social capital theory by Bourdieu (1986) emphasizes that social relationships provide value to their members in times of need. In particular, this value may include connections that enable individuals to access the quantity and quality of resources held by their peers. Thus, social capital contributes significantly by providing access to resources, information support, and opportunities that depict the connection to financial resilience.

This underlying discussion on LCH, Schumpeterian, financial knowledge, and social capital theory links to Salignac et al. (2019), which establishes the conceptualization and measurement of financial resilience as an individual's ability to access and draw on internal capabilities and appropriate acceptable external resources and support in times of financial adversity.

The World Bank's 2017 Global Findex database assessed financial resilience by examining respondents' abilities to generate emergency funds and identify their primary funding source. Since this concept has only been based on one dimension (financial position), Salignac et al. (2019) initiated a discussion on financial resilience by developing a multidimensional framework including four components: economic resources, financial resources, financial knowledge and behavior, and social networks.

Furthermore, it covered an individual's ability to access and use internal and external resources during difficult times. Salignac et al. (2019) pointed out that in the current interconnected society where individuals engage in economic activities and social interactions, factors such as involvement in the banking sector, social networks, and financial literacy are crucial in characterizing one's capacity to recover. In the same vein, Moore et al. (2019) perceived that financial resilience was built through financial inclusion whereby leveraging financial services would increase investment, generate wealth, enhance risk-sharing, and reduce transaction costs in responding to shocks and consumption smoothing. Thus, financial inclusion would be associated with financial resilience. This situation was similar to the ideas of Salignac et al. (2019), which represented the two financial resilience components of economics and financial resources by activity or accumulation related to income, savings, debt management, and access to financial services products. In addition, from a sociological point of view, family and friends are the group to rely on during unexpected events (Harknett and Knab, 2007; Sarkisian and Gerstel, 2004), which also highlights social networking.

Most existing studies on this topic have focused on defining and measuring the concept of financial resilience (Salignac et al., 2019) and its determinants (Bialowolski et al., 2022; Erdem and Rojahn, 2022; Kass-Hanna et al., 2022; Klapper and Lusardi, 2020). Using data from the 2015 Indonesia Family Life Survey, Salignac et al. (2022) revealed notable variations in the performance of Indonesian households across different financial resilience components. On average, Indonesian households exhibited higher scores for social capital, while their scores were lower for economic resources. Additionally, as the economy works in a system, social demographic factors also contribute to resilient financial conditions. Low-income households, younger respondents, high number of children (Clark et al., 2021), and low education status (Wiersma et al., 2020) have made individuals more likely to have low financial resilience (financial fragility). Additionally, there have been mixed findings on the effects of financial resilience, indicating that single women are more likely to be financially fragile than single men (Demertzis et al., 2020). However, while no significant relationship has been found, the complementary effect of other factors such as income, age, and education level were highlighted (Clark et al., 2021; Wiersma et al., 2020). In a related study, Herrmann et al. (2023) found that educational attainment was unrelated to gig workers' income levels.

Recent literature has conclusively established the association between financial literacy and financial resilience in the context of the South Asian and sub-Saharan African regions (Kass-Hanna et al., 2022), European countries during the COVID-19 pandemic (Erdem and Rojahn, 2022), and middle-aged and older adults from Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Israel, the Czech Republic, and Poland (Bialowolski et al., 2022). In particular, financial literacy has been among the factors contributing to better financial decisions and protecting people from losing financial resilience. Sound financial knowledge, skills, and behaviors are thus required to support individuals' financial security in an increasingly complex financial system (Lusardi and Mitchell, 2014). However, financial knowledge and behaviors are not solely the individual's responsibility but are also linked to the availability of financial information. Improving financial knowledge and behavior thus necessitates considering internal and external factors. Furthermore, financial well-being has always been associated with applying the financial knowledge determined by financial behavior (Potocki and Cierpial-Wolan, 2019).

However, literature regarding gig workers' financial resilience remains relatively scarce. Much of the existing research has focused only on the issues of job satisfaction and autonomy (Au and Tsang, 2023; Gleim et al., 2019) and workers' motivations for participating in the gig economy (Dickey et al., 2011; Doucette and Bradford, 2019). Dickey et al. (2011) studied individuals' motivations for taking second jobs in the United Kingdom's oil and gas industry, finding that holding multiple jobs was a way for workers to deal with financial difficulties. In contrast, a recent study by Adermon and Hensvik (2022) found that in the case of Sweden, gig work was more financially beneficial than unemployment, highlighting gig jobs as a stepping stone for workers to switch from the gig sector to the traditional sector.

In the Malaysian context, there have been a growing number of studies (Samad et al., 2023; Uchiyama et al., 2022) regarding gig workers. Uchiyama et al. (2022) conducted a study investigating the working conditions of e-hailing drivers and online food delivery riders, two of the country's most prominent groups of on-demand app-based gig workers. Furthermore, the study took into account their perspectives on addressing issues related to inequality. Gig workers commonly acknowledge their status as independent contractors, and at first glance platform firms offer a mutually beneficial arrangement by providing flexibility and autonomy. However, rather than fostering an open labor market with low entry barriers, platform companies have established a hands-off system that neither interferes with nor fully formalizes the employment status of gig workers. In essence, the gig labor market places the total burden of responsibility and risk on workers through its performance-based approach. On a positive note, the COVID-19 pandemic expanded the gig labor market to include millions of unemployed individuals, young people, recent graduates, and women across Asia. However, this expansion paradoxically revealed the concealed inequalities experienced by gig workers glaring absence of social protections. Samad et al. (2023) examined the motivations, problems, and challenges of gig workers in Malaysia, revealing that the primary motivations for engaging in gig work included flexible working hours, the prospect of earning extra income, the ease of earning money, and the absence of stringent qualification requirements.

It is noteworthy that challenges persist among Malaysian gig workers, particularly in terms of saving capacity and the absence of retirement security. As such, although the body of literature regarding gig workers has been growing, discussion of their financial resilience remains relatively scarce. Thus, the present paper has contributed to the understanding of the financial security of gig workers facing adverse economic shocks.

3. Methodology

3.1. Sample and data collection

The sample comprised gig workers over 18 years old residing in Malaysia. We conducted stratified sampling according to the proportion of informal workers in each Malaysian state and the five regions of Peninsular Malaysia: Northern, Central, Southern, and the East Coast, as well as East Malaysia, comprising Sabah and Sarawak.[1] We administered the survey face-to-face to ensure that all participants understood the questions and could provide accurate responses.[2] More than 400 gig workers were included in this research to reach the required number with a 95% confidence level.[3] We provided the respondents with a briefing on the purpose of the research, offered monetary incentives, and collected the data with the assistance of a trained enumerator from June 2022 to November 2022.

The enumerator recruitment process began with advertising the job vacancy on social media platforms to identify qualified candidates with relevant experience and essential basic literacy skills. Additionally, we conducted briefings and provided interview guides as research tools.

Four hundred and ninety responses were collected and scrutinized for completeness, missing data, and consistency, finally selecting 452 valid responses for the analysis. The questionnaire was in both English and Bahasa Melayu to suit Malaysia's multiethnic and multilingual society. The questionnaire comprised four sections. Section 1 consisted of the respondents' demographic profiles. Section 2 sought to measure the respondents' general and mental health. Section 3 covered the respondents' financial vulnerability, resilience, and financial literacy, and finally, Section 4 covered the respondents' financial profiles.

3.2. Financial resilience

Examining the financial resilience of gig workers has illuminated their capacity to rebound from unexpected financial shocks. It has also offered a detailed analysis of its components, developing intuitive strategies to enhance resilience while minimizing risks. The present study used four measures: economic resources, financial resources, financial knowledge and behavior, and social capital to capture gig workers' financial resilience, following the comprehensive measures of Salignac et al. (2019), which serve as a valuable foundation for evaluating individual positions regarding financial strengths and weaknesses, providing a significant resource to policymakers, agencies, and implementors in the field. The first measure is economic resources, which encompasses income, savings, debt management, and the capacity to cover living expenses and obtain emergency funds. The second measurement of financial resources assesses access to and demand for financial products and services. The third measure of financial resilience comprises financial knowledge and behavior, which pertains to individuals' understanding and confidence in financial products and services, use of financial advice, and proactive financial behavior. Finally, the fourth measure, social capital, encompasses individuals' social connections with their friends, family, community, and government, which can provide financial support and advice in decision-making. We can express this relationship as:

$$Financial\ resilience = f(Economic\ resources,\ financial\ resources,\ financial\ knowledge,\ social\ capital) \quad (1)$$

[1] As data regarding the gig worker population was unavailable, the preset study used the number of informal workers as a proxy for estimating the gig worker population.

[2] The present study has significantly contributed to the comprehensive examination of gig workers' financial resilience, complementing prior research conducted by Samad et al. (2023) and Uchiyama et al. (2022), which primarily employed a qualitative (interview-based) approach.

[3] A pre-test was carried out before the survey session, consisting of an expert review and 30 randomly selected gig worker samples.

Table 1 presents the financial resilience dimension and its construct. The present study used 17 items from the financial resilience section measured on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) to measure financial resilience.

The items were arranged in the same polarity from lowest to highest. If respondents selected "agree" or "strongly agree" (or "strongly disagree" or "disagree'), their response was considered indicative of high (or low) financial resilience. Finally, we calculated financial resilience scores based on the average scores of the 17 questions. Table 2 shows the classifications of the average calculated scores. A score between 1- and 1.75 was classified as very low financial resilience, 1.76–2.5 was classified as low financial resilience, 2.51–3.25 was classified as high financial resilience, and 3.64–4.00 was classified as very high financial resilience.

3.3. Determinants of financial resilience among Malaysia's gig workers

The present analysis explored factors contributing to financial resilience among Malaysia's gig workers to provide intuitive findings for policy formulation. Based on previous literature, sociodemographic factors and financial literacy were among the elements determining individuals' financial resilience.

3.4. Financial literacy

Previous research concerning financial literacy has focused on developing various methods and approaches to assess individual levels of financial literacy. While numerous scholars have proposed different measurement techniques (Hung et al., 2009), none has achieved universal consensus as the definitive method. This situation underscores the ongoing need for further research (Marcolin and Abraham, 2006). Traditionally, financial knowledge has often been used interchangeably with financial literacy (Bucher-Koenen et al., 2017; Hilgert et al., 2003; Lusardi and Mitchell, 2011a). However, opinions have diverged among scholars who have argued that financial knowledge alone has not equaled financial literacy (Kimiyaghalam and Safari, 2015). Considerable efforts by scholars and public and private initiatives to enhance financial knowledge have been positive; however, it has been insufficient to promoting financial literacy (Lusardi and Mitchell, 2011b). This present study adopted a more liberal measurement of financial literacy by evaluating only respondents' perceived knowledge. The measurement was adapted from recent work by Stella et al. (2020). This approach has held particular significance in the financial literacy literature because it recognizes the importance of individuals' developed financial skills and attitudes as critical determinants of their level of financial literacy.

We measured financial literacy using a nine-item scale to record responses using a 4-item Likert scale (1 = strongly disagree through to 4 = strongly agree). The measure focused on identifying gig workers' financial literacy and covered the basic knowledge of financial concepts such as saving and emergency preparedness, borrowing, understanding risks and returns, preparation for retirement, and compounding interest. The financial literacy and its constructs are shown in Table 3.

3.5. Sociodemographic factors

The present study considered sociodemographic indicators such as age, gender, education level, gig worker status, and gig job category, which were based on prior research (Clark et al., 2021; Demertzis et al., 2020; Wiersma et al., 2020). Table 4 shows a detailed description of the variables.

3.6. Method

The data analysis comprised two parts. First, we calibrated a financial resilience score using the average score derived from

Table 1
Financial resilience and its constructs.

Financial Resilience	Constructs
Economic resources	I have solid savings (more than 3 months of income) and assets accumulation if I were to be retrenched.
	I am very comfortable with paying off debt.
	I have no debt.
	In the event of hospitalization, I am not worried about paying for medical expenses of RM2,500.
	If I am diagnosed with a critical illness (e.g., cancer, heart attack, coma, etc.), I have sufficient funds to support myself without burdening my family.
Financial resources	I have access to full use of a wide range of banking services.
	I have access to mainstream credit.
	I have no unmet need for credit.
	I have significant insurance coverage.
	I have no unmet need for insurance.
Financial knowledge and behavior	I have very good knowledge of financial services.
	I am very confident using financial service products.
	I have received financial advice.
Social capital	Whenever I make an important financial decision, I seek all relevant information.
	I have a well-established social network relationship.
	I am very likely to receive social support in a time of crisis.
	I don't need community or government support.

Table 2
Financial Resilience Scores.

Very low financial resilience	Low financial resilience	High financial resilience	Very high financial resilience
1–1.75	**1.76–2.50**	**2.51–3.25**	**3.26–4.00**

Table 3
Financial literacy constructs.

Financial Concept	Construct
Saving and emergency preparedness	"I should have an emergency fund that covers two to six months of expenses."
The concept of borrowing	"I know that if I make a late payment on my loan, it will be more difficult for me to apply for other loans."
Understanding returns	"I know I can earn higher returns by saving in a fixed deposit account than in a regular savings or current account."
Understanding risk	"I know that when I use my home as collateral for a loan, there is a chance that I could lose my home."
Preparation for retirement	"I am responsible for providing the majority of funds that will be needed for retirement."
Compounding interest	"I know that the earlier I start saving for retirement, the more money I will have because the effects of compounding interest increase over time."

Table 4
Description of variables.

Explanatory Variables	Description
Financial resilience	Very low financial resilience = 1 Low financial resilience = 2 High financial resilience = 3 Very high financial resilience = 4
Income below RM 4849	Dummy = 1 if monthly household income was below RM 4849; 0 = otherwise
Income above RM15,039	Dummy = 1 if monthly household income was above RM15,039; 0 = otherwise
Age	Continuous variable: Age of respondent in years
Number of people in a household	Continuous variable: Number of people
Gender: Female	Dummy = 1 if female; 0 otherwise
Education level: tertiary	Dummy = 1 if highest education attainment equalled Sijil Tinggi Peperiksaan Malaysia/Sijil Tinggi Agama Malaysia (STPM/STAM) degree and above; 0 otherwise
Financial literacy	Dummy = 1 if at least four out of six questions were answered correctly; 0 otherwise

Note: Income levels below RM 4849 and RM 15,039 signify the median monthly income by household group for the bottom 40 percent and the top 20 percent in Malaysia.

responses with descriptive findings regarding financial resilience, as has previously been explained. The second part of the analysis employed an ordered probit regression model to analyze the factors contributing to Malaysian gig workers' financial resilience.

The present study employed an ordered probit regression model (McCullagh, 1980; McKelvey and Zavoina, 1975), a statistical approach for analyzing ordinal responses in which the probability of a response falling into a particular category is evaluated using the standard normal cumulative distribution function as a linear function of the explanatory variables (Wooldridge, 2012). This study's dependent variable was ordinal data, taking four distinct values: very low financial resilience (1), low financial resilience (2), high financial resilience (3), and very high financial resilience (4). Therefore, employing an ordered probit regression model was the most appropriate method for analyzing determinants of financial resilience. Estimating the ordered probit model involved using a maximum likelihood method to estimate the parameters. Let y_i^* denotes the dependent variable in the ordinal variable coded as 1, 2, 3, and 4 based on financial resilience level. In addition, financial resilience was expressed as a function of a vector of the explanatory variable x_i using the following linear relationship:

$$y_i^* = \beta' x_i + \varepsilon_i \tag{2}$$

where β' is the vector of unknown parameters, and ε_i is the error term. x_i includes explanatory variables such as sociodemographic characteristics, including income level, age, number of people in a household, gender, education level, and financial literacy. It is assumed that y_i^* is related to the observable ordinal variable y_i as follows:

$$y_i = 1 \ [\text{`}\textit{Very low financial resilience}\text{'}] \text{ if } -\infty < y_i^* < \theta_0$$

$$y_i = 2 \ [\text{`}\textit{low financial resilience}\text{'}] \text{ if } \theta_0 < y_i^* < \theta_1$$

$$y_i = 3 \ [\text{`}\textit{high financial resilience}\text{'}] \text{ if } \theta_1 < y_i^* < \theta_2$$

$$y_i = 4\ [\text{`very high financial resilience'}] \text{ if } y_i^* \geq \theta_2$$

Where the probability $[y_i = j] = \varnothing(\theta_j - x_i'\beta) - \varnothing(\theta_{j-1} - x_i'\beta)$ for $j = 1, 2, 3$, or 4, where $\varnothing(.)$ denotes the cumulative distribution function operator for the standard normal. However, endogeneity issues may arise under such conditions due to omitted variables, reverse causality, simultaneous relationships, or measurement errors (Stolper and Walter, 2017). Studies have often applied instrumental variable regressions to address endogeneity when examining the effect of financial literacy on financial behavior (Stolper and Walter, 2017) and financial resilience and literacy (Kass-Hanna et al., 2022), since financial literacy would possibly affect other factors in the model besides the financial resilience. In particular, a study by Behrman et al. (2012) found that financial literacy and schooling were significantly positively correlated with wealth. The findings also showed that schooling's effect became positive only when it interacted with financial literacy, thus implying that having good financial literacy could lead to large wealth payoffs. Erdem and Rojahn (2022) used the lagged values of the independent variables in panel data estimations in their study concerning financial literacy in explaining financial resilience. In addition, including variables such as skills and attitudes in the prediction of financial literacy can help mitigate potential issues related to omitted variable bias, as noted by Bucher-Koenen and Lusardi (2011), and addresses broader concerns related to endogeneity problems, as discussed by Stolper and Walter (2017). The present study used an extended regression model (ERM) to handle the endogeneity problem. The extended regression model (ERM) is based on the multivariate normal distribution and likelihood estimation. It can simultaneously handle endogeneity problems with endogenous variables, endogenous sample selection, random effects, or a combination of scenarios (Liu et al., 2021).[4]

4. Empirical results

Based on the demographic profiles presented in Table 5, of the total of 452 respondents, most were Malay (59.7%), male (67.3%), aged between 25 and 54 years old (57.7%), and full-time gig workers (63.9%).

Table 6 shows the results of the Kaiser-Meyer-Olkin (KMO) test, Bartlett test, and Cronbach's alpha to assess the sampling adequacy and suitability for factor analysis and internal consistency. The Cronbach's alpha reliability analysis showed that the questionnaire attained acceptable reliability with $\alpha = 0.845$. The KMO test result and Bartlett chi-square value denoted greater adequacy of the factor analysis, confirming that the variables were correlated and that the items used in constructing the financial resilience index had relatively high internal consistency.

The subsequent analysis focused on exploring the financial resilience of Malaysian gig workers using descriptive and empirical methods. Table 7 shows the average scores of financial resilience and the percentage of gig workers in each financial resilience category. Slightly more than half (52.6%) of the sampled gig workers were categorized as having low financial resilience, which indicated their reduced ability to bounce back after adverse events and experiences, adapt to changing circumstances, and deal with environmental stress. While examining the degree of their financial resilience, the calculated average score of 2.39 indicated the low financial resilience position of the respondents. Intuitively, more than half of them had limited ability to recover from unexpected events, adjust to changing situations, and cope with external pressure related to their financial situation, potentially exposing them to the risk of bankruptcy.

The components of financial resilience, as shown in Fig. 1, revealed that the economic resources component exhibited the lowest score with an average score of 2.19, followed by the financial resources component with a score of 2.30.

This outcome suggested that gig workers had a limited capacity to cover living expenses, manage debts, or obtain funds during emergencies (mainly from income, savings, and access to financial products and services). In other words, gig workers need help covering basic living expenses and managing debt on loans or credit card payments. In addition, the social network component was found to be 2.51, which implied a high ability to rebound financially with their current social network. A high score in the social network component implied that giggers had good access to individuals who could provide financial assistance, guidance, or opportunities. In addition, they had strong connections with people who could offer job leads, business prospects, or other financial support mechanisms. Gig workers need sufficient economic and financial resources, which can present challenges in maintaining financial stability. However, they possessed strong social networks that could provide support and assistance during times of need. Despite their financial limitations, gig workers benefited from robust social networks offering various kinds of assistance. Such networks included family, friends, fellow gig workers, or other connections within their professional community. This support system has helped gig workers navigate financial hardships, access additional resources, and receive emotional or practical support. The presence of a robust social network suggested that gig workers had a valuable asset that could mitigate some of the financial difficulties they may face. While economic resources may be limited, the support and assistance provided by their social connections contributed to their overall financial resilience and ability to navigate challenges in the gig economy. The financial knowledge and behavior component scored the highest at 2.66, indicating high ability to rebound financially. When investigating more deeply into financial knowledge and behavior, it became evident that respondents could be categorized into four groups (very low, low, high, and very high) based on their scores.[5] This categorization revealed a clear trend: as financial knowledge and behavior improved, individuals tended to exhibit higher levels of financial resilience, as shown in Fig. 2.

[4] The extended model under the ERM framework contains the eoprobit submodule.

[5] A score between 1-1.75 was classified as very low, 1.76-2.5 was classified as low, 2.51-3.25 was classified as high, and 3.64-4.00 was classified as very high in financial knowledge and behavior.

Table 5
Respondents' Profiles.

Dimension	Items	Frequency	Percentage
Gender	Male	304	67.3
	Female	148	32.7
Age group[1]	15 - 24 years old	183	40.5
	25 - 54 years old	261	57.7
	55 - 64 years old	6	1.3
	Above 65 years old	2	0.4
Ethnicity	Malay	270	59.7
	Chinese	89	19.7
	Indian	22	4.9
	Sabah native	62	13.7
	Sarawak native	2	0.4
	Others	7	1.6
Gig worker status	Full-time	289	63.9
	Part-time	98	21.7
	Casual	65	14.4
Category of current gig work	Food delivery/delivery service	146	32.3
	E-hailing	85	18.81
	Accommodation	14	3.10
	Household services	47	10.40
	Local microtasking	3	0.66
	Freelancer work	71	15.71
	Consultants	15	3.32
	Art, design, & entertainment	15	3.32
	Education	56	12.39

Note: [1] The study collected age data as a continuous variable, categorized for simplicity in interpreting the respondent's profile. Nonetheless, the empirical analysis treated age as a continuous variable.

Table 6
Results of sampling adequacy.

Variable	Kaiser-Meyer-Olkin Test	Bartlett Test (chi-square)	Cronbach's Alpha
Financial resilience	0.865	2578.72***	0.845

Note: *** denotes significance at the 1% significance level.

Table 7
Financial resilience scores.

Score	Very low financial resilience	Low financial resilience	High financial resilience	Very high financial resilience
	1–1.75	1.76–2.50	2.51–3.25	3.26–4.00
Percentage of gig workers in each category (%)	7.74	52.65	36.73	2.88
Average score	2.39			

Table 8 presents the respondent's responses to the financial literacy questions. The results showed that more than 70% of the respondents answered "agree" or "strongly agree" on saving, borrowing, risks and returns, retirement, and compounding interest. This high agreement suggested that respondents possessed basic knowledge of these financial concepts, contributing to their ability to make informed financial decisions and effectively manage their finances.

Table 9 displays the responses of respondents who answered "agree" and "strongly agree" to financial concepts across their highest education levels. Notably, respondents with tertiary education levels exhibit the highest responses across various financial literacy concepts. This implies that as individuals advance in their education, there is an associated improvement in financial literacy.

Hence, the adoption of a range of strategies and initiatives aimed at enhancing financial literacy spearheaded by various organizations, including Bank Negara Malaysia, Agensi Kaunseling dan Pengurusan Kredit, and the Ministry of Education through both curriculum and non-curriculum programs since 2007 mirrors encouraging current findings regarding financial literacy levels among gig workers. Nevertheless, there is an opportunity for enhancement, particularly in promoting saving and retirement planning concepts. Budgeting remains a significant concern, guiding individuals to effectively manage their income within the gig economy while considering the associated risks. Fig. 3 shows average financial resilience scores across demographic characteristics. Even though the average score indicated low financial resilience, it showed that males were less resilient than female gig workers, with average scores of 2.38 and 2.41, respectively. Regarding age group, gig workers aged 45–54 scored the lowest (2.22) compared to other age groups. In contrast, those working full-time and in the art, design, and entertainment sectors were the least resilient groups.

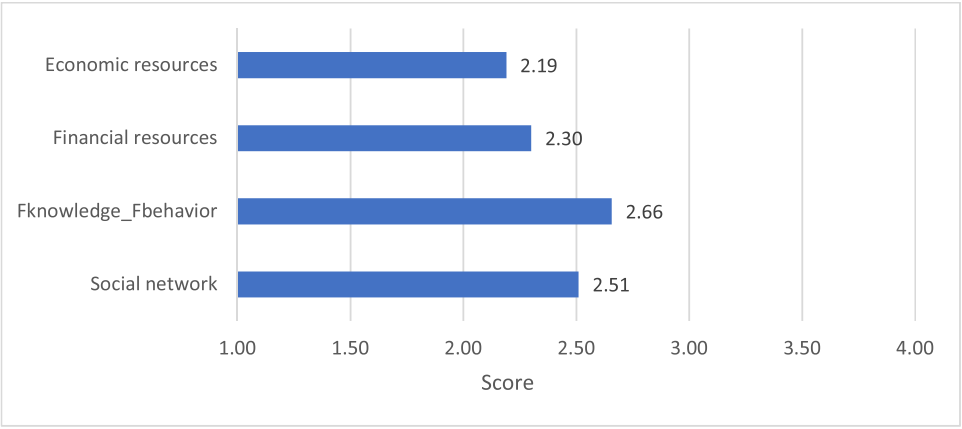


Fig. 1. Financial resilience component (Average score =2.39).
Note: Fknowledge and Fbehavior signify financial knowledge and financial behavior, respectively.

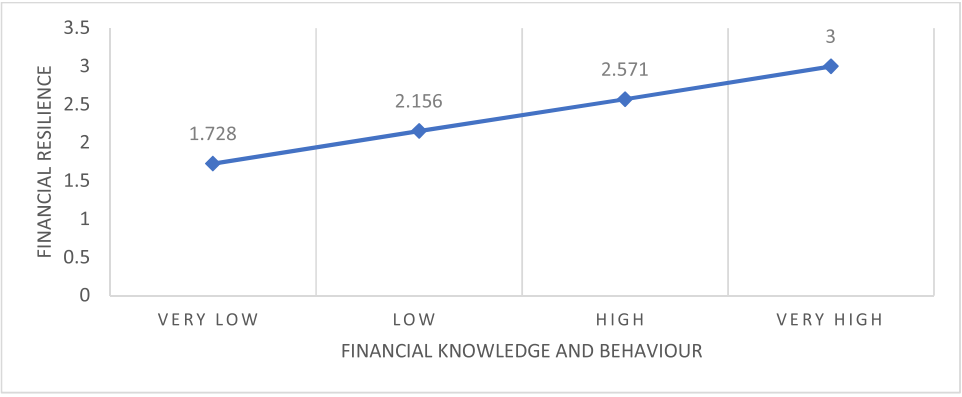


Fig. 2. Financial literacy and financial resilience.

Table 8
Financial literacy.

	Financial concept	Strongly disagree and disagree (1) Proportion of the sample (%)	Agree and strongly agree (3)	Differences (3)-(1)
I should have an emergency fund that covers two to six months of my expenses.	Saving	23.67	76.33	52.65
I know that if I make a late payment on my loan, it will be more difficult for me to apply for other loans.	Borrowing	12.83	87.17	74.34
I know that I can earn higher returns by saving in a fixed deposit account than in regular savings or current accounts.	Return	19.69	80.31	60.62
I know that when I use my home as collateral for a loan, I can lose my home.	Risk	21.68	78.32	56.64
I am responsible for providing the majority of funds needed for retirement.	Retirement	24.78	75.22	50.44
I know that the earlier I start saving for retirement, the more money I will have because the effects of compounding interest increase over time.	Compounding effects	13.05	86.95	73.89

This situation suggested that male gig workers aged between 45 and 54 struggled more when recovering from financial setbacks or changing circumstances. One interesting fact was that gig workers working full-time faced more significant challenges in maintaining financial stability and recovering from economic shocks. This result implied variations in gig workers' resilience levels based on demographic characteristics.

While descriptive statistics offer a snapshot of the data, an empirical analysis draws meaningful insights and enables data-driven decisions. This paper next proceeded with an empirical analysis of the determinants of financial resilience among gig workers. The results for the determinants of financial resilience from the ordered probit models and the Extended Regression Model (ERM) are

Table 9
Financial literacy across education levels (Agree and Strongly Agree).

Highest education level	Saving	Borrowing	Return	Risk	Retirement	Compounding effects
	Proportion of the sample (%)					
No formal education	2.21	1.77	2.21	2.43	1.55	2.21
Primary education	1.11	0.88	0.44	0.44	0.66	0.66
Secondary education	21.90	24.78	23.67	22.35	20.58	25.44
Technical/vocational certification	6.42	7.30	6.64	5.75	4.65	7.52
Tertiary education	44.47	52.21	47.35	47.12	47.57	50.88
Others	0.22	0.22	0.00	0.22	0.22	0.22
TOTAL	**76.33**	**87.17**	**80.31**	**78.32**	**75.22**	**86.95**

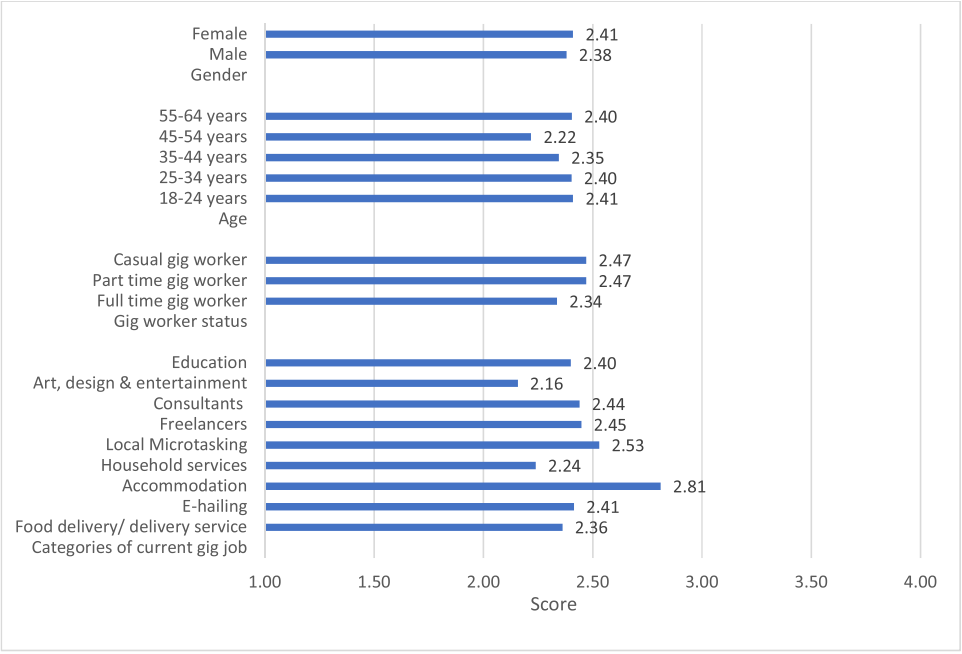


Fig. 3. Financial resilience scores across demographic characteristics.

presented in Table 10. Overall, the model for the ordered probit model was satisfactory, given that the log-likelihood value was −425.888 and the likelihood ratio of chi-square statistics was (prob > chi2 = 0.000). The ordered probit estimates also indicated that an income below RM 4849, an income above RM 15,039, age, and financial literacy were significant factors when evaluating financial resilience. Considering the possibility of endogeneity between financial resilience and income, as Behrman et al. (2012) indicated, the ERM result provides the coefficient estimates after controlling for the endogenous covariate, where it provides the coefficient estimates for the auxiliary endogenous covariate equation. This study found that the correlation coefficient of the residuals was −0.733 and was significant at the 0.01 level, indicating rejection of the null hypothesis of no endogenous covariate bias. In other words, income above RM 15,039 was an endogenous variable, and the unobservable factors affecting income above RM 15,039 reduced the financial resilience of the gig worker.

The regression coefficient of income below RM 4849, income above RM 15,039, and financial literacy was significant at the 0.01 level in the primary regression equation. Age was significant at the level of 0.05. The findings implied that income above RM 15,039 and financial literacy improved the probability of financial resilience and remained robust after accounting for endogeneity. Table 11 reports the marginal effect of the explanatory variables on the levels of financial resilience (very low financial resilience, low financial resilience, high financial resilience, and very high financial resilience). In particular, having an income below RM 4849 was indicated with a negative sign, contributing to low financial resilience. On the other hand, having an income above RM 15,039 contributed to being financially resilient, indicated by a positive sign. Thus, a higher income can provide gig workers with increased financial stability and flexibility. This result implied that gig workers with an income above RM 15,039 and good financial literacy were more likely to be financially resilient, allowing them to cover their living expenses more comfortably, build emergency savings, manage debts effectively, and have a greater capacity to handle unexpected financial challenges. A higher income cushions their financial position regarding savings and social security schemes when facing uncertainty or retirement.

In addition, age appeared to decrease gig workers' financial resilience. This situation could be due to accumulated wealth, career stage, or financial responsibilities. The marginal effect implied that the probability of maintaining that resilience level decreased with

Table 10
Ordered probit model estimation results: baseline analysis.

Variables	Ordered probit			Extended ordered probit regression (ERM) with correction for endogeneity bias		
	Coef.	Robust Std. error	z-value	Coef.	Robust Std. error	z-value
Panel A: Main Equation						
Income below RM 4849	−0.357***	0.123	−2.91	−0.342***	0.115	−2.97
Income above RM 15,039	1.080***	0.222	4.86	2.537***	0.338	6.53
Age	−0.012**	0.006	−1.98	−0.011**	0.005	−1.96
Number of people in a household	−0.025	0.025	−0.99	−0.025	0.023	−1.08
Gender: female	−0.051	0.116	−0.44	−0.053	0.109	−0.49
Education level: tertiary	0.090	0.118	0.76	−0.024	0.115	0.21
Financial literacy	0.344***	0.122	2.82	0.257***	0.121	2.12
Panel B: Income above RM 15,039						
Education level: tertiary				0.395**	0.206	1.92
Financial literacy				0.492*	0.242	1.97
Constant				−2.232	0.242	−9.20
Corr (e.Income above RM 15,039, e.Financial Resilience)				−0.733***	0.163	−4.49
Observations	452			452		
Log Likelihood	−425.888			−520.09		
p-value>*chi2*	0.000			0.000		
Wald chi2(17)	69			97.83		

Notes: Table 10 reports the ordered probit model and Extended Regression Model (ERM) with endogenous covariate, respectively. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variable: Financial resilience score.

Table 11
Marginal effect of explanatory variables on levels of financial resilience.

Variables	Marginal effect (δ_y/δ_x)			
	Very low financial resilience	Low financial resilience	High financial resilience	Very high financial resilience
Income below RM 4849	0.041***	0.098***	−0.119***	−0.018***
Income above RM 15,039	−0.065***	−0.338***	0.276***	0.127***
Age	0.001*	0.003*	−0.004*	−0.000
Number of people in household	0.003	0.006	−0.008	−0.001
Gender: female	0.006	0.013	−0.017	−0.002
Education level: tertiary	−0.011	−0.023	0.030	0.004
Financial literacy	−0.047***	−0.081***	0.115***	0.013**

Notes: Table 11 reports the marginal effect of the overall model. Dependent variable: Financial resilience score. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

each additional year of age. This finding suggested that younger gig workers may have certain advantages or characteristics contributing to their ability to maintain a higher level of financial resilience. This situation could be due to greater adaptability, higher energy levels, or a better grasp of emerging technologies and trends in the gig economy. On the other hand, as gig workers age, they may face additional challenges impacting their financial resilience. These challenges include changes in health, reduced job opportunities, or decreased ability to adapt to evolving market conditions.

Meanwhile, good financial literacy increases the probability of being financially resilient. Individuals or groups with higher levels of financial literacy were more likely to demonstrate better financial decision-making skills, preparedness, and the ability to overcome financial challenges effectively. This outcome suggested that gig workers with a strong understanding of financial concepts and skills were likelier to maintain a high level of resilience. Understanding and considering these factors can help assess an individual's or a group's level of financial resilience and identify potential areas for improvement or targeted interventions to enhance their financial well-being.

Although gig jobs offer flexibility, they also involve income volatility. Among the top reasons for taking gig jobs, 44.03% of the respondents said that they "want autonomy and control," 29.20% highlighted that it was "the only way to make an income," and 14.38% stated that it was "to make extra money on the side." The present study segregated the sample according to the top three motivations for getting involved in gig jobs to provide robust evidence and understand the factors explaining financial resilience. Based on the study's findings (Table 12), gig workers motivated by "autonomy and control" exhibited notable financial resilience. Approximately 38.46 per cent of these respondents were categorized as financially resilient, indicating their ability to effectively manage their finances and maintain stability in the face of financial challenges. Additionally, a smaller percentage of 1.54 per cent of these respondents were classified as financially very resilient, indicating an even higher level of financial well-being.

On the other hand, among the respondents who were motivated by "the only way to make an income" or "to make extra money on the side," significant proportions (33.67% and 40.91%, respectively were classified as financially resilient. This outcome suggested that gig workers who engaged in gig jobs primarily for income generation purposes, whether as their primary source of income or as additional earnings, displayed a noteworthy level of financial resilience. However, despite the presence of financially resilient gig workers, approximately half of the respondents found themselves in a financially vulnerable position. This result indicated that many

Table 12
Financial resilience across gig workers' motivation for gig jobs.

Reasons	"want autonomy and control"	"the only way to make an income"	"to make extra money on the side"
	Percentage of gig workers in each category (%)		
Very low financial resilience	7.69	9.55	3.79
Low financial resilience	52.31	54.27	50.76
High financial resilience	38.46	33.67	40.91
Very high financial resilience	1.54	2.51	4.55

gig workers face challenges managing their finances and may be more susceptible to financial instability or adversity.

The study's findings highlight the importance of understanding the motivations behind gig work and the corresponding impact on workers' financial resilience. It emphasizes the need for interventions, support systems, and policies to help enhance financial well-being and stability for gig workers, particularly those who may be more vulnerable to financial challenges.

For robustness, the present study estimated the determinants of financial resilience based on gig workers' motives for seeking gig jobs. Table 13 reveals the results for gig workers' motivations of "want autonomy and control", "the only way to make an income," and "to make extra money on the side," respectively. These results were consistent with the baseline analysis. In particular, gig workers' motivations, "wants autonomy and control," additional income above RM 15,039, higher education level, and sound financial literacy were more likely to be show financial resilience. Furthermore, the findings suggested that higher levels of education among gig workers motivated to make extra money on the side enhanced their financial resilience. Higher education often provides individuals with valuable skills, knowledge, and opportunities for better-paying gig work, leading to increased income and financial security, enabling them to manage their finances and build resilience effectively. One interesting finding showed that each additional person in a household and level of education increased gig workers' probability of being very financially resilient. This finding implied that gig workers and other household members were likelier to exhibit higher financial resilience. The presence of multiple income sources within a household may contribute to increased financial stability and the ability to withstand financial shocks.[6] The marginal effect also indicated that the probability of gig workers maintaining a financially resilient position decreased as individuals aged.

Furthermore, this study examines in detail financial resilience based on the category of gig work. The present study segregated the sample into six categories of the gig work sector to present their financial resilience, as depicted in Table 14. All gig job categories show a higher proportion of respondents in "very low" and "low" financial resilience, except for the "accommodation" and "local micro-tasking" sectors. Within the "accommodation" and "local micro-tasking" sectors, respondents demonstrate a higher proportion of "high" financial resilience compared to "low" financial resilience. In addition, the average score obtained from respondents from the "accommodation" sector is the highest across all sectors. This implies that respondents in these sectors can more effectively manage their finances and maintain financial stability compared to other sectors. Given that gig workers dominate the "food delivery" and "e-hailing" sectors in Malaysia, there is a pressing need for intervention to enhance financial stability among gig workers in these sectors.

We then attempt to model the factors that determine financial resilience across sectors with a focus on "food delivery/delivery services," which has a high proportion of gig workers in both our sample and in Malaysia, along with the "e-hailing" and "education" job categories.[7] Table 15 reports the marginal effect of the explanatory variables on the levels of financial resilience across gig job categories. In the "Food delivery/delivery service" category, the marginal effect also indicates that the probability of gig workers maintaining a financially resilient position decreases as individuals age, which is consistent with earlier findings. This suggests that older gig workers in this sector may face potential disadvantages in maintaining financial resilience, which can be attributed to physical demands, technological proficiency, and market dynamics. Meanwhile, the "e-hailing" and "education" job categories highlight the role of financial literacy in the financial resilience of gig workers, suggesting that those with sound financial literacy are more likely to experience financial resilience.

5. Conclusion and discussion

The rise of gig workers has reflected the changing economic landscape in the twenty-first century. This article has provided a better understanding of the financial resilience of Malaysian gig workers. Furthermore, it has offered insights into the factors determining gig workers' financial resilience. This study stands out as a ground-breaking research effort delving into the financial circumstances of Malaysian gig workers, thus proposing evidenced-based policy action. The results revealed that slightly more than half (52.4%) of gig

[6] However, this should be interpreted with caution, since this study didn't have information regarding household composition. The OECD-modified scale considers the composition of each household by assigning different weights to adults and children; however, the available data did not provide this composition. Despite this limitation, the present study tried to analyze and interpret the available data, focusing on other relevant financial indicators and strategies to gauge financial resilience.

[7] While modeling the determinant of financial resilience in the "accommodation" and "local micro-tasking" categories is interesting, we are unable to do so because of the absence of outcomes for all categories of financial resilience, as depicted in Table 14. For example, there is no respondent categorized under "very low" financial resilience for the "accommodation" category. The same holds for "freelancer work" and the "art, design, & entertainment" categories. Additionally, the marginal effect for the "household service" and "consultant" job categories could not be calculated, as only one respondent was categorized for "very high" and "very low" financial resilience.

Table 13
Marginal effect of explanatory variables on levels of financial resilience: motivation for gig jobs.

	Income below RM4,849	Income above RM15,039	Age	Number of people in a household	Gender: Female	Education level: tertiary	Financial literacy
"want autonomy and control"							
Very low financial resilience	0.047	−0.048*	−0.001	−0.014*	0.030	−0.070	−0.029
Low financial resilience	0.161*	−0.302***	−0.002	−0.040	0.073	−0.141*	−0.067
High financial resilience	−0.195*	0.305***	0.003	0.052*	−0.099	0.202***	0.092
Very high financial resilience	−0.012	0.045	0.000	0.002	−0.004	0.008	0.004
"the only way to make an income"							
Very low financial resilience	0.035	−0.070***	0.003***	0.002	0.023	−0.004	−0.051
Low financial resilience	0.054	−0.214	0.004***	0.003	0.028	−0.006	−0.057*
High financial resilience	−0.075	0.209*	−0.006***	−0.004	−0.045	0.009	0.095*
Very high financial resilience	−0.013	0.074	−0.001*	−0.001	−0.007	0.001	0.014
"to make extra money on the side"							
Very low financial resilience	0.031***	−0.025*	−0.000	0.003	−0.009	0.008	−0.021
Low financial resilience	0.253***	−0.395***	−0.002	0.028	−0.080	0.069	−0.131*
High financial resilience	−0.252***	0.308***	0.002	−0.029	0.081	−0.069	0.141
Very high financial resilience	−0.032	0.112*	0.000	−0.003	0.008	−0.007	0.012

Notes: Table 13 reports the marginal effect based on the motivation for gig jobs. Dependent variable: Financial resilience score. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14
Financial resilience across gig worker categories.

Category of gig job	Average financial resilience score	Very low financial resilience	Low financial resilience	High financial resilience	Very high financial resilience
		Percentage of gig workers in each category (%)			
Food delivery/delivery service	2.36	3.10	16.59	11.95	0.66
E-hailing	2.41	1.55	9.73	6.42	1.11
Accommodation	2.81	0.00	0.44	2.21	0.44
Household services	2.24	1.11	6.42	2.65	0.22
Local microtasking	2.53	0.00	0.22	0.44	0.00
Freelancer work	2.45	0.66	8.41	6.64	0.00
Consultants	2.44	0.22	1.55	1.33	0.22
Art, design, & entertainment	2.16	0.22	2.43	0.66	0.00
Education	2.40	0.88	6.86	4.42	0.22
TOTAL		7.74	52.65	36.73	2.88

workers were categorized as having low financial resilience, linking it to gig workers' ability to rebound from shocks or uncertain events, which indicated their limited ability to bounce back after adverse events and experiences, adapt to changing circumstances, and deal with environmental stress. In particular, gig workers had insufficient economic and financial resources and social networks, implying they were least likely to bounce back from adverse financial situations.

Turning to the economic resource component, it was notable that more than half of the respondents had debt and were uncomfortable with their ability to pay off their debts. Furthermore, the majority of the respondents revealed that they were unable to raise RM 2500 for medical expenses. This situation was primarily attributed to the high cost of living, which left no surplus income. The scenario above underlines the importance of social security policies and their ecosystem to support the capabilities of gig workers' resilience to cope with labor market dynamics and increase interest in the gig economy. When accessing financial products, such as credit and insurance coverage, at least 40 per cent encountered obstacles in obtaining such products, possibly because gig workers need proper documentation and have higher potential risk profiles due to the absence of permanent employment or steady monthly

Table 15
Marginal effect of explanatory variables levels of financial resilience: category of gig jobs.

	Income below RM4,849	Income above RM15,039	Age	Number of people in a household	Gender: Female	Education level: tertiary	Financial literacy
"Food delivery/delivery service"							
Very low financial resilience	0.050*	−0.046	0.005**	0.004	−0.011	0.014	−0.051
Low financial resilience	0.095	−0.103	0.007**	0.006	−0.017	0.021	−0.061
High financial resilience	−0.127	0.129	−0.011**	−0.010	0.249	−0.031	0.101
Very high financial resilience	−0.019	0.023	−0.001	−0.001	0.003	−0.004	0.011
"E-hailing"							
Very low financial resilience	−0.007	0.062	0.001	0.007	0.027	−0.025	−0.112
Low financial resilience	−0.014	0.068	0.001	0.013	0.042	−0.045	−0.131*
High financial resilience	0.015	−0.102	−0.001	−0.015	−0.052	0.052	0.187**
Very high financial resilience	0.005	−0.027	−0.000	−0.005	−0.017	0.018	0.056*
"Education"							
Very low financial resilience	0.041	−0.034	0.000	−0.008	−0.054	−0.002	−0.119
Low financial resilience	0.182	−0.225	0.001	−0.029	−0.109	−0.007	−0.189**
High financial resilience	−0.213	0.241	−0.002	0.035	0.159	0.008	0.300**
Very high financial resilience	−0.011	0.018	−0.000	0.001	0.004	0.000	0.009

Notes: Table 15 reports the marginal effect based on the category for gig jobs: Food delivery/delivery services. Dependent variable: Financial resilience score. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

income. In addition, gig workers' financial profiles revealed that most respondents did not have unemployment insurance (89.08%), private life insurance or takaful (71.18%), private health insurance or takaful (60.70%), family takaful (80.13%), investment-linked insurance (81.88%), or retirement savings (85.37%), which revealed low financial resilience.

On the other hand, more than half of the respondents had a basic knowledge of critical financial concepts. At the same time, more than 70 per cent of the respondents were hoping for community and government support, which underlined the need for government intervention in this early stage of the gig economy. Leveraging the flexibility of the gig economy, upgrading digital skills, and keeping up with e-commerce would raise the income level and raise the quality of life of gig workers. High financial literacy would translate into good financial behavior in their financial decisions and financial resilience. However, there is room for improvement, especially regarding financial and fundamental investment planning courses, which would prepare them for retirement and unforeseen shocks.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used ChatGPT in order to improve the language. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication**.**

CRediT authorship contribution statement

Siti Nurazira Mohd Daud: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Zaiton Osman:** Conceptualization, Data curation, Writing – review & editing. **Shamzaeffa Samsudin:** Formal analysis, Funding acquisition, Investigation, Project administration. **Ing Grace Phang:** Conceptualization, Data curation, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data availability statement

The datasets generated during the current study are available from the corresponding author on reasonable request.

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